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# CALCULATION OF SUSPENSION PEPTIZATION

~~H. F.~~ Sweeton
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CHEMICAL TECHNOLOGY DIVISION

Chemical Development Section A

and

CHEMISTRY DIVISION

# CALCULATION OF SUSPENSION PEPTIZATION

F. H. Sweeton

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ABSTRACT

Existing theories of flocculation, particle repulsion due to Gouy-Chapman double layers, and particle attraction resulting from London--Van der Waals forces have been combined to help understand the flocculation characteristics of $ThO_2$ suspensions. The potential energy due to the combined repulsion and attraction of two spherical particles has been calculated for temperatures between 25 and 300°C, particle radii between 50 and 3200 Å, electrolyte valences of 1 and 2, electrolyte concentrations between $10^{-5}$ and $10^{-3}$ M, and surface potentials corresponding to surface ionic energies of between 2 and 10 kT units. Flocculation rate calculations indicate that the surface potential required for a particular degree of stability is lowest at low temperatures, large particle radii, low electrolyte valence, low electrolyte concentration, and low suspension concentration.

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## SYMBOLS USED

(Numbers indicate pages where symbols are used)

| | |
|---|---|
| $A$ | Constant for London type of Van der Waals attraction (p. 22) |
| $a$ | Radius of spherical particles (p. 10) |
| $c_o$ | Concentration of suspension at temperature $T_o$ in weight per unit volume (p. 12) |
| $D$ | Diffusion constant (p. 9) |
| $d$ | Half distance between two parallel plates (p. 16) |
| $d_o$ | Density of suspended solid at temperature $T_o$ (p. 12) |
| $e$ | Charge of an electron (p. 13) |
| $G$ | Free energy of double layer per unit area of solid-liquid interface for two parallel plates (p. 17) |
| $G(0)$ | $G$ when surface charge is zero (p. 18) |
| $G_\infty$ | $G$ with infinite distance between the parallel plates (p. 18) |
| $H$ | Separation of equal parallel ring elements on two spheres (p. 20) |
| $H_o$ | Distance between the nearest surfaces of two spheres (p. 20) |
| $H_N$ | Separation between particles (surface to surface) in a suspension if the particles assume a close-packed type of orientation without change in average concentration (p. 10) |
| $h$ | Radius of a ring element on a sphere (p. 20) |
| $J$ | Stationary diffusion current of particles (p. 9) |
| $k$ | Boltzmann constant (p. 9) |
| $M$ | Moles per liter (p. 27) |
| $n$ | Electrolyte concentration, molecules per unit volume (p. 13) |
| $n_o$ | $n$ when temperature is $T_o$ (p. 14) |
| $n_i$ | Concentration of ion i, number per unit volume (p. 15) |
| $n_{io}$ | $n_i$ far from surface (p. 15) |

SYMBOLS (continued)

| | |
|---|---|
| $n_+$ | $n_{io}$ when i is positive ion (p. 16) |
| $n_-$ | $n_{io}$ when i is negative ion (p. 16) |
| R | Distance between spheres (center to center)(p. 22) |
| r | Distance to center of reference particle (p. 9) |
| s | $\chi/a$ (p. 11) |
| T | Temperature (p. 9) |
| $T_o$ | Reference temperature (p. 19) |
| $t_f$ | Hypothetical time for complete flocculation to pairs if rate for whole process were the initial rate (p. 12) |
| U | $\frac{ze\psi_d}{kT}$ (p. 17) |
| V | Total potential energy of interaction of two spherical particles (p. 9) |
| $V_A$ | Attractive energy of two spherical particles (p. 22) |
| V(H) | Potential energy of interaction per unit cross-section of two plates separated by distance H (p. 20) |
| $V_R$ | Repulsive energy per unit cross-section of two parallel plates (p. 18); repulsive energy of two spherical particles (p. 20) |
| $V_M$ | Maximum potential energy of interaction between spherical particles (p. 13) |
| $V_N$ | V for $H_o = H_N$ (p. 10) |
| $V(\chi)$ | V for $H_o = \chi$(p. 10) |
| Y | $ze\psi/kT$ (p. 17) |
| Z | $ze\psi_o/kT$ (p. 17) |
| $Z_C$ | The value of Z that results in a particular flocculation rate for particular values of the other parameters (p. 31) |
| z | Valence of the counterions (p. 13) |
| $z_i$ | z for ith ion (p. 15) |
| $z_+$ | z for the positive ion (p. 16) |
| $z_-$ | z for the negative ion (not including sign)(p. 16) |

SYMBOLS (continued)

| | |
|---|---|
| $\Delta$ | La Place operator, $\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2}$ (p. 15) |
| $\epsilon$ | Dielectric constant (p. 13) |
| $\epsilon_o$ | $\epsilon$ when temperature is $T_o$ (p. 19) |
| $\eta$ | Viscosity of liquid medium (p. 11) |
| $\kappa$ | $\sqrt{8\pi e^2 z^2 n/\epsilon kT}$ (p. 13) |
| $\lambda$ | Fraction of final charge (applied to a charging process) (p. 18) |
| $\nu$ | Concentration of single particles in number per unit volume (p. 9) |
| $\nu'_A$ | $\nu$ averaged over large volume (p. 11) |
| $\nu_N$ | Average $\nu$ at distance $H_N$ from reference particle (p. 10) |
| $\xi$ | $\kappa\chi$ (p. 17) |
| $\rho$ | Friction constant (p. 9); density of water (p. 12); charge density (volume) (p. 15) |
| $\rho_o$ | Density of water at temperature $T_o$ (p. 12) |
| $\rho'$ | Charge density during charging process (p. 18) |
| $\chi$ | Distance from charged surface (p. 16); distance between two spherical particles (center to center) (p. 10) |
| $\psi$ | Electrical potential relative to infinite distance from surface (p. 15) |
| $\psi_o$ | $\psi$ at charged surface (p. 16) |
| $\psi_d$ | $\psi$ half way between two charged plates (p. 16) |
| $\psi'$ | $\psi$ during charging process (p. 18) |

## 1.0 SUMMARY

In order to help understand the flocculation characteristics of $ThO_2$ suspensions, existing theories of flocculation in a field of force, repulsion between particles due to Gouy-Chapman double layers, and attraction between particles due to London--Van der Waals forces are combined to give a method of calculating the surface potential required to give a desired stability to a particular suspension. The combined effects of the repulsion and attraction of two spherical particles as a function of the distance between the particles are calculated for all permutations of the following parameter values: temperatures of 25, 90, 150, 200, 250, and 300°C; particle radii of 50, 100, 200, 400, 800, 1600, and 3200 Å; electrolyte valences of 1 and 2; electrolyte concentrations of $1x10^{-5}$, $3x10^{-5}$, $10x10^{-5}$, $30x10^{-5}$, and $100x10^{-5}$ M; and surface potentials corresponding to surface ionic energies of 2, 3, 4, 5, 6, 8, and 10 kT units (where k is the Boltzmann constant). Some of the nearly 3000 potential energy functions determined in this way are combined with flocculation theory to calculate the surface potential required to give a particular initial flocculation rate for particular values of temperature, particle radius, electrolyte valence, electrolyte concentration, and suspension concentration.

If these calculated cases are examined to see how the surface potential must change when only one parameter is varied, it is seen that the surface potential (1) increases rapidly with increasing temperature; (2) decreases rapidly as the particle radius increases (particularly at small radii); (3) does not change much as the electrolyte valence increases, provided the electrolyte concentration is low, but increases rapidly if the electrolyte concentration is high; (4) does not change much as the electrolyte concentration increases, provided the electrolyte valence is 1, but increases rapidly if the valence is 2; (5) increases only moderately as the suspension concentration increases; and (6) increases only slightly for an appreciable decrease in flocculation rate.

Other cases can be determined by the methods outlined, using the potential energy functions that have been calculated.

Errors introduced in the mathematical development are discussed.

It is necessary to determine by experiment the value of the surface potential under the conditions of interest in order to apply the calculations to real $ThO_2$ suspensions.

## 2.0 INTRODUCTION

The purpose of this report is to use existing theory to calculate how various parameters may be expected to affect the effective repulsion between suspended charged particles in sols and slurries. Such information, when combined with experimentally determined surface potential, offers a chance to predict the degree of stability of sols and slurries under a variety of conditions. Although such predictions are not expected to be very accurate because of the varied assumptions that must be introduced to solve the mathe-

matical relations, it is expected that such calculations should help in interpolating data, and thus decrease the number of experiments necessary to define the peptization state of varied sol and slurry suspensions.

These calculations are needed for application to $ThO_2$ suspensions now being studied for use as thorium-bearing fluids in the homogeneous reactor program. One of the most important aspects of such suspensions is how the individual particles interact with each other, since this interaction can be expected to affect strongly the settling rate, the settled bed density, the viscosity, and the tendency to form cakes. Suspension peptization, calculated on the basis of particle interaction, should be very useful in planning experimental work on $ThO_2$ suspensions and in evaluating the results.

In this report particle interaction is evaluated in terms of the tendency of particles to diffuse toward their neighboring particles. In calculating the diffusion rate, account is taken of the energy of interaction of the particles approaching each other. The interaction is considered to result from repulsive forces arising from the electrical charge on the solid surface and from attractive forces of the Van der Waals type.

The treatment is limited to spherical particles, to suspensions that are only slightly flocculated (although they may be flocculating at a high rate), and to only electrostatic type of repulsion between particles. It does not consider any repeptization process or any settling effects. The calculations of this report follow closely the methods discussed by Verwey and Overbeek (1948), who developed an essential part of the methods. It has been convenient to refer frequently to Overbeek's later discussion (1952) of this same material.

The extensive calculations necessary to obtain the potential energy values listed in Table A1 were made by Miss D. J. Wehe of the ORNL Mathematics Panel using the Panel's high-speed electronic calculator known as the Oracle.

Mr. Benny A. Soldano has contributed valuable constructive criticism.

## 3.0 FLOCCULATION THEORY FOR PEPTIZED SUSPENSIONS

### 3.1 Flocculation in a Field of Force

A convenient method of comparing the stability of various suspensions involves the use of flocculation theory in combination with the calculated energy of interaction of two adjacent particles as they approach each other. In the following discussion only the initial flocculation process is considered. This simplifies the mathematics and is no more arbitrary than considering some later stage in the flocculation process.

The basic equation for the rate of flocculation was originally developed by Fuchs (1934) for application to smoke and mists. His general approach to flocculation in a field of force was to consider the rate at which particles in a suspension diffuse to a particular particle. This rate of flocculation, or, more accurately, the probability of flocculation per unit time, is controlled by both the concentration gradient and the potential energy function describing the interaction of two flocculating particles as they move toward each other. By proper mathematical development it can be shown how the overall flocculation rate at the start is a function of the temperature, particle size, and suspension concentration and a particular function of the interaction of the particles. The actual interaction is discussed in Section 3.2.

Consider one stationary particle and the diffusion current of other particles by Brownian motion toward this particle in a field of force such that energy is absorbed as the particles approach each other. The average current to each of a large number of such reference particles is (Overbeek, p. 284, eq. 31):

$$J = 4\pi r^2 \left( D \frac{\partial \nu}{\partial r} + \frac{\nu}{\rho} \frac{dV}{dr} \right) \tag{1}$$

where $J$ = stationary diffusion current toward the reference particle in number per unit time

$r$ = distance from center of reference particle to the point of interest

$D$ = diffusion constant

$\nu$ = concentration of single particles in number per unit volume

$\rho$ = a frictional constant

$V$ = potential energy of particle interaction

It is assumed that enough time has elapsed to establish a constant flow of particles across the potential energy barrier but that not enough time has elapsed for the formation of an appreciable number of flocculated pairs of particles.

This equation can be rewritten to apply to a reference particle that is itself in Brownian motion. This requires doubling the effective diffusion constant and halving the frictional constant. At the same time $\rho$ can be eliminated by means of Einstein's deduction (Overbeek, p. 284, eq. 33):

$$\frac{1}{\rho} = \frac{D}{kT} \tag{2}$$

where $k$ = the Boltzmann constant and $T$ = temperature. The equation modified

for a free-moving reference particle is thus (Overbeek, p. 284, eq. 34):

$$J = 8\pi r^2 \left( D \frac{\partial \nu}{\partial r} + \frac{\nu D}{kT} \frac{dV}{dr} \right) \tag{3}$$

Some discussion of suspensions is necessary before integrating this equation. If concentrated suspensions are considered, allowance must be made for particles being so close together that each is constantly being repelled by its neighbors. Under these conditions the particles can be expected to be forced toward taking an ordered arrangement that minimizes the repulsion between neighboring particles. Such a structure can be visualized as having each particle at the center of a hypothetical uniform sphere (the diameter of which is controlled by the overall particle concentration), and having these spheres in a face-centered cubic arrangement. Such a "close-packed" orientation gives a maximum number of nearest neighbors, and thus results in a maximum distance between neighboring particles for any particular overall particle concentration.

If limits are set to conform to this picture of the structure of concentrated suspensions, integration of eq. 3 gives

$$\nu = \nu_N \exp\left(-\frac{V-V_N}{kT}\right) + \frac{J \exp\left(-\frac{V-V_N}{kT}\right)}{8\pi D} \int_{2a+H_N}^{2a+H_o} \frac{\exp\left(\frac{V(\chi)-V_N}{kT}\right)}{\chi^2} \, d\chi \tag{4}$$

where $a$ = radius of the particles

$H_N$ = separation of neighboring particles (surface to surface) when in the "close-packed" orientation

$\nu_N$ = average concentration of particles at distance $H_N$ from any reference particle

$V_N$ = potential energy of interaction of two particles that are separated by the distance $H_N$

$H_o$ = separation between particles (surface to surface)

$\chi$ = distance between particles (center to center)

$V(\chi)$ = potential energy of interaction of two particles that are separated by distance $\chi$

For eq. 5 to be compatible with the boundary condition that

$$\nu = 0 \qquad \text{when } H_o = 0,$$

it can be shown that

$$J = \frac{8\pi D \nu_N}{\int_{2a}^{2a+H_N} \frac{\exp \frac{V(\chi)-V_N}{kT}}{\chi^2} d\chi} \tag{5}$$

or

$$J = \frac{8\pi D \nu_N a}{\int_{2}^{2+H_N/a} \frac{\exp \frac{V-V_N}{kT}}{s^2} ds} \tag{6}$$

where $s = \chi/a$. Equation 6 is of direct use in determining flocculation rates, since it can be used to eliminate J in the expression for the rate of change in concentration as a result of the flocculation process,

$$-\frac{d\nu_A}{dt} = 2\nu_A J \tag{7}$$

where $\nu_A$ = average concentration of single particles. The substitution gives

$$-\frac{d \ln \nu_A}{dt} = \frac{16\pi D \nu_N a}{\int_{2}^{2a+H_N/a} \frac{\exp \frac{V-V_N}{kT}}{s^2} ds} \tag{8}$$

It is convenient to change several of the quantities in eq. 8. The quantity D can be replaced by a relation derived by Einstein (Kruyt, p. 19, eq. 13),

$$D = \frac{kt}{6\pi\eta a} \tag{9}$$

where $\eta$ = viscosity of the liquid medium. However, applying eq. 9 to the present case, where the particles are charged, may introduce an appreciable error. The ionic atmosphere around such particles can significantly decrease their effective diameters as far as diffusion is concerned because the particles tend to be pulled around by the ions in the atmosphere, these ions being more mobile because of their small mass (Kruyt, p. 19). The

error in using the actual particle diameter is in the direction of giving a low flocculation rate. The quantity $\nu_N$ can be approximated by assuming it to be equal to the average concentration, $\nu_A$, although actually it will be larger unless $\nu_A$ is very small. If the suspended material is assumed to have the same expansion coefficient as the water medium, $\nu_A$ can be expressed simply by

$$\nu_A = \frac{3}{4\pi a^3} \frac{c_o}{d_o} \frac{\rho}{\rho_o} \tag{10}$$

where $c_o$ = weight of solid per unit volume of suspension at temperature $T_o$

$d_o$ = density of solid at temperature $T_o$

$\rho$ = density of water at temperature $T$

$\rho_o$ = density of water at temperature $T_o$

The rate of flocculation can be expressed as a time unit by

$$-\frac{d \ln \nu_A}{dt} = \frac{1}{t_f} \tag{11}$$

where $t_f$ = hypothetical time for complete flocculation (into pairs) if the initial rate were constant until completion of the process.

The last three equations and the assumption about $\nu_N$ allow eq. 8 to be written in the form

$$\frac{1}{t_f} = \frac{2kc_o\rho T}{\pi d_o \rho_o \eta a^3} \frac{1}{\int_2^{2+H_N/a} \frac{\exp\left(\frac{V-V_N}{kT}\right)}{s^2} ds} \tag{12}$$

This equation can be rewritten in the following form, which is convenient for calculations:

$$\log \int_2^{2+H_N/a} \frac{\exp\left(\frac{V-V_N}{kT}\right)}{s^2} ds = \log \frac{T\rho}{\eta} + \log \frac{2k}{\pi d_o \rho_o} - 3 \log a + \log c_o + \log t_f \tag{13}$$

Overbeek gives an approximation that eliminates the need for the graphical integration indicated in eq. 13 and thus simplifies flocculation calculations. This approximation, after modification for use with concentrated suspensions, is (Overbeek, p. 285, eq. 37)

$$\int_{2}^{2+H_N/a} \frac{\exp\left(\frac{V-V_N}{kT}\right)}{s^2}\, ds = \sim \frac{1}{4\kappa a} \exp \frac{V_M-V_N}{kT} \tag{14}$$

where $V_M$ = the maximum on the potential energy curve

$$\kappa = \sqrt{\frac{8\pi e^2 z^2 n}{\epsilon kT}}$$

$e$ = charge of an electron

$z$ = valence of the counterion in the solution phase

$n$ = electrolyte concentration in molecules per unit volume

$\epsilon$ = dielectric constant

The approximation given in eq. 14 is easier to understand when the term on the right is written in the form

$$\int_{2}^{2+1/\kappa a} \frac{\exp \frac{V_M-V_N}{kT}}{(2)^2}\, ds$$

It can now be seen that the approximation is equivalent to assuming that (1) the exponential term is held at its maximum value throughout the integration, (2) the upper integration limit now corresponds to a particle separation of $1/\kappa$ (this is the effective thickness of the mobile layer, which will be discussed in Sec. 3.2), and (3) the initial value of the s in the denominator is used throughout the integration.

The defined value of $\kappa$ can be combined with eqs. 12 and 14 to give the general equation

$$\exp\left(\frac{V_M-V_N}{kT}\right) = \sim \frac{16 \cdot 2^{1/2}\, k^{1/2}\, c_o \rho T^{1/2} e\, zn^{1/2} t_f}{\pi^{1/2}\, d_o \rho_o \eta a^2\, \epsilon^{1/2}} \tag{15}$$

While this equation is perfectly usable, a substitution which makes the concentration parameter independent of temperature is convenient:

$$n = n_o \frac{\rho}{\rho_o} \tag{16}$$

where $n_o$ = concentration of the electrolyte when the temperature is $T_o$

$T_o$ = any arbitrarily chosen reference temperature

$\rho$ = density of water at temperature T

$\rho_o$ = density of water at temperature $T_o$

Substitution into eq. 15 gives

$$\exp \frac{V_M - V_N}{kT} = \sim \frac{16 \cdot 2^{1/2} k^{1/2} e}{\pi^{1/2} d_o \rho_o^{3/2}} \frac{c_o}{a^2} t_f z n_o^{1/2} \frac{T^{1/2} \rho^{3/2}}{\epsilon^{1/2} \eta} \tag{17}$$

or

$$\frac{V_M - V_N}{kT} = \sim \ln \frac{T^{1/2} \rho^{3/2}}{\epsilon^{1/2} \eta} + \ln \frac{16 \cdot 2^{1/2} k^{1/2} e}{\pi^{1/2} d_o \rho_o^{3/2}} - 2 \ln a + \ln z + 1/2 \ln n_o + \ln c_o + \ln t_f \tag{18}$$

This equation makes possible the calculation of the degree of peptization in terms of the value of $(V_M - V_N)/kT$ that corresponds to a particular hypothetical flocculation period, $t_f$, and to a particular combination of temperature, particle radius, valence of counterions, electrolyte concentration, and suspension concentration.

## 3.2 Potential Energy Functions

When two charged particles approach each other, energy tends to be absorbed due to the electrostatic repulsion and to be released due to the London--Van der Waals attraction. The combination of these two effects gives the potential energy functions to be considered here. Any other possible energy contributions, such as short-distance Born repulsion, will be neglected.

Repulsive Potential Energy. Verwey and Overbeek (1948) succeeded in applying the Gouy-Chapman theory of the diffuse double layer to two charged parallel plates separated by an electrolytic solution. They used the results to solve for the repulsive energy between two charged spheres. Their

generalized results, which are discussed below, can be applied to particular situations defined by particle radius, surface potential, ionic concentration, valence of the counterion, and temperature. The following development of the repulsive potential energy follows closely that later given by Overbeek (1952).

The Gouy-Chapman concept of the diffuse double layer can be established by applying three equations to the physical system of a charged surface in contact with an ion-containing solution. The charged surface tends to attract ions of opposite sign and repel ions of the same sign. The first equation, Poisson's, relates the electrical potential to the distribution of mobile charge (Overbeek, p. 128, eq. 37).

$$\Delta \psi = -\frac{4\pi\rho}{\epsilon} \tag{19}$$

where $\Delta$ = the LaPlace operator, $\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2}$

$\psi$ = electrical potential at any point relative to that in the solution far from the solid interface

$\rho$ = charge density in amount per unit volume

$\epsilon$ = dielectric constant

The use of this equation is simplified by assuming that (1) the charge density is uniform over the surface, (2) the charges in solution exist as points, and (3) the solvent is a continuous medium that influences the double layer only through its dielectric constant.

The second equation relates the ion concentration at any point to the electrical potential at the same point (Overbeek, p. 128, eq. 38):

$$n_i = n_{io} \exp\left(-\frac{z_i e \psi}{kT}\right) \tag{20}$$

where $n_i$ = concentration of ith ion (number per unit volume)

$n_{io}$ = concentration of ith ion far from the surface

$z_i$ = valence (including sign) of the ith ion

$e$ = charge of the electron

$k$ = Boltzmann constant

$T$ = temperature

It is assumed that the ions are arranged in the potential field according to the Boltzmann distribution.

The third equation expresses the charge density within the mobile layer in terms of ion concentration (Overbeek, p. 128, eq. 39):

$$\rho = \sum z_i e n_i \tag{21}$$

These three equations can be combined to give the following differential equation for the simplified case when the charged surface is a plane, all cations have one valence, and all anions have one valence (Overbeek, p. 248, eq. 6):

$$\Delta \psi = \frac{d^2\psi}{d\chi^2} = \frac{4\pi e}{\epsilon}\left(n_- z_- \exp \frac{z_- e\psi}{kT} - n_+ z_+ \exp - \frac{z_+ e\psi}{kT}\right) \tag{22}$$

where $n_-$ = number of negative ions per unit volume far from the surface

$n_+$ = number of positive ions per unit volume far from the surface

$z_-$ = valence of the negative ion (not including sign)

$z_+$ = valence of the positive ion

$\chi$ = distance from the charged surface to point of interest

Verwey and Overbeek integrated this equation for the situation where two parallel flat plates face each other in a solution. The first integration is made for the boundary conditions

$$\begin{aligned} \psi &= \psi_o \text{ when } \chi = 0 \\ \psi &= \psi_d \text{ when } \chi = d \\ \frac{d\psi}{d\chi} &= 0 \text{ when } \chi = d \end{aligned} \tag{23}$$

where 2d = distance between the two plates. The integrated equation is (Overbeek, p. 249, eq. 8)

$$\frac{d\psi}{d\chi} = -\sqrt{\frac{8\pi kT}{\epsilon}}\sqrt{n_- \exp \frac{z_- e\psi}{kT} + n_+ \exp - \frac{z_+ e\psi}{kT} - n_- \exp \frac{z_- e\psi_d}{kT} - n_+ \exp - \frac{z_+ e\psi_d}{kT}} \tag{24}$$

In the case of symmetrical electrolytes, where $z \equiv z_- = z_+$ and $n \equiv n_- = n_+$, eq. 24 can be written in the simplified form (Overbeek, p. 249, eq. 8')

$$\frac{d\psi}{d\chi} = -\sqrt{\frac{8\pi kTn}{\epsilon}} \sqrt{2 \cosh \frac{ze\psi}{kT} - 2 \cosh \frac{ze\psi_d}{kT}} \tag{25}$$

It is now convenient to make the following substitutions:

$$\begin{aligned} Y &\equiv \frac{ze\psi}{kT} \\ Z &\equiv \frac{ze\psi_o}{kT} \\ U &\equiv \frac{ze\psi_d}{kT} \\ \kappa^2 &\equiv \frac{8\pi ne^2z^2}{\epsilon kT} \\ \xi &\equiv \kappa\chi \end{aligned} \tag{26}$$

Equation 25 can then be rewritten (Overbeek, p. 250, eq. 11)

$$\frac{dY}{d\xi} = -\sqrt{2 \cosh Y - 2 \cosh U} \tag{27}$$

and integration from Y = Z to Y = U gives (Overbeek, p. 250, eq. 12)

$$\kappa d = 2 \exp\left(-\frac{U}{2}\right) \left[F\left(\exp(-U), \frac{\pi}{2}\right) - F\left(\exp(-U), \arcsin \exp - \frac{Z-U}{2}\right)\right] \tag{28}$$

where $F(k,\phi) = \int_0^{\phi} \frac{d\alpha}{\sqrt{1 - k^2\sin^2\alpha}}$ . Verwey and Overbeek (1948)

solved this equation for a variety of values of Z and U.

The next step is the calculation of the free energy associated with the double layer between the two plates. For this Verwey and Overbeek used a charging process similar to that of the Debye-Hückel theory (Overbeek, p. 246, eq. 2):

$$G = G(0) + \int_0^1 \frac{d\lambda}{\lambda} \int \rho' \psi' \, dV \tag{29}$$

where G = free energy of the double layer per unit area on each of the two parallel plates

$G(0)$ = G when the surface charge is zero

$\lambda$ = fraction of full charge

$\rho'$ = charge density for a particular value of $\lambda$

$\psi'$ = electrical potential during the charging process

dV = an element of volume

The surface potential, $\psi_o$, is constant throughout this charging process, and $\psi' = 0$ far from the surface. They point out that, in this case, where only flat parallel double layers are being considered, G(0) is zero. They integrated this expression for free energy using eqs. 19, 22, and 27. The resulting equation is (Overbeek, p. 253, eq. 15)

$$G = -\frac{2nkT}{\kappa}\left\{\frac{\kappa d}{2}\left[3 \exp U - 2 - \exp(-U)\right] + 2\sqrt{2\cosh Z - 2\cosh U} - 4 \exp U/2 \left[E\left(\exp(-U), \frac{\pi}{2}\right) - E\left(\exp(-U), \arcsin \exp - \frac{Z-U}{2}\right)\right]\right\} \tag{30}$$

where $E(k,\phi) = \int_0^{\phi} \sqrt{1 - k^2 \sin^2\alpha}\, d\alpha$. Eliminating n by substituting in the defined value of $\kappa$ changes eq. 30 to

$$G = \frac{\kappa}{z^2}\left(\epsilon T^2\right)\left(-\frac{k^2}{4\pi e^2}\right) f_1(U,Z) \tag{31}$$

where $f_1(U,Z)$ = expression in braces in eq. 30. This is possible since the $\kappa d$ term inside the braces is itself a function of U and Z, as shown by eq. 28.

The repulsive energy of two such plates can be expressed as (Overbeek, p. 253, eq. 17)

$$V_R = 2(G - G_\infty) \tag{32}$$

where $V_R$ = repulsive energy per unit cross-section through both plates and $G_\infty$ = G when $d = \infty$. Combination of eqs. 31 and 32 gives

$$V_R = \frac{\kappa}{z^2}\frac{\epsilon T^2}{\epsilon_o T_o^2}\left\{\epsilon_o T_o^2\left(-\frac{k^2}{2\pi e^2}\right)\left[f_1(U,Z) - f_1(Z)_{U=0}\right]\right\} \tag{33}$$

where $f_1(Z)_{U=0} = f_1(U,Z)$ when $U = 0$

$T_o$ = arbitrarily chosen reference temperature

$\epsilon_o = \epsilon$ at temperature $T_o$

This equation can be rewritten

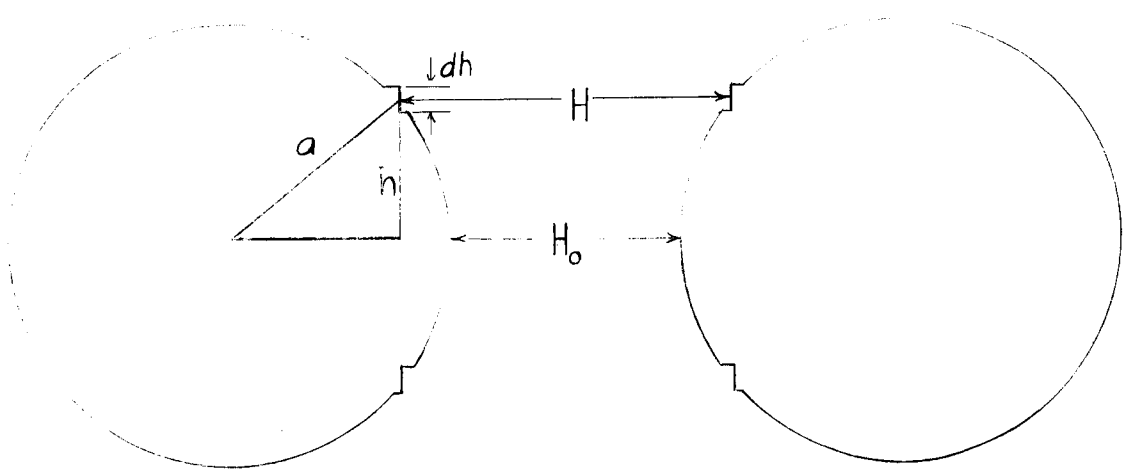
$$V_R = \frac{\kappa}{z^2} \frac{\epsilon T^2}{\epsilon_o T_o^2} f(U,Z) \tag{34}$$

Verwey and Overbeek (p. 82, or Overbeek, p. 254) determined f(U,Z) for a variety of values of Z and U at a reference temperature of 298.1°K. This makes it possible to determine $V_R$, the repulsive energy per unit cross-section of two parallel plates, for any desired values of $\kappa$, z, and T and for many values of Z and U.

In principle these energy calculations for parallel flat plates can be applied to particles that have flat sides, if one is willing to assume a simple orientation of two flocculating particles, but flocculation calculations for such nonspherical particles would be very difficult. Adaption of the theory to spherical particles thus has certain advantages even though the conversion cannot be done precisely.

Derjaguin (and later Verwey and Overbeek) developed a method (see Overbeek, pp. 257-258 and Verwey and Overbeek, pp. 137-142) for making this transformation from flat plates to spheres. The general approach is to divide the surface of each sphere into a large number of rings, each parallel to a similar ring on the other sphere. Then the total repulsive energy is taken as the sum of the energies associated with all such pairs of rings, calculated by means of the above theory for parallel flat plates.

The following sketch defines the terms used in making the transformation:



The process can be summarized by

$$V_R = \int_0^a 2\pi h \; V(H)dh \tag{35}$$

where $V_R$ is now the repulsive energy between two spheres

$h$ = radius of a ring element

$V(H)$ = repulsive energy per unit cross-section through two parallel flat plates separated by distance H

$a$ = radius of the two spheres

The accuracy of this transformation is best for those elements for which h is small. Thus the method works best when the energy associated with the outer rings is small compared to that with the inner, closer rings. This condition is achieved when $\kappa a$ is much greater than 1.

In order to solve eq. 35 it is convenient to find a way to express h in terms of H. Examination of the above sketch shows

$$\frac{H - H_o}{2} = a - \sqrt{a^2 - h^2} \tag{36}$$

where $H$ = the distance between the ring elements being considered

$H_o$ = the distance between the two spheres, surface to surface

$a$ = radius of the spheres

Differentiation of this equation gives

$$\frac{dH}{2} = \frac{2h \; dh}{2(a^2 - h^2)^{1/2}} \tag{37}$$

or

$$2h \; dh = a \; dH \left(1 - \frac{h^2}{a^2}\right)^{1/2} \tag{38}$$

If this is substituted into eq. 35, and if $(1 - h^2/a^2)^{1/2}$ is assumed to

be 1, the resulting equation is

$$V_R = \pi a \int_{H_o}^{\infty} V(H)\, dH \tag{39}$$

Letting the integration go to infinity is a convenience and does not contribute a large error in the normal case where V(H) decreases rapidly as H increases. Values of V(H) can be obtained from eq. 34 for use in the graphical solutions of eq. 39. The resulting solutions can be indicated by

$$V_R = \frac{\epsilon T^2}{\epsilon_o T_o^2} \frac{a}{z^2} L(Z, \chi H_o) \tag{40}$$

where $L(Z, \chi H_o)$ = a function of Z and $\chi H_o$. Verwey and Overbeek determined (p. 141, or Overbeek, p. 258) the function L for a variety of values of Z and $\chi H_o$ at 298.1°K, which permits obtaining $V_R$ by simply substituting the appropriate values into the above equation. In this case $T_o$ = 298.1°K and $\epsilon_o$ = 78.55.

This equation can be rewritten in the following form, which is convenient for use in the calculations to be discussed later:

$$\frac{V_R}{kT} = \frac{10^{-7}}{k\, \epsilon_{298.1} (298.1)^2} \epsilon T \frac{a}{z^2} L(Z, \chi H_o)\, 10^7 \tag{41}$$

While this equation permits calculating $V_R/kT$ as a function of T, a, z, Z, and $\chi H_o$, we are also interested in determining the value of $H_o$, which can be done from

$$H_o = \frac{(\chi H_o)}{\chi} .$$

Substituting the value of $\chi$ given in eq. 26 results in

$$H_o = \frac{(\chi H_o)}{zn^{1/2}} \epsilon^{1/2} T^{1/2} \frac{k^{1/2}}{8^{1/2} \pi^{1/2} e} \tag{43}$$

But it is convenient to use a concentration function independent of temperature. This can be done by substituting

$$n = n_o \cdot \rho / \rho_o \tag{44}$$

where $n_o$ = the electrolyte concentration at the reference temperature of 298.1°K (counterions per unit volume)

$\rho_o$ = density of the solution phase at 298.1°K

$\rho$ = density of the solution at temperature T

After this substitution eq. 43 becomes

$$H_o = \frac{(\kappa H_o)}{z n_o^{1/2}} \cdot \frac{\epsilon^{1/2} T^{1/2}}{\rho^{1/2}} \cdot \frac{k^{1/2} \rho_o^{1/2}}{8^{1/2} \pi^{1/2} e} \tag{45}$$

Attractive Potential Energy. The fact that sols can flocculate indicates the presence of attractive forces between the suspended particles. It is commonly assumed that these are Van der Waals forces, of which three types are known: the Keesom type involves the interaction of permanent dipoles; the Debye type, the interaction of a permanent dipole with an induced dipole; and the London type, a quantum mechanical interaction of nonpolar molecules. Since the London forces apply to apolar as well as to polar molecules, they are thought to furnish the chief mechanism of attraction in colloidal systems.

The London--Van der Waals energy of attraction between molecules has several distinctive properties. Although at distances less than about 50 Å it is inversely proportional to the sixth power of distance, at somewhat greater distances it tends to be inversely proportional to the seventh power. This is due to a shift in phase of the wave being propagated from one molecule to the other. The London force is independent of temperature since it does not involve any motion of the molecule as a whole. The London interaction of a molecule in one particle with a molecule in another particle tends to be independent of interaction of other molecules in the same two particles.

The attractive energy between two spheres has been calculated by Hamaker (1937) by integrating the interaction of each incremental volume of one sphere with each incremental volume of the other. His result is

$$V_A = -\frac{A}{6}\left(\frac{2a^2}{R^2-4a^2} + \frac{2a^2}{R^2} \ln \frac{R^2 - 4a^2}{R^2}\right) \tag{46}$$

where $V_A$ = attractive energy

$A$ = attraction constant

$R = 2a + H_o$, the distance between the centers of the spheres

In making the integration Hamaker assumed that the spheres are far enough apart to allow integration on a volume basis in place of a summation over each possible atom pair. He also showed that the interaction of particles is attractive even when they are suspended in a liquid. The above formula indicates that the attractive energy depends on the ratio of the common radii of the particles to their separation. However, when the absolute dimensions approach 50 or 100 Å, the apparent attractive energy tends to be too high because the integration does not correct for the phase shift mentioned above.

The value of the attraction constant, A, of eq. 46 is a major consideration in the theory of attractive forces. This constant depends on the number of atoms per unit volume and on the interaction of two atoms separated by unit distance. The theoretical interaction is not precisely defined, and the approximate formulation involves experimental quantities not readily available for all materials. In the practical situation where solids such as $ThO_2$ are suspended in an aqueous medium, the value of A is even much less certain because in this case the overall effect includes solid-to-solid, solid-to-liquid, and liquid-to-liquid interactions. As a result of the uncertainty in fixing A by theory, its value here will be regarded as a more-or-less arbitrary parameter. It will be assumed to be $1 \times 10^{-12}$ erg, a value which Verwey and Overbeek (p. 104) have thought to be in the neighborhood of a correct value. This is the same order as the $0.6 \times 10^{-12}$ value for water-water interaction calculated by Verwey and Overbeek (p. 104) by a method of Slater and Kirkwood (see reference list).

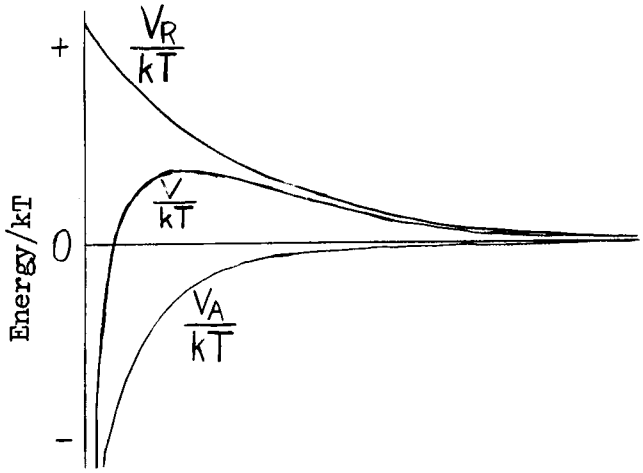
Equation 46 can be written in a form similar to that of eq. 41,

$$\frac{V_A}{kT} = -\frac{A}{6k}\frac{1}{T}\left(\frac{2a^2}{R^2 - 4a^2} + \frac{2a^2}{R^2} + \ln\frac{R^2 - 4a^2}{R^2}\right) \tag{47}$$

<u>Combined Potential Energy</u>. The overall potential energy function for the interaction of two spheres is the sum of eqs. 41 and 47,

$$\frac{V}{kT} = \frac{V_R}{kT} + \frac{V_A}{kT} \tag{48}$$

where V = total potential energy of interaction for two charged spheres. The sketch below shows the general relation of V, $V_R$, and $V_A$ as a function of the distance between the spheres:




It is convenient to assume that these potential energy functions, which have been derived tacitly for dilute suspensions, can be applied as a first approximation to concentrated suspensions. At high concentrations each particle is necessarily in the vicinity of neighboring particles. The actual energy barrier to flocculation in this case differs from the maximum on the energy curve by the energy corresponding to the average separation of particles. In the terminology already used in discussing the flocculation rate theory, this energy barrier is $V_M - V_N$, where $V_N$ is the energy associated with a separation distance $H_N$.

The average separation distance can be calculated using the previously postulated structure for concentrated suspensions (p. 10 ). The ratio of the volume of a particle to the volume of a unit cell in the assumed "face-centered" cubic structure should be the same as the total volume of particles in a unit volume of suspension. This can be expressed as follows:

$$\frac{\frac{4}{3}\pi a^3}{\frac{(2a+H_N)^3}{\sqrt{2}}} = \frac{\frac{c_o}{d_o}}{\left(1 - \frac{c_o}{d_o}\right)\frac{\rho_o}{\rho} + \frac{c_o}{d_o}} \tag{49}$$

where $H_N$ = distance between adjacent particles when in the close-packed type of orientation

$c_o$ = suspension concentration in weight per unit volume when the temperature is $T_o$

$d_o$ = density of solid at temperature $T_o$

$\rho$ = density of liquid medium at temperature T

$\rho_o$ = density of liquid medium at temperature $T_o$

This relation assumes that the temperature coefficient of expansion of the solid is zero. Equation 49 can be rearranged to

$$H_N = aQ(T,c_o) \tag{50}$$

where $Q(T,c_o) = \left[\frac{4\sqrt{2}\pi}{3}\left(\frac{\rho_o}{\rho}\frac{d_o}{c_o} - \frac{\rho_o}{\rho} + 1\right)\right]^{1/3} - 2$. The value of the term $Q(T,c_o)$ is shown in the Appendix (p. 128) for a variety of values of T and $c_o$.

## 3.3 Discussion of Assumptions Used in Theory

During the development of the theory many assumptions were introduced to simplify the physical model and make calculations possible. Since the validity of calculations made from the theory depends primarily on these assumptions, it seems worthwhile to summarize them before going on to some calculated results.

Value of $\kappa a$ Factor. When using the repulsive energy of flat plates to solve for the repulsive energy of spheres, the assumption was made that most of the repulsion was associated with the nearest surfaces. This condition holds when the product $\kappa a$ is large, or, in other words, the effective mobile layer thickness, $1/\kappa$, is small relative to a. In regard to this $\kappa a$ function, Overbeek (p. 260) states that values of $\kappa a$ above 3 give little error in this respect and that as $\kappa a$ is lowered to 0.5 the accuracy is lost, particularly when the surface potential is low.

Particle Separation. If particles are separated by only a few atom diameters, the assumptions made when using eq. 19 become questionable. These were that the charges in solution exist as points, that the solvent is a continuous medium, and that the surface charge is uniformly distributed. In addition, the calculated attractive energy under these conditions will be relatively large, and therefore will contribute a larger uncertainty to the potential energy function. Also, the Born repulsive forces, which have not been taken into account, are more likely to be significant at these short distances. Thus potential energy functions are not reliable if they indicate that particles approach quite close to each other before developing their maximum repulsion.

On the other hand the calculated potential energy curves are also less accurate when separation distances are large, for in the mathematical development no account is taken of the fact that, as separation distances become large, the London forces fall off extra fast because of the so-called "retardation effect". According to Overbeek (p. 266 and 271) the wavelength associated with the London forces is approxi-

mately 1000 Å, and the corresponding error in calculated attractive energy is about 50% for particles 500 Å in radius and 240 Å apart. However, the total calculated attractive energy in this case is less than 1.0 kT unit* (when T = 298°K), and therefore the error is small compared to the 20-30 kT units normally required to give an effective potential energy barrier.

Concentration of Electrolyte. Increasing the concentration of electrolyte tends to improve the validity of stability calculation by increasing the value of $\kappa a$, the effect of which has already been discussed. On the other hand it tends to give a high potential gradient at the surface, which means that the surface charge is high. At the same time the Stern type layer of ions close to the surface is likely to be appreciable, and the potential function calculated on the assumption of point charges can be in error as a result.

Particle Size. No direct assumptions about particle sizes have been made, but particle size is indirectly restricted by the requirement about the size of $\kappa a$, which has already been discussed. Of course, large particles will settle at appreciable rates because of gravity, and this effect may be important in specific cases but is not considered here.

Particle Shape. The method of calculating repulsive and attractive energy that has been outlined applies only to spherical particles. As has already been pointed out, a somewhat similar calculation for cubic particles could be made using the flat-plate approach; but assumptions about orientation would have to be made, and the flocculation theory that has been presented would not be directly applicable. On the other hand, certain assumptions made in order to integrate the total interaction of spheres would be removed.

Symmetry of Valence. The derivation assumes that all ions in solution have the same valence. However, not much error would be expected in using these calculations for unsymmetrical electrolytes provided the valence of the counterions is used for all. This is because the concentration of the ions that have the same sign as the charge on the surface is so low in most of the mobile layer that changing their valence has relatively little effect on the charge distribution in the layer.

Concentration of Suspension. The calculation is best for dilute suspensions. As the suspension concentration increases, the average separation between adjacent particles must, of course, decrease. When the average separation gets to be so small that particles tend to be interacting continually with their neighbors, they can be expected to tend toward the postulated arrangement that minimizes their total interaction. The calculation recognizes this ordered arrangement to the extent of determining the average distance between particles but does not correct further the potential energy functions derived for the simple interaction of two particles. Neither, in practice, has the effective concentration of particles available for diffusion across the potential energy barrier been calculated, and so the concentration

*where k = the Boltzmann constant

averaged over the whole volume has been used instead. This should result in indicating an excessive stability at high suspension concentrations.

Attraction Constant. Since the value of the constant for the London type of attraction is not at all well established, whatever value is used is essentially arbitrary. In practice this factor could be regarded as an arbitrary parameter and be adjusted over a fairly wide range to improve the agreement between calculated and experimental results.

Flocculation Rate. Use of the initial flocculation rate as an index of stability is arbitrary, since even at the start the reaction is not first order. If the flocculation rate at some other fixed point on the flocculation curve was used instead, the apparent effect of suspension concentration would be different.

## 4.0 CALCULATIONS OF STABILITY

### 4.1 Calculation of Potential Energy Functions

The potential energy function $\frac{V_R}{kT} + \frac{V_A}{kT}$ has been calculated for all permutations of the following values of the parameters:

T: 25, 90, 150, 200, 250, and 300°C

a: 50, 100, 200, 400, 800, 1600, and 3200 Å

z: 1 and 2

$n_o$: $1 \times 10^{-5}$, $3 \times 10^{-5}$, $10 \times 10^{-5}$, $30 \times 10^{-5}$, and $100 \times 10^{-5}$ M

Z: 2, 3, 4, 5, 6, 8, and 10

$\kappa H_o$: 0.005, 0.009, 0.017, 0.030, 0.055, 0.1, 0.2, 0.3, 0.7, 1.5, and 3

The temperatures chosen are thought to cover a range that is of most interest in the technological development of aqueous $ThO_2$ suspensions for nuclear breeding. The value of 90°C is included because it seemed more practical than 100°C for carrying out future experiments on suspension stability. The range in particle size goes from sol dimensions up into slurry dimensions. The electrolyte concentrations were chosen to include what was thought would be a practical range for achieving stability. The $\kappa H_o$ values were selected to define the maxima in the potential energy functions and to give the general nature of these functions at greater separations.

Equation 41 was used to calculate $V_R/kT$ and eq. 47 to calculate $V_A/kT$. The values of $L(Z, \kappa H_o) \cdot 10^7$ that were used are listed in Table 1; these are taken from the calculated results of Verwey and Overbeek (p. 141 and Over-

Table 1. Values[a] of $L(Z, \mu H_o) \cdot 10^7$ Used in Calculations

| $\mu H_o$ | $10^7 L$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | Z = 2 | 3 | 4 | 5 | 6 | 8 | 10 |
| 0.005[b] | 7.46 | 15.94 | $26.3_2$ | 38.1 | $50.8_5$ | 77.4 | 104.1 |
| 0.009[b] | 7.44 | 15.87 | 26.2 | 37.9 | 50.45 | 76.3 | 101.0 |
| 0.017[b] | 7.39 | 15.74 | 25.9 | 37.4 | 49.7 | 74.3 | 95.5 |
| 0.030[b] | 7.31 | 15.53 | $25.4_5$ | $36.6_6$ | 48.5 | 71.2 | 88.5 |
| 0.55[b] | 7.16 | 15.13 | $24.6_5$ | 35.3 | 46.2 | 65.7 | 78.7 |
| 0.10 | 6.90 | 14.5 | 23.3 | $33.0_5$ | 42.5 | 57.3 | 66.9 |
| 0.2 | 6.35 | 13.1 | $20.7_5$ | 28.6 | 35.6 | 45.0 | 51.1 |
| 0.3 | 5.85 | 11.9 | 18.61 | 24.92 | 30.5 | 37.0 | 40.9 |
| 0.7 | 4.06 | 7.98 | 11.96 | 15.31 | 17.93 | 20.7 | 22.2 |
| 1.5 | $1.91_5$ | 3.67 | 5.29 | 6.59 | $7.56_5$ | 8.54 | 8.99 |
| 3.0 | 0.43 | $0.86_5$ | 1.25 | 1.53 | 1.78 | 1.95 | $2.05_5$ |

[a]From E. J. W. Verwey and J. T. G. Overbeek, Theory of the Stability of Lyophobic Colloids, Elsevier Publishing Co., Inc., New York, 1948, p. 141.

[b]Values on these lines were obtained by graphical interpolation of Verwey and Overbeek's results.

beek, p. 258), some directly and others by graphical interpolation. Verwey and Overbeek (p. 140) state that their answers are accurate to a few percent of their values. Values of constants used in the calculations are given in Table 2. Equation 45 was used to calculate $H_o$.

The answers obtained are tabulated at the end of this report (Table A1, p. 43). Headings show the values of parameters used in calculating each table. Temperature, particle radius, and ionic concentration are shown in units of degrees centigrade, angstroms, and moles per liter at 25°C, respectively, rather than in the units used for the calculation (degrees Kelvin, centimeters, and molecules per $cm^3$ at 25°C). The values of $H_o$ in the first column are given in centimeters. The letter E in an answer indicates that the part to the left should be multiplied by 10 raised to the power given on the right. Thus "0.10000 E-7" is equivalent to "0.10000 x $10^{-7}$".

The problem was coded in a manner to ensure that the computer would not introduce errors larger than the following:

| Function | Maximum Computer Error |
|---|---|
| $H_o$ | 1% or $10^{-8}$ cm, whichever is larger |
| $\frac{V_R}{kT}$ and $\frac{V_A}{kT}$ | 0.2 |

Since the answers produced by the computer have been transferred directly to the report by a photographic process, the insignificant digits have not been rounded off.

Checks made at the time of the calculation indicated that the code fed to the machine was free of errors. An additional independent check was made at a later date by calculating 14 cases on a hand-operated desk calculator. The answers agreed with those from the Oracle. The values of the parameters for these checked cases are given below:

| Case No. | T, °C | a, Å | z | $n_o$, M | Z | $H_o$ |
|---|---|---|---|---|---|---|
| 1 | 300 | 200 | 1 | 3 x $10^{-5}$ | 2 | 0.009 |
| 2 | 250 | 100 | 2 | 100 x $10^{-5}$ | 3 | 0.03 |
| 3 | 200 | 50 | 2 | 1 x $10^{-5}$ | 4 | 0.10 |
| 4 | 150 | 3200 | 1 | 30 x $10^{-5}$ | 5 | 0.3 |
| 5 | 90 | 1600 | 1 | 10 x $10^{-5}$ | 6 | 1.5 |
| 6 | 25 | 800 | 2 | 3 x $10^{-5}$ | 8 | 0.005 |
| 7 | 300 | 400 | 2 | 100 x $10^{-5}$ | 10 | 0.017 |
| 8 | 300 | 400 | 1 | 1 x $10^{-5}$ | 2 | 0.055 |
| 9 | 250 | 200 | 1 | 30 x $10^{-5}$ | 3 | 0.2 |
| 10 | 200 | 100 | 2 | 10 x $10^{-5}$ | 4 | 0.7 |
| 11 | 150 | 50 | 2 | 3 x $10^{-5}$ | 5 | 3.0 |
| 12 | 90 | 3200 | 1 | 100 x $10^{-5}$ | 6 | 0.009 |
| 13 | 90 | 1600 | 1 | 1 x $10^{-5}$ | 8 | 0.03 |
| 14 | 25 | 800 | 2 | 30 x $10^{-5}$ | 10 | 0.1 |

Table 2. Values of Constants Used in Calculations

$$A = 10^{-12} \text{ erg}$$
$$d_o = 10 \text{ g/cm}^3 \text{ at } 25^oC$$
$$e = 4.803 \times 10^{-10} \text{ absolute esu}$$
$$k = 1.380 \times 10^{-16} \text{ erg/}^oK$$
$$n_o(\text{in molecules/cm}^3) = n_o \text{ (in moles/liter)} \times 6.025 \times 10^{20}$$
$$\psi(\text{in statvolts}) \times 299.8 = \psi \text{ (in absolute volts)}$$

| Temperature | | Dielectric Constant[a] ($\epsilon$) | Density of Water[b] ($\rho$), | Viscosity of Water[c] ($\eta$), |
|---|---|---|---|---|
| $^oC$ | $^oK$ | | g/cm$^3$ | poises |
| 25 | 298.1 | 78.55 | 0.9970 | 0.00894 |
| 90 | 363.1 | 58.03 | 0.9653 | 0.00317 |
| 150 | 423.1 | 43.89 | 0.9169 | 0.00186 |
| 200 | 473.1 | 34.59 | 0.8647 | 0.00136 |
| 250 | 523.1 | 26.75 | 0.7992 | 0.00113 |
| 300 | 573.1 | 19.66 | 0.7130[d] | 0.00095 |

[a]The first value is that used by Verwey and Overbeek in calculating the repulsion function. The second is calculated using equation given by E. E. Dorsey, Properties of Ordinary Water-Substance, Reinhold Publishing Corp., New York, 1940, p. 364. The rest are from G. C. Akerlof and H. I. Oshry, J. Am. Chem. Soc., 72: 2844-7 (1950).

[b]N. S. Osborne, H. F. Stimson, and D. C. Ginnings, J. Res. Natl. Bur. Standards, 23: 261 (1939).

[c]E. E. Dorsey, loc. cit., pp. 183 and 185.

[d]The value 0.7124 was used in the Oracle calculations.

## 4.2 Surface Potential Function Corresponding to a Particular Stability

The flocculation theory discussed above allows calculation of the value of a potential energy function corresponding to particular values of six parameters (temperature, particle radius, electrolyte valence, electrolyte concentration, suspension concentration, and flocculation time). This value of potential energy function can be converted to a hypothetical surface potential by use of the potential energy functions that have been calculated and are listed in Table A1. It is convenient to express the hypothetical potential in terms of $Z_C/z$ where the subscript C indicates that this is a particular or critical value of Z corresponding to a particular combination of the six general parameters. The actual procedure used to determine $Z_C/z$ depends on whether or not the approximate equation for flocculation rate is used; the following discussion treats both methods in detail.

The approximate method is simpler and speedier than the regular method; it uses eq. 18. An example of the use of this equation is given in Table 3 for the arbitrarily chosen set of parameter values given at the top of the table. The left-hand column in the middle of the page gives the values of all the terms on the right-hand side of eq. 18; these values are readily obtained from Table A3, p. 129. The sum of these terms is the value of $(V_M-V_N)/kT$ that satisfies the desired conditions, and this particular value of the term is indicated by the subscript C. In this case $\left(\frac{V_M-V_N}{kT}\right)_C$ is equal to 21.45.

The next step involves calculating $H_N$ for the same conditions using eq. 50 on p. 25. This is done by multiplying Q (see Table A2, p. 128) for the particular values of $c_o$ and T by the particle radius, a. This procedure is also indicated in Table 3. In this sample case $\bar{H}_N$ is found to be 1560 Å.

Inspection of the calculated table of $(V_R + V_A)/kT$ (or $V/kT$) for 300°C, 400 Å, z = 1, and $10^{-5}$M (Table A1, p. 43) shows that $V/kT$ is approximately 24 and 55 for Z values of 2 and 3, respectively. Since there are no calculations for values of Z below 2, the curves for Z = 2 and Z = 3 are used to extrapolate to the value of Z corresponding to $\left(\frac{V_M-V_N}{kT}\right)_C$. Interpolation is used when possible. Figure 1 shows the two desired curves. For each curve the maximum value (designated $V_M/kT$) and the value at $H_o = H_N$ (designated $V_N/kT$) are determined. Then the differences in these quantities ($(V_M-V_N)/kT$) are found as shown in the tabulation in the upper right corner of Fig. 1. A plot like that on the right of Fig. 1 is used for interpolation to obtain $Z_C$, the value of Z corresponding to $\left(\frac{V_M-V_N}{kT}\right)_C$; in this case the values of $Z_C$ and $Z_C/z$ are 1.90.

Table 3. Example of First Step in Calculating $Z_C$

**Parameter Values for this Particular Calculation**

$T = 300^{\circ}C$

$a = 400$ Å

$z = 1$

$n_o = 1 \times 10^{-5}$ M

$c_o = 400$ g/liter

$t_f = 0.5$ day

| Approximate Method (See Table A3, p. 129) | | Regular Method (See Table A4, p. 130) | |
|---|---|---|---|
| $\ln \frac{T^{1/2}\rho^{3/2}}{\epsilon^{1/2}\eta}$ | 8.14 | $\log \frac{T\rho}{\eta}$ | 5.63 |
| $\ln \frac{16 \cdot 2^{1/2} k^{1/2} e}{\pi^{1/2} d_o \rho_o^{3/2}} - 2 \ln a$ | -14.61 | $\log \frac{2k}{\pi d_o \rho_o} - 3 \log a$ | -0.86 |
| $\ln z$ | 0.00 | $\log c_o$ | -0.40 |
| $\ln n_o$ | 18.17 | $\log t_f$ | 4.64 |
| $\ln c_o$ | -0.92 | $\log \left( \int_2^{2+\frac{H_N}{a}} \frac{\exp \frac{V-V_N}{kT}}{s^2} ds \right)_C$ | 9.01 |
| $\ln t_f$ | 10.67 | | |
| $\left(\frac{V_M - V_N}{kT}\right)_C$ | 21.45 | | |

**Average Particle Separation**

| | |
|---|---|
| Q (from Table A2, p. 128) | 3.89 |
| $H_N$ | 1560 Å |

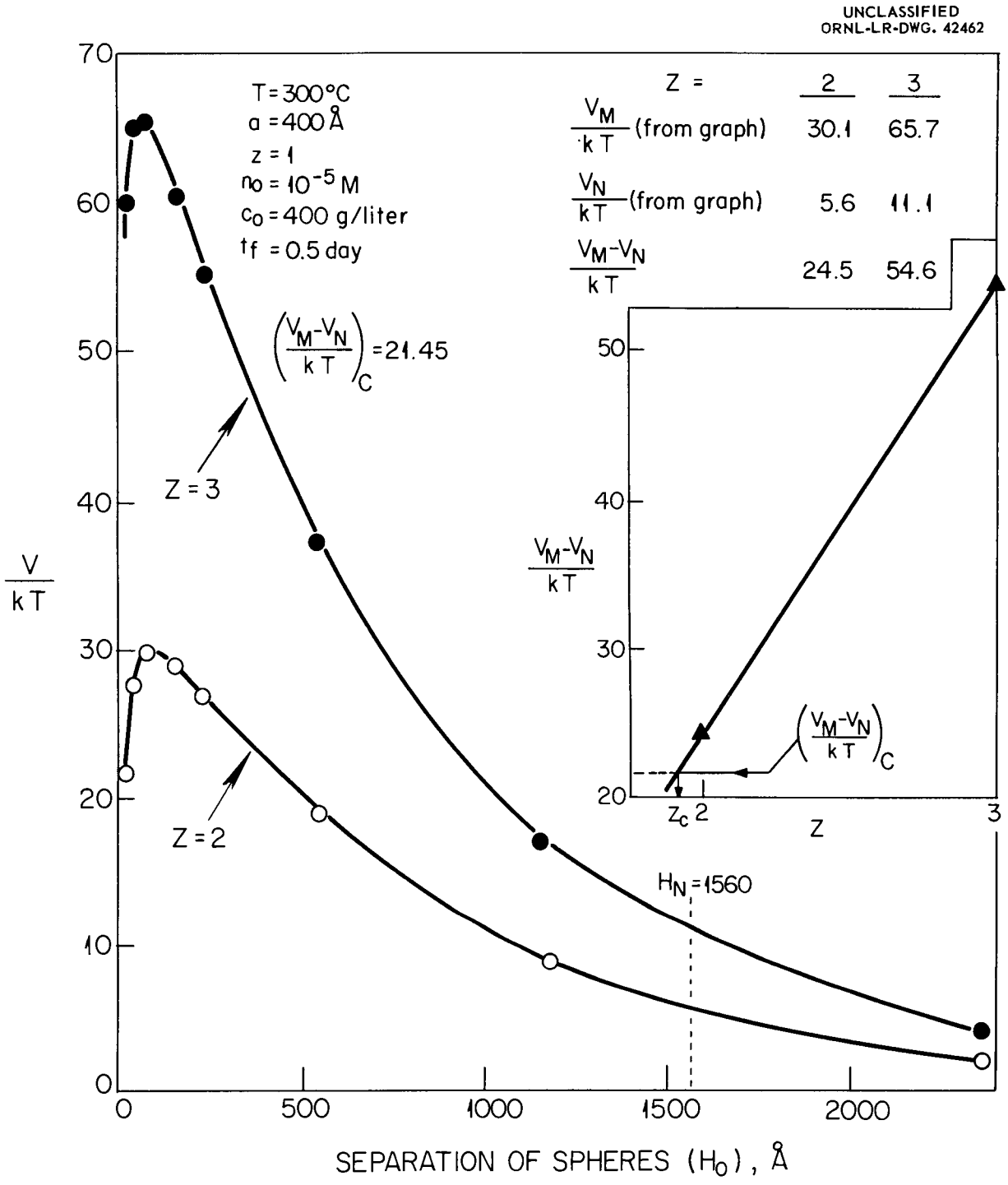



Fig. 1. Determination of $Z_c/z$ by approximate method.

The more accurate method of determining $Z_C/z$, which involves use of eq. 13, can be demonstrated for the same set of parameters that was used in the above discussion. The values of the terms on the right-hand side of eq. 13, which can be determined quickly from Table A4 (p. 130) are listed for this particular case in the right-hand column of Table 3 labeled "Regular Method". The log of the desired integral for this example is found to be 9.01.

The next step in the procedure is to find out by trial and error what value of Z results in the desired value of the integral on the left-hand side of eq. 13. According to the previous calculation, $Z_C$ is approximately 1.90. Therefore it is reasonable to start by determining the integral for Z = 2.0. Table 4 shows how the data are prepared for plotting. The value of V/kT (the fourth column) is read from the curve in Fig. 1 for various values of $H_o$ (the first column). The quantity s is equal to $2 + H_o/a$. The quantity $V_N/kT$ is the potential energy shown in Fig. 1 for $H_o = H_N$ and in this particular case is 5.5. Table A5 (p. 131) is provided to aid in determining the value of the exponential in the next to last column. The actual integration is carried out by plotting the last column,

$\frac{\exp\ (V-V_N)/kT}{s^2}$, vs. the second column, s (see Fig. 2), and by determining the area under the resulting curve, which here is $1.95 \times 10^9$. The process is then repeated for a value of Z on the other side (if possible) of the approximate value of $Z_C$. In this case it is necessary to go to Z = 3, as the potential energy tables do not include values of Z below 2. The integral obtained is $8.22 \times 10^{21}$, the log of which is $21.9_1$. Interpolation (or extrapolation) of Z against the logarithm of the integrals gives the desired improved value of $Z_C$; this last step is illustrated in the upper right-hand part of Fig. 2. The new value of $Z_C$ and $Z_C/z$ is 1.98.

## 4.3 Results of Calculations

Table 5 gives the results of some calculations made by the methods that have been described. The first six columns of the table show the values of the parameters used in each case. The last two columns give the values of $Z_C/z$ calculated by the two methods. The intervening columns give values of functions that are pertinent to each calculation or else helpful in evaluating its reliability.

The seventh column gives the value of $H_N$, which is the normal distance between particles when they repel each other sufficiently to tend to take a "close-packed" orientation.

Table 4. Example of Determining $Z_C/z$ by Regular Method: Calculation of Integration Function

| $H_o$, Å | $s$ $(2+\frac{H_o}{a})$ | $s^2$ | $\frac{V}{kT}$ | $\frac{V-V_N}{kT}$ | $\exp \frac{V-V_N}{kT}$ | $\frac{\exp \frac{V-V_N}{kT}}{s^2}$ |
|---|---|---|---|---|---|---|
| 40 | 2.10 | 4.41 | 26.0 | 20.5 | $0.80 \times 10^9$ | $0.182 \times 10^9$ |
| 60 | 2.15 | 4.62 | 29.5 | 24.0 | $26.5 \times 10^9$ | $5.74 \times 10^9$ |
| 80 | 2.20 | 4.84 | 30.0 | 24.5 | $43.7 \times 10^9$ | $9.04 \times 10^9$ |
| 100 | 2.25 | 5.06 | 30.0 | 24.5 | $43.7 \times 10^9$ | $8.65 \times 10^9$ |
| 120 | 2.30 | 5.29 | 29.7 | 24.2 | $32.3 \times 10^9$ | $6.11 \times 10^9$ |
| 140 | 2.35 | 5.52 | 29.3 | 23.8 | $21.7 \times 10^9$ | $3.93 \times 10^9$ |
| 160 | 2.40 | 5.76 | 28.8 | 23.3 | $13.1 \times 10^9$ | $2.28 \times 10^9$ |
| 180 | 2.45 | 6.00 | $28.3_5$ | $22.8_5$ | $8.4 \times 10^9$ | $1.40 \times 10^9$ |
| 200 | 2.50 | 6.25 | 27.8 | 22.3 | $4.84 \times 10^9$ | $0.77 \times 10^9$ |
| 220 | 2.55 | 6.50 | 27.3 | 21.8 | $2.93 \times 10^9$ | $0.45 \times 10^9$ |
| 240 | 2.60 | 6.76 | 26.9 | 21.4 | $1.97 \times 10^9$ | $0.29 \times 10^9$ |
| 260 | 2.65 | 7.02 | 26.5 | 21.0 | $1.32 \times 10^9$ | $0.19 \times 10^9$ |
| 280 | 2.70 | 7.29 | 26.0 | 20.5 | $0.80 \times 10^9$ | $0.11 \times 10^9$ |

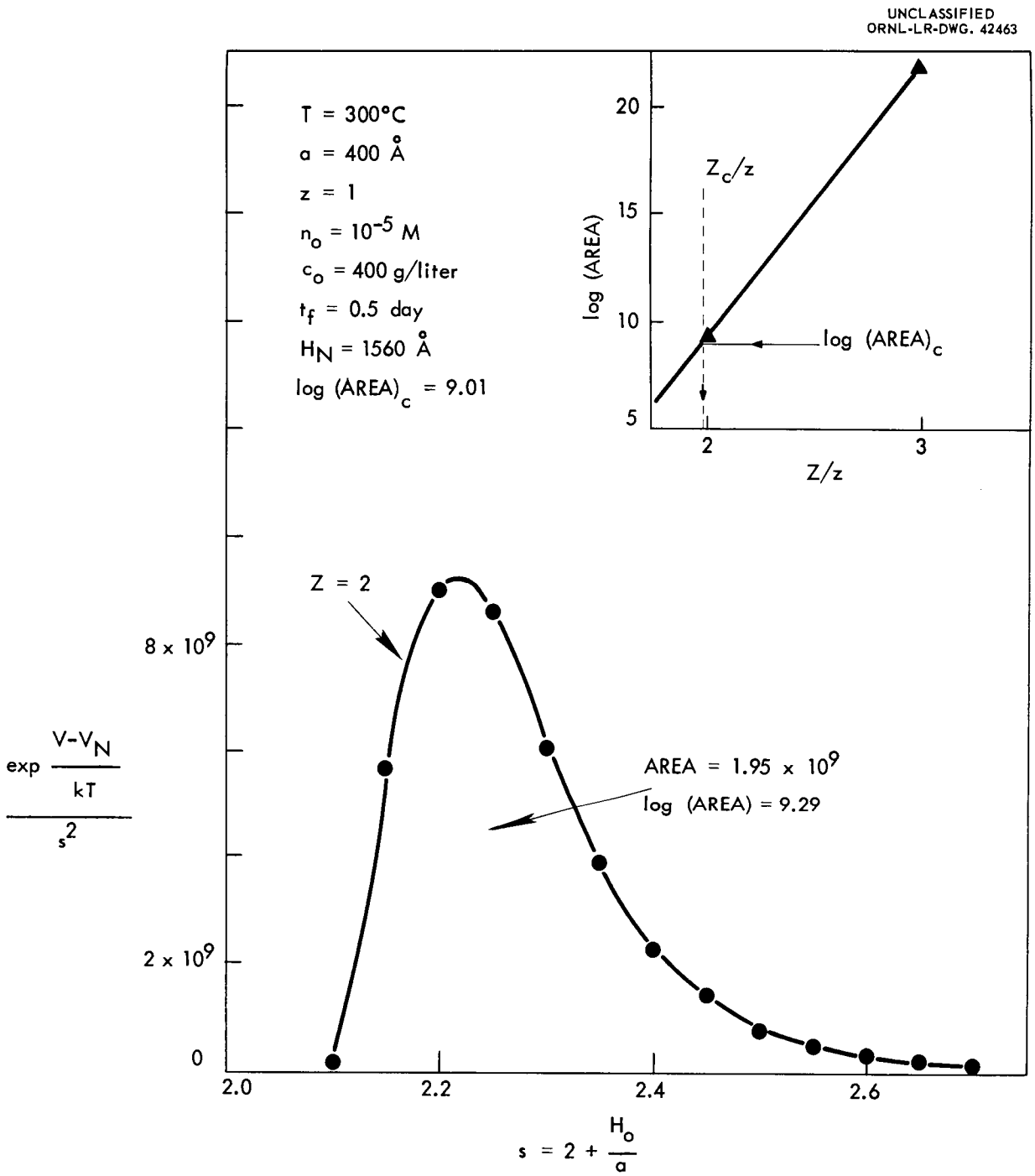



Fig. 2. Determination of $Z_c/z$ by regular method: graphical integration and interpolation.

Table 5. Characteristics of Various Suspensions

| Temp. (T), °C | Particle Radius (a), Å | Valence of Counter-ion (z) | Electrolyte Conc. ($n_o$), $10^{-5}$ moles per liter | Suspension Conc. ($c_o$), g/liter | Floc. Time ($t_f$), days | Normal Separation ($H_N$), Å | $\left(\frac{V_N}{kT}\right)_C$ | $\left(\frac{V_M-V_N}{kT}\right)_C$ | Separation at Max. Energy ($H_M$), Å | Mobile Layer Thickness (1/κ), Å | κa | $Z_C/z$ Approx. Method | $Z_C/z$ Regular Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 200 | 1 | 30 | 400 | 0.5 | 658 | 0.9 | 21.78 | 47 | 176 | 1.14 | 1.89 | |
| 25 | 400 | 1 | 1 | 400 | 0.5 | 1316 | → 13.1 | 18.70 | 120 | 962 | → 0.42 | 1.58 | |
| 90 | 200 | 1 | 30 | 400 | 0.5 | 668 | 0.2 | 23.02 | 40 | 170 | 1.18 | 1.99 | |
| 90 | 400 | 1 | 1 | 400 | 0.5 | 1336 | → 10.5 | 19.94 | 100 | 927 | → 0.43 | 1.60 | |
| 150 | 200 | 1 | 30 | 400 | 0.5 | 688 | 0.1 | 23.69 | 38 | 163 | 1.23 | 2.12 | |
| 150 | 400 | 1 | 1 | 400 | 0.5 | 1376 | → 9.8 | 20.61 | 100 | 893 | → 0.45 | 1.66 | |
| 200 | 200 | 1 | 30 | 400 | 0.5 | 708 | 0.2 | 24.08 | 37 | 158 | 1.27 | 2.28 | |
| 200 | 400 | 1 | 1 | 400 | 0.5 | 1416 | → 8.2 | 21.00 | 100 | 863 | → 0.46 | 1.71 | |
| 250 | 200 | 1 | 30 | 400 | 0.5 | 736 | 0.1 | 24.32 | 32 | 152 | 1.32 | 2.48 | |
| 250 | 400 | 1 | 1 | 400 | 0.5 | 1472 | → 7.6 | 21.24 | 100 | 831 | → 0.48 | 1.80 | |
| 300 | 50 | 1 | 1 | 400 | 0.5 | 195 | → 25.7 | 25.62 | → 10 | 789 | → 0.06 | 9.40 | |
| 300 | 50 | 1 | 30 | 400 | 0.5 | 195 | 5.5 | 27.32 | → 7 | 144 | → 0.35 | 7.58 | |
| 300 | 100 | 1 | 1 | 400 | 0.5 | 390 | → 26.5 | 24.32 | 25 | 789 | → 0.13 | 5.69 | |
| 300 | 100 | 1 | 30 | 400 | 0.5 | 390 | 2.2 | 25.93 | → 17 | 144 | 0.69 | 4.38 | |
| 300 | 200 | 1 | 1 | 400 | 0.5 | 780 | → 16.0 | 22.84 | 55 | 789 | → 0.25 | 3.24 | |
| 300 | 200 | 1 | 3 | 400 | 0.5 | 780 | 6.9 | 23.39 | 48 | 456 | → 0.44 | 2.89 | |
| 300 | 200 | 1 | 10 | 400 | 0.5 | 780 | 1.5 | 23.99 | 38 | 250 | 0.80 | 2.74 | |
| 300 | 200 | 1 | 30 | 1 | 0.5 | 8320 | 0 | 18.55 | 35 | 144 | 1.39 | 2.46 | |
| 300 | 200 | 1 | 30 | 100 | 0.5 | 1476 | 0 | 23.16 | 30 | 144 | 1.39 | 2.75 | |
| 300 | 200 | 1 | 30 | 200 | 0.5 | 1088 | 0 | 23.85 | 29 | 144 | 1.39 | 2.80 | |
| 300 | 200 | 1 | 30 | 400 | 0.5 | 780 | 0 | 24.54 | 28 | 144 | 1.39 | 2.84 | |
| 300 | 200 | 1 | 30 | 400 | 1. | 780 | 0 | 25.23 | 27 | 144 | 1.39 | 2.89 | |
| 300 | 200 | 1 | 30 | 400 | 2 | 780 | 0 | 25.92 | 26 | 144 | 1.39 | 2.93 | |
| 300 | 200 | 1 | 30 | 400 | 3.5 | 780 | 0 | 26.48 | 25 | 144 | 1.39 | 2.97 | |
| 300 | 200 | 1 | 30 | 400 | 7 | 780 | 0 | 27.17 | 25 | 144 | 1.39 | 3.01 | |
| 300 | 200 | 1 | 30 | 400 | 15 | 780 | 0 | 27.94 | 25 | 144 | 1.39 | 3.05 | |
| 300 | 200 | 1 | 30 | 400 | 30 | 780 | 0 | 28.63 | 25 | 144 | 1.39 | 3.09 | |
| 300 | 200 | 1 | 30 | 400 | 60 | 780 | 0 | 29.32 | → 24 | 144 | 1.39 | 3.13 | |
| 300 | 200 | 1 | 30 | 400 | 120 | 780 | 0 | 30.02 | → 24 | 144 | 1.39 | 3.17 | |
| 300 | 200 | 1 | 30 | 400 | 180 | 780 | 0 | 30.44 | → 24 | 144 | 1.39 | 3.19 | |
| 300 | 200 | 1 | 30 | 800 | 0.5 | 532 | 0.8 | 25.24 | 28 | 144 | 1.39 | 2.92 | |
| 300 | 200 | 1 | 30 | 1200 | 0.5 | 412 | 2.3 | 25.64 | 25 | 144 | 1.39 | 3.06 | |
| 300 | 200 | 1 | 30 | 1400 | 0.5 | 368 | 3.4 | 25.80 | 25 | 144 | 1.39 | 3.12 | |
| 300 | 200 | 1 | 100 | 400 | 0.5 | 780 | 0 | 25.14 | → 23 | 79 | 2.53 | 3.14 | |
| 300 | 200 | 2 | 1 | 400 | 0.5 | 780 | 3.3 | 23.53 | 33 | 395 | 0.51 | 3.47 | |
| 300 | 200 | 2 | 3 | 400 | 0.5 | 780 | 0.8 | 24.08 | → 20 | 228 | 0.88 | 3.66 | |
| 300 | 200 | 2 | 10 | 400 | 0.5 | 780 | 0 | 24.68 | → 18 | 125 | 1.60 | 4.38 | |
| 300 | 200 | 2 | 30 | 400 | 0.5 | 780 | 0 | 25.23 | → 10 | 72 | 2.78 | 6.30 | |
| 300 | 400 | 1 | 1 | 1 | 0.5 | 16,640 | 0 | 15.47 | 105 | 789 | 0.51 | 1.60 | |
| 300 | 400 | 1 | 1 | 100 | 0.5 | 2952 | 0.3 | 20.08 | 85 | 789 | 0.51 | 1.73 | |
| 300 | 400 | 1 | 1 | 200 | 0.5 | 2176 | 1.8 | 20.77 | 85 | 789 | 0.51 | 1.79 | |
| 300 | 400 | 1 | 1 | 400 | 0.5 | 1560 | 5.0 | 21.45 | 85 | 789 | 0.51 | 1.90 | 1.98 |
| 300 | 400 | 1 | 1 | 800 | 0.5 | 1064 | → 11.1 | 22.16 | 80 | 789 | 0.51 | 2.09 | |
| 300 | 400 | 1 | 1 | 1200 | 0.5 | 824 | → 17.2 | 22.56 | 75 | 789 | 0.51 | 2.27 | |
| 300 | 400 | 1 | 1 | 1400 | 0.5 | 736 | → 20.4 | 22.72 | 75 | 789 | 0.51 | 2.37 | |
| 300 | 400 | 1 | 3 | 400 | 0.5 | 1560 | 1.2 | 22.01 | 85 | 456 | 0.88 | 1.87 | |
| 300 | 400 | 1 | 10 | 400 | 0.5 | 1560 | 0 | 22.61 | 50 | 250 | 1.60 | 1.93 | |
| 300 | 400 | 1 | 30 | 400 | 0.5 | 1560 | 0 | 23.16 | 40 | 144 | 2.77 | 2.05 | |
| 300 | 400 | 1 | 100 | 400 | 0.5 | 1560 | 0 | 23.76 | 35 | 79 | 5.06 | 2.28 | |
| 300 | 400 | 2 | 1 | 400 | 0.5 | 1560 | 1.0 | 22.15 | 65 | 395 | 1.01 | 2.05 | 2.14 |
| 300 | 400 | 2 | 3 | 400 | 0.5 | 1560 | 0 | 22.70 | 50 | 228 | 1.75 | 2.19 | |
| 300 | 400 | 2 | 10 | 400 | 0.5 | 1560 | 0 | 23.30 | 35 | 125 | 3.19 | 2.56 | |
| 300 | 400 | 2 | 30 | 400 | 0.5 | 1560 | 0 | 23.85 | → 22 | 72 | 5.55 | 3.24 | |
| 300 | 400 | 2 | 100 | 400 | 0.5 | 1560 | 0 | 24.45 | → 14 | 39 | 10.24 | 5.78 | |
| 300 | 800 | 1 | 1 | 400 | 0.5 | 3120 | 1.0 | 20.07 | 100 | 789 | 1.01 | 1.47 | |
| 300 | 800 | 1 | 30 | 400 | 0.5 | 3120 | 0 | 21.77 | 57 | 144 | 5.56 | 1.67 | |
| 300 | 1600 | 1 | 1 | 400 | 0.5 | 6240 | 1 | 18.69 | 120 | 789 | 2.03 | 1.33 | |
| 300 | 1600 | 1 | 30 | 400 | 0.5 | 6240 | 0 | 20.39 | 56 | 144 | 11.11 | 1.52 | |
| 300 | 3200 | 1 | 1 | 400 | 0.5 | 12,480 | 1 | 17.30 | 120 | 789 | 4.06 | 1.29 | |
| 300 | 3200 | 1 | 30 | 400 | 0.5 | 12,480 | 0 | 19.00 | 61 | 144 | 22.4 | 1.44 | |

The value of $(V_N/kT)_C$, given in the next column and obtained by interpolation against Z, is the value of $V_N/kT$ corresponding to the situation when $Z = Z_C$. It gives an indication of the degree of ordered structure in the suspension. A large value of this function indicates the possibility of appreciable error from the high concentration of particles. In order to focus attention on such cases arrows have been placed in front of the values that are greater than one-third of the required potential energy barrier, which is given in the next column.

The tenth column gives $H_M$, the separation at maximum repulsive energy. This is useful for evaluating the validity of assumptions that the suspending medium is homogeneous, the surface charge is uniformly distributed, and the ions in solution are point charges. Arrows are used to call attention to the cases where the separation is less than 25 Å (an arbitrarily selected value).

The next column shows the value of $1/\kappa$, the effective thickness of the mobile layer. As would be expected, $(V_N/kT)_C$ is large when $1/\kappa$ amounts to an appreciable fraction of $H_N$.

The function $\kappa a$ is useful in evaluating the validity of transforming from the repulsion of flat plates to that of spherical surfaces. Overbeek (p. 260) indicates that this part of the calculation is not valid when $\kappa a$ is below 0.5; such values are marked with arrows.

In the discussions which follow, the calculated effect of one or two parameters at a time is considered by selecting the data for appropriate cases given in Table 5. Each graph of such an effect shows the conditions common to all points on the graph.

Effect of Temperature. Figure 3 shows how much the surface potential function $Z_C/z$ must change if the stability is to remain constant while the temperature changes. Figure 4 is the same except the surface potential itself has been substituted for $Z_C/z$. Examination of the data in Table 5 shows that the curve for 400 Å (radius) particles in $10^{-5}$ M electrolyte is less reliable than that for 200 Å particles in $30 \times 10^{-5}$ M electrolyte because of higher values of $V_N/kT$ and lower values of $\kappa a$. Both curves, however, indicate that increasing the temperature should decrease the stability unless the surface potential can be simultaneously increased appreciably.

Effect of Particle Radius. Figure 5 shows the effect of particle radius. The two curves are given for electrolyte concentrations of $10^{-5}$ and $30 \times 10^{-5}$ M. Inspection of the data in Table 5 indicates that for low radii the calculations are less accurate, particularly for the lower electrolyte concentration. However, both curves indicate that, with small particles, increasing the radius makes it much easier to keep a suspension peptized; with larger radii the effect appears to be in the same direction but smaller.

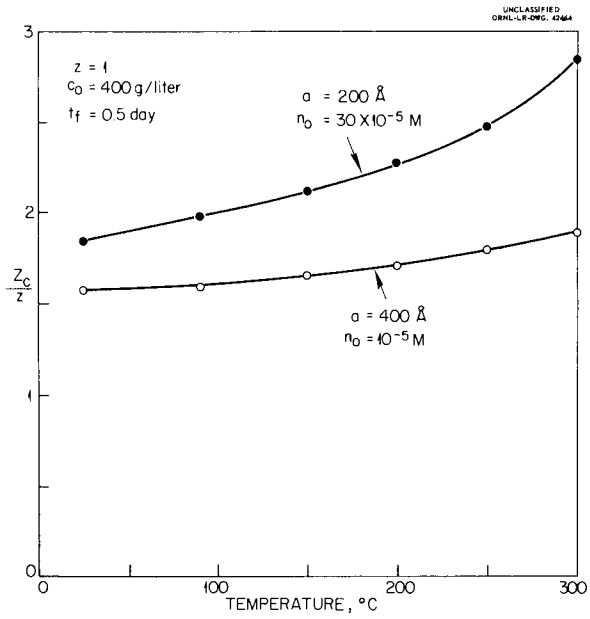



Fig. 3. Effect of temperature on $Z_c/z$.

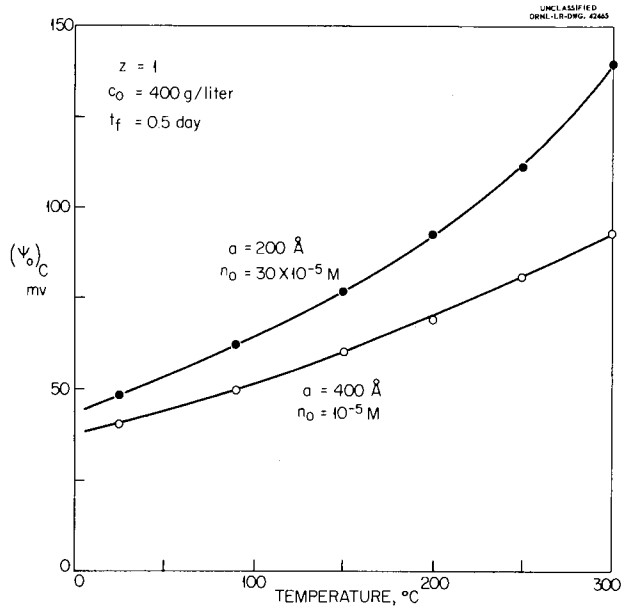



Fig. 4. Effect of temperature on $(\psi_0)_c$.

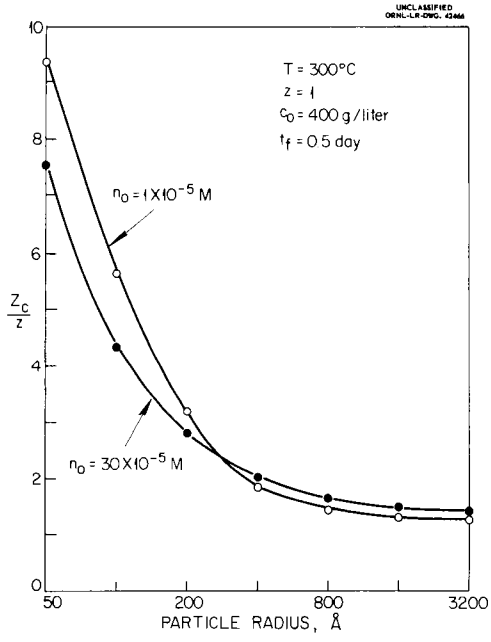



Fig. 5. Effect of particle radius on $Z_c/z$.

Effects of Electrolyte Valence and Concentration. Figures 6 and 7 give the calculated effects of electrolyte valence and concentration for two different particle sizes. The accuracy of the calculation appears to suffer at the higher valence and concentration due to the small value of $H_M$. This is especially true at the smaller particle radius. Some of the points for a valence of 1 and a particle radius of 200 Å are less accurate because of low values of $\kappa a$ and a large value of $V_N/kT$. The curves indicate that with a valence of 1 the electrolyte concentration has a relatively small effect; but with a valence of two, increasing the electrolyte concentration necessitates considerably higher surface potential. At the lowest electrolyte concentration there is little difference between valences of 1 and 2.

Effect of Suspension Concentration. The two cases shown in Fig. 8 indicate that increasing the suspension concentration tends to require an increase in the surface potential. However, this effect is small relative to the effect of some of the other variables.

Effect of the Flocculation Period. Figure 9 shows the interaction of surface potential and flocculation time. The curve indicates that only a small increase in surface potential is required to give a large increase in the flocculation period.

## 5.0 APPLICATION TO $ThO_2$ SUSPENSION TECHNOLOGY

The direct usefulness of the foregoing calculations is limited because only hypothetical values of surface potential are included. A real $ThO_2$ suspension can be expected to have an equilibrium surface potential that is determined by other parameters and that cannot be controlled directly.

Experimental work aimed at determining the surface potential of $ThO_2$ under conditions of interest should serve to tie the present calculations to real suspensions. Experimental variables that are probably of interest are temperature, electrolyte valence, electrolyte concentration, and pH of the suspending medium. The potential is probably essentially independent of particle radius and suspension concentration.

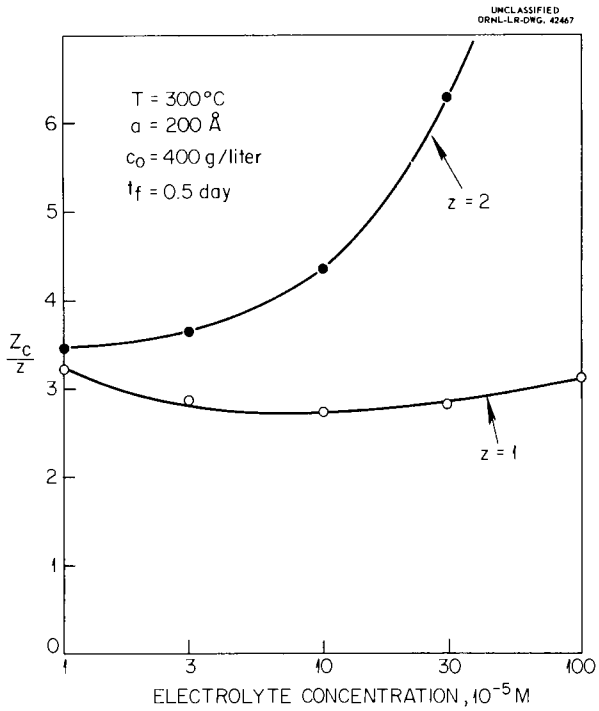



Fig. 6. Effect of electrolyte valence and concentration on $Z_c/z$ (a = 200 Å).

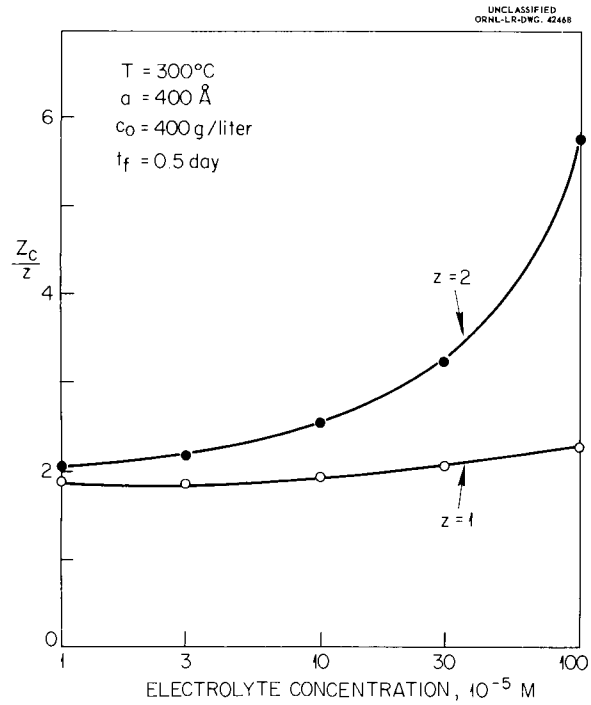



Fig. 7. Effect of electrolyte valence and concentration on $Z_c/z$ (a = 400 Å).

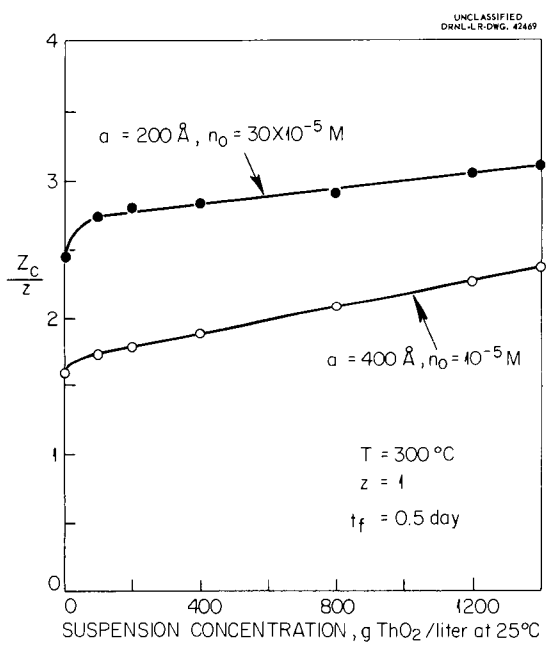



Fig. 8. Effect of suspension concentration on $Z_c/z$.

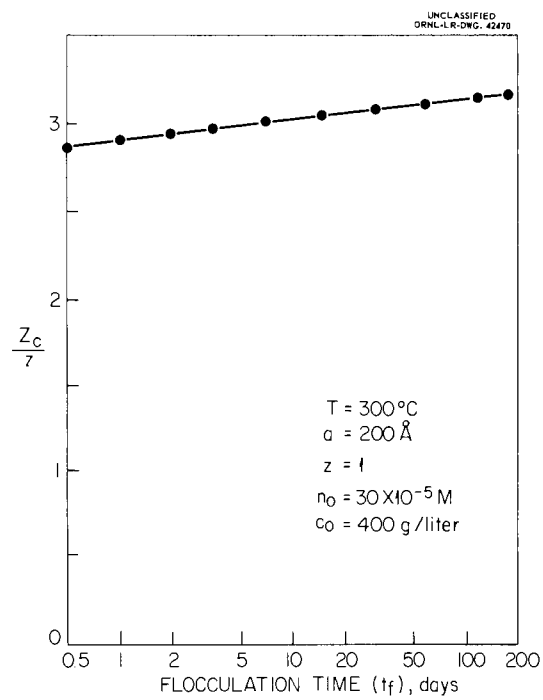



Fig. 9. Effect of flocculation time ($t_f$) on $Z_c/z$.

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# 7.0 APPENDIX

Table A1. Potential Energy of Particle Interaction

On pages 44 to 127 is given the calculated potential energy of interaction of two spherical particles as a function of:

Temperature, $^{o}C$

Particle radius, Å

Electrolyte valence (z)

Electrolyte concentration, M

Particle separation ($H_o$), cm

Surface potential function (Z)

25°C 50 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.48099E-7 | -3.5701 | 6.7364 | 19.352 | 33.669 | 49.166 | 81.434 | 113.88 |
| 0.86578E-7 | 3.7190 | 13.964 | 26.519 | 40.740 | 55.993 | 87.411 | 117.43 |
| 0.16353E-6 | 7.1968 | 17.345 | 29.693 | 43.670 | 58.620 | 88.519 | 114.28 |
| 0.28859E-6 | 8.3325 | 18.323 | 30.379 | 44.004 | 58.394 | 85.984 | 107.01 |
| 0.52909E-6 | 8.5830 | 18.269 | 29.840 | 42.784 | 56.032 | 79.732 | 95.532 |
| 0.96198E-6 | 8.3677 | 17.604 | 28.300 | 40.150 | 51.636 | 69.623 | 81.291 |
| 0.19239E-5 | 7.7164 | 15.920 | 25.218 | 34.759 | 43.266 | 54.691 | 62.105 |
| 0.28859E-5 | 7.1098 | 14.463 | 22.618 | 30.287 | 37.069 | 44.969 | 49.709 |
| 0.67338E-5 | 4.9345 | 9.6988 | 14.536 | 18.607 | 21.792 | 25.158 | 26.981 |
| 0.14429E-4 | 2.3274 | 4.4605 | 6.4294 | 8.0094 | 9.1945 | 10.379 | 10.926 |
| 0.28859E-4 | 0.52262 | 1.0513 | 1.5192 | 1.8595 | 2.1634 | 2.3700 | 2.4976 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.27770E-7 | -16.946 | -6.6403 | 5.9754 | 20.292 | 35.789 | 68.058 | 100.50 |
| 0.49986E-7 | -2.9384 | 7.3073 | 19.862 | 34.082 | 49.335 | 80.754 | 110.77 |
| 0.94418E-7 | 4.3441 | 14.492 | 26.841 | 40.818 | 55.767 | 85.666 | 111.43 |
| 0.16662E-6 | 7.1614 | 17.152 | 29.208 | 42.833 | 57.223 | 84.813 | 105.83 |
| 0.30547E-6 | 8.2176 | 17.904 | 29.475 | 42.419 | 55.666 | 79.367 | 95.167 |
| 0.55540E-6 | 8.2823 | 17.519 | 28.214 | 40.065 | 51.550 | 69.538 | 81.206 |
| 0.11108E-5 | 7.7066 | 15.910 | 25.208 | 34.749 | 43.257 | 54.681 | 62.095 |
| 0.16662E-5 | 7.1077 | 14.460 | 22.616 | 30.285 | 37.067 | 44.967 | 49.707 |
| 0.38878E-5 | 4.9344 | 9.6988 | 14.536 | 18.607 | 21.792 | 25.158 | 26.981 |
| 0.83310E-5 | 2.3274 | 4.4605 | 6.4294 | 8.0094 | 9.1944 | 10.379 | 10.926 |
| 0.16662E-4 | 0.52262 | 1.0513 | 1.5192 | 1.8595 | 2.1634 | 2.3700 | 2.4976 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.15210E-7 | -44.744 | -34.437 | -21.821 | -7.5045 | 7.9918 | 40.260 | 72.711 |
| 0.27378E-7 | -17.439 | -7.1931 | 5.3619 | 19.582 | 34.835 | 66.253 | 96.273 |
| 0.51715E-7 | -2.4440 | 7.7045 | 20.053 | 34.030 | 48.979 | 78.878 | 104.64 |
| 0.91261E-7 | 3.9873 | 13.977 | 26.034 | 39.659 | 54.049 | 81.639 | 102.66 |
| 0.16731E-6 | 6.9926 | 16.679 | 28.249 | 41.193 | 54.441 | 78.142 | 93.942 |
| 0.30420E-6 | 7.8969 | 17.134 | 27.829 | 39.679 | 51.165 | 69.153 | 80.820 |
| 0.60841E-6 | 7.6380 | 15.842 | 25.139 | 34.680 | 43.188 | 54.613 | 62.027 |
| 0.91261E-6 | 7.0879 | 14.441 | 22.596 | 30.265 | 37.047 | 44.947 | 49.687 |
| 0.21294E-5 | 4.9336 | 9.6980 | 14.535 | 18.606 | 21.791 | 25.157 | 26.981 |
| 0.45630E-5 | 2.3274 | 4.4604 | 6.4294 | 8.0094 | 9.1944 | 10.379 | 10.926 |
| 0.91261E-5 | 0.52262 | 1.0513 | 1.5192 | 1.8595 | 2.1634 | 2.3700 | 2.4976 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.87816E-8 | -91.328 | -81.021 | -68.405 | -54.088 | -38.592 | -6.3232 | 26.127 |
| 0.15807E-7 | -42.405 | -32.159 | -19.604 | -5.3840 | 9.8692 | 41.287 | 71.307 |
| 0.29857E-7 | -14.756 | -4.6074 | 7.7410 | 21.718 | 36.667 | 66.566 | 92.332 |
| 0.52690E-7 | -2.2457 | 7.7448 | 19.801 | 33.426 | 47.816 | 75.406 | 96.432 |
| 0.96598E-7 | 4.2323 | 13.919 | 25.489 | 38.433 | 51.681 | 75.381 | 91.182 |
| 0.17563E-6 | 6.8279 | 16.065 | 26.760 | 38.610 | 50.096 | 68.084 | 79.751 |
| 0.35126E-6 | 7.3698 | 15.573 | 24.871 | 34.412 | 42.920 | 54.345 | 61.759 |
| 0.52690E-6 | 6.9894 | 14.342 | 22.497 | 30.167 | 36.949 | 44.849 | 49.589 |
| 0.12294E-5 | 4.9268 | 9.6912 | 14.528 | 18.600 | 21.784 | 25.151 | 26.974 |
| 0.26345E-5 | 2.3271 | 4.4601 | 6.4291 | 8.0091 | 9.1941 | 10.379 | 10.926 |
| 0.52690E-5 | 0.52261 | 1.0513 | 1.5192 | 1.8595 | 2.1634 | 2.3700 | 2.4976 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.48099E-8 | -184.16 | -173.86 | -161.24 | -146.92 | -131.43 | -99.162 | -66.710 |
| 0.86578E-8 | -92.945 | -82.699 | -70.144 | -55.924 | -40.671 | -9.2533 | 20.767 |
| 0.16353E-7 | -40.456 | -30.307 | -17.959 | -3.9821 | 10.967 | 40.866 | 66.632 |
| 0.28859E-7 | -15.898 | -5.9075 | 6.1492 | 19.773 | 34.164 | 61.753 | 82.780 |
| 0.52909E-7 | -2.3633 | 7.3234 | 18.894 | 31.838 | 45.085 | 68.786 | 84.586 |
| 0.96198E-7 | 3.8862 | 13.123 | 23.818 | 35.668 | 47.154 | 65.142 | 76.810 |
| 0.19239E-6 | 6.4136 | 14.617 | 23.915 | 33.456 | 41.964 | 53.388 | 60.802 |
| 0.28859E-6 | 6.5580 | 13.911 | 22.066 | 29.735 | 36.517 | 44.417 | 49.157 |
| 0.67338E-6 | 4.8757 | 9.6400 | 14.477 | 18.548 | 21.733 | 25.099 | 26.923 |
| 0.14429E-5 | 2.3233 | 4.4563 | 6.4252 | 8.0053 | 9.1903 | 10.375 | 10.922 |
| 0.28859E-5 | 0.52240 | 1.0511 | 1.5190 | 1.8593 | 2.1631 | 2.3698 | 2.4974 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.24049E-7 | -28.841 | -26.265 | -23.111 | -19.531 | -15.657 | -7.5904 | 0.52234 |
| 0.43289E-7 | -12.332 | -9.7714 | -6.6326 | -3.0776 | 0.73570 | 8.5902 | 16.095 |
| 0.81768E-7 | -3.5754 | -1.0382 | 2.0488 | 5.5431 | 9.2804 | 16.755 | 23.196 |
| 0.14429E-6 | -0.27982E-1 | 2.4696 | 5.4838 | 8.8900 | 12.487 | 19.384 | 24.641 |
| 0.26454E-6 | 1.5050 | 3.9267 | 6.8193 | 10.055 | 13.367 | 19.292 | 23.242 |
| 0.48099E-6 | 1.9414 | 4.2507 | 6.9245 | 9.8871 | 12.758 | 17.255 | 20.172 |
| 0.96198E-6 | 1.9109 | 3.9619 | 6.2864 | 8.6716 | 10.798 | 13.654 | 15.508 |
| 0.14429E-5 | 1.7733 | 3.6116 | 5.6504 | 7.5677 | 9.2632 | 11.238 | 12.423 |
| 0.33669E-5 | 1.2335 | 2.4246 | 3.6339 | 4.6518 | 5.4479 | 6.2895 | 6.7453 |
| 0.72148E-5 | 0.58187 | 1.1151 | 1.6073 | 2.0023 | 2.2986 | 2.5948 | 2.7316 |
| 0.14429E-4 | 0.13065 | 0.26283 | 0.37981 | 0.46489 | 0.54085 | 0.59250 | 0.62441 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.13885E-7 | -57.543 | -54.966 | -51.813 | -48.233 | -44.359 | -36.292 | -28.179 |
| 0.24993E-7 | -27.404 | -24.843 | -21.704 | -18.149 | -14.336 | -6.4818 | 1.0232 |
| 0.47209E-7 | -10.720 | -8.1838 | -5.0966 | -1.6024 | 2.1349 | 9.6096 | 16.051 |
| 0.83310E-7 | -3.4330 | -0.93544 | 2.0787 | 5.4849 | 9.0824 | 15.979 | 21.236 |
| 0.15273E-6 | 0.14830 | 2.5699 | 5.4626 | 8.6986 | 12.010 | 17.935 | 21.885 |
| 0.27770E-6 | 1.4945 | 3.8037 | 6.4776 | 9.4402 | 12.311 | 16.808 | 19.725 |
| 0.55540E-6 | 1.8255 | 3.8765 | 6.2009 | 8.5862 | 10.713 | 13.569 | 15.422 |
| 0.83310E-6 | 1.7475 | 3.5858 | 5.6246 | 7.5419 | 9.2374 | 11.212 | 12.397 |
| 0.19439E-5 | 1.2323 | 2.4234 | 3.6328 | 4.6506 | 5.4467 | 6.2884 | 6.7442 |
| 0.41655E-5 | 0.58183 | 1.1150 | 1.6073 | 2.0023 | 2.2985 | 2.5948 | 2.7315 |
| 0.83310E-5 | 0.13065 | 0.26282 | 0.37981 | 0.46488 | 0.54085 | 0.59250 | 0.62441 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.76051E-8 | -115.39 | -112.82 | -109.66 | -106.08 | -102.21 | -94.148 | -86.035 |
| 0.13689E-7 | -58.537 | -55.975 | -52.837 | -49.281 | -45.468 | -37.614 | -30.109 |
| 0.25857E-7 | -26.194 | -23.657 | -20.570 | -17.076 | -13.339 | -5.8643 | 0.57723 |
| 0.45630E-7 | -11.363 | -8.8662 | -5.8520 | -2.4458 | 1.1517 | 8.0491 | 13.305 |
| 0.83656E-7 | -3.4421 | -1.0205 | 1.8721 | 5.1081 | 8.4201 | 14.345 | 18.295 |
| 0.15210E-6 | 0.53751E-1 | 2.3630 | 5.0368 | 7.9994 | 10.870 | 15.367 | 18.284 |
| 0.30420E-6 | 1.4401 | 3.4911 | 5.8156 | 8.2008 | 10.327 | 13.183 | 15.037 |
| 0.45630E-6 | 1.5987 | 3.4370 | 5.4759 | 7.3932 | 9.0886 | 11.063 | 12.248 |
| 0.10647E-5 | 1.2206 | 2.4117 | 3.6211 | 4.6389 | 5.4350 | 6.2767 | 6.7325 |
| 0.22815E-5 | 0.58124 | 1.1145 | 1.6067 | 2.0017 | 2.2979 | 2.5942 | 2.7309 |
| 0.45630E-5 | 0.13063 | 0.26280 | 0.37978 | 0.46486 | 0.54082 | 0.59248 | 0.62438 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.43908E-8 | -210.70 | -208.12 | -204.96 | -201.39 | -197.51 | -189.44 | -181.33 |
| 0.79035E-8 | -110.53 | -107.97 | -104.83 | -101.27 | -97.462 | -89.608 | -82.103 |
| 0.14928E-7 | -52.748 | -50.211 | -47.124 | -43.629 | -39.892 | -32.417 | -25.976 |
| 0.26345E-7 | -25.565 | -23.067 | -20.053 | -16.647 | -13.049 | -6.1525 | -0.89596 |
| 0.48299E-7 | -10.389 | -7.9675 | -5.0749 | -1.8389 | 1.4730 | 7.3981 | 11.348 |
| 0.87816E-7 | -3.1091 | -0.79984 | 1.8740 | 4.8365 | 7.7079 | 12.204 | 15.121 |
| 0.17563E-6 | 0.37117 | 2.4221 | 4.7466 | 7.1318 | 9.2587 | 12.114 | 13.968 |
| 0.26345E-6 | 1.1008 | 2.9391 | 4.9779 | 6.8952 | 8.5907 | 10.565 | 11.750 |
| 0.61471E-6 | 1.1562 | 2.3473 | 3.5567 | 4.5746 | 5.3706 | 6.2123 | 6.6681 |
| 0.13172E-5 | 0.57595 | 1.1092 | 1.6014 | 1.9964 | 2.2927 | 2.5889 | 2.7256 |
| 0.26345E-5 | 0.13032 | 0.26250 | 0.37948 | 0.46456 | 0.54052 | 0.59217 | 0.62408 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.24049E-8 | -398.75 | -396.18 | -393.02 | -389.44 | -385.57 | -377.50 | -369.39 |
| 0.43289E-8 | -213.94 | -211.38 | -208.24 | -204.69 | -200.88 | -193.02 | -185.52 |
| 0.81768E-8 | -106.39 | -103.86 | -100.77 | -97.279 | -93.541 | -86.066 | -79.625 |
| 0.14429E-7 | -54.986 | -52.488 | -49.474 | -46.068 | -42.470 | -35.573 | -30.316 |
| 0.26454E-7 | -25.467 | -23.046 | -20.153 | -16.917 | -13.605 | -7.6803 | -3.7302 |
| 0.48099E-7 | -10.540 | -8.2311 | -5.5573 | -2.5947 | 0.27660 | 4.7735 | 7.6905 |
| 0.96198E-7 | -2.5705 | -0.51953 | 1.8049 | 4.1901 | 6.3170 | 9.1732 | 11.026 |
| 0.14429E-6 | -0.47160 | 1.3666 | 3.4055 | 5.3228 | 7.0182 | 8.9933 | 10.178 |
| 0.33669E-6 | 0.84825 | 2.0393 | 3.2486 | 4.2665 | 5.0626 | 5.9043 | 6.3600 |
| 0.72148E-6 | 0.53437 | 1.0676 | 1.5598 | 1.9548 | 2.2511 | 2.5473 | 2.6841 |
| 0.14429E-5 | 0.12648 | 0.25865 | 0.37564 | 0.46071 | 0.53668 | 0.58833 | 0.62024 |

25°C 100 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.48099E-7 | -12.974 | 7.6385 | 32.870 | 61.505 | 92.497 | 157.03 | 221.93 |
| 0.86578E-7 | 3.4916 | 23.983 | 49.093 | 77.533 | 108.04 | 170.87 | 230.91 |
| 0.16353E-6 | 12.142 | 32.439 | 57.136 | 85.091 | 114.98 | 174.78 | 226.32 |
| 0.28859E-6 | 15.520 | 35.501 | 59.614 | 86.864 | 115.64 | 170.82 | 212.87 |
| 0.52909E-6 | 16.733 | 36.107 | 59.248 | 85.136 | 111.63 | 159.03 | 190.63 |
| 0.96198E-6 | 16.617 | 35.091 | 56.482 | 80.182 | 103.15 | 139.12 | 162.46 |
| 0.19239E-5 | 15.417 | 31.825 | 50.420 | 69.502 | 86.518 | 109.36 | 124.19 |
| 0.28859E-5 | 14.216 | 28.922 | 45.233 | 60.571 | 74.135 | 89.935 | 99.415 |
| 0.67338E-5 | 9.8689 | 19.397 | 29.072 | 37.215 | 43.584 | 50.317 | 53.963 |
| 0.14429E-4 | 4.6549 | 8.9210 | 12.858 | 16.018 | 18.388 | 20.759 | 21.852 |
| 0.28859E-4 | 1.0452 | 2.1026 | 3.0384 | 3.7191 | 4.3268 | 4.7400 | 4.9952 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.27770E-7 | -41.676 | -21.063 | 4.1683 | 32.803 | 63.795 | 128.33 | 193.23 |
| 0.49986E-7 | -11.580 | 8.9111 | 34.021 | 62.461 | 92.968 | 155.80 | 215.84 |
| 0.94418E-7 | 4.9972 | 25.294 | 49.991 | 77.945 | 107.84 | 167.64 | 219.17 |
| 0.16662E-6 | 12.114 | 32.096 | 56.209 | 83.458 | 112.23 | 167.41 | 209.47 |
| 0.30547E-6 | 15.377 | 34.750 | 57.891 | 83.779 | 110.27 | 157.67 | 189.27 |
| 0.55540E-6 | 16.170 | 34.644 | 56.035 | 79.735 | 102.70 | 138.68 | 162.01 |
| 0.11108E-5 | 15.331 | 31.739 | 50.335 | 69.416 | 86.432 | 109.28 | 124.10 |
| 0.16662E-5 | 14.190 | 28.896 | 45.207 | 60.545 | 74.109 | 89.909 | 99.389 |
| 0.38878E-5 | 9.8678 | 19.396 | 29.071 | 37.214 | 43.582 | 50.316 | 53.962 |
| 0.83310E-5 | 4.6549 | 8.9209 | 12.858 | 16.018 | 18.388 | 20.758 | 21.852 |
| 0.16662E-4 | 1.0452 | 2.1026 | 3.0384 | 3.7191 | 4.3268 | 4.7400 | 4.9952 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.15210E-7 | -99.532 | -78.919 | -53.688 | -25.053 | 5.9395 | 70.477 | 135.37 |
| 0.27378E-7 | -42.712 | -22.221 | 2.8890 | 31.329 | 61.835 | 124.67 | 184.71 |
| 0.51715E-7 | -10.476 | 9.8203 | 34.517 | 62.471 | 92.370 | 152.16 | 203.70 |
| 0.91261E-7 | 4.1841 | 24.165 | 48.278 | 75.528 | 104.30 | 159.48 | 201.54 |
| 0.16731E-6 | 11.786 | 31.160 | 54.301 | 80.189 | 106.68 | 154.08 | 185.68 |
| 0.30420E-6 | 14.729 | 33.203 | 54.594 | 78.295 | 101.26 | 137.24 | 160.57 |
| 0.60841E-6 | 14.946 | 31.354 | 49.949 | 69.031 | 86.047 | 108.89 | 123.72 |
| 0.91261E-6 | 14.041 | 28.747 | 45.058 | 60.396 | 73.960 | 89.760 | 99.240 |
| 0.21294E-5 | 9.8561 | 19.384 | 29.059 | 37.202 | 43.571 | 50.304 | 53.950 |
| 0.45630E-5 | 4.6543 | 8.9204 | 12.858 | 16.018 | 18.388 | 20.758 | 21.852 |
| 0.91261E-5 | 1.0452 | 2.1026 | 3.0384 | 3.7191 | 4.3268 | 4.7400 | 4.9952 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.87816E-8 | -194.83 | -174.22 | -148.98 | -120.35 | -89.361 | -24.823 | 40.079 |
| 0.15807E-7 | -94.706 | -74.215 | -49.105 | -20.664 | 9.8417 | 72.677 | 132.71 |
| 0.29857E-7 | -37.030 | -16.732 | 7.9639 | 35.918 | 65.817 | 125.61 | 177.14 |
| 0.52690E-7 | -10.017 | 9.9636 | 34.077 | 61.326 | 90.107 | 145.28 | 187.33 |
| 0.96598E-7 | 4.8396 | 24.213 | 47.354 | 73.242 | 99.738 | 147.13 | 178.73 |
| 0.17563E-6 | 11.566 | 30.040 | 51.431 | 75.132 | 98.103 | 134.07 | 157.41 |
| 0.35126E-6 | 13.877 | 30.285 | 48.880 | 67.962 | 84.978 | 107.82 | 122.65 |
| 0.52690E-6 | 13.543 | 28.249 | 44.560 | 59.898 | 73.462 | 89.262 | 98.743 |
| 0.12294E-5 | 9.7917 | 19.320 | 28.995 | 37.138 | 43.506 | 50.240 | 53.886 |
| 0.26345E-5 | 4.6490 | 8.9151 | 12.853 | 16.013 | 18.383 | 20.753 | 21.846 |
| 0.52690E-5 | 1.0449 | 2.1023 | 3.0381 | 3.7187 | 4.3264 | 4.7397 | 4.9949 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.48099E-8 | -382.89 | -362.27 | -337.04 | -308.41 | -277.41 | -212.88 | -147.97 |
| 0.86578E-8 | -198.12 | -177.63 | -152.52 | -124.08 | -93.575 | -30.739 | 29.301 |
| 0.16353E-7 | -90.679 | -70.382 | -45.685 | -17.731 | 12.167 | 71.965 | 123.49 |
| 0.28859E-7 | -39.438 | -19.457 | 4.6565 | 31.905 | 60.686 | 115.86 | 157.91 |
| 0.52909E-7 | -10.238 | 9.1347 | 32.275 | 58.163 | 84.659 | 132.06 | 163.66 |
| 0.96198E-7 | 4.1354 | 22.609 | 44.000 | 67.700 | 90.671 | 126.64 | 149.98 |
| 0.19239E-6 | 10.935 | 27.343 | 45.939 | 65.020 | 82.036 | 104.88 | 119.71 |
| 0.28859E-6 | 11.971 | 26.677 | 42.988 | 58.326 | 71.890 | 87.690 | 97.170 |
| 0.67338E-6 | 9.4836 | 19.012 | 28.686 | 36.830 | 43.198 | 49.932 | 53.578 |
| 0.14429E-5 | 4.6074 | 8.8735 | 12.811 | 15.971 | 18.341 | 20.711 | 21.805 |
| 0.28859E-5 | 1.0410 | 2.0984 | 3.0343 | 3.7149 | 4.3226 | 4.7358 | 4.9911 |

| $H_0$ | V/kT Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.24049E-7 | -65.996 | -60.843 | -54.535 | -47.376 | -39.628 | -23.494 | -7.2687 |
| 0.43289E-7 | -30.862 | -25.739 | -19.462 | -12.351 | -4.7253 | 10.983 | 25.993 |
| 0.81768E-7 | -11.269 | -6.1950 | -0.20797E-1 | 6.9677 | 14.442 | 29.391 | 42.275 |
| 0.14429E-6 | -2.6056 | 2.3896 | 8.4180 | 15.230 | 22.425 | 36.220 | 46.733 |
| 0.26454E-6 | 1.7232 | 6.5665 | 12.351 | 18.823 | 25.447 | 37.297 | 45.198 |
| 0.48099E-6 | 3.3687 | 7.9872 | 13.335 | 19.260 | 25.002 | 33.996 | 39.830 |
| 0.96198E-6 | 3.7037 | 7.8057 | 12.454 | 17.225 | 21.479 | 27.191 | 30.898 |
| 0.14429E-5 | 3.5075 | 7.1841 | 11.261 | 15.096 | 18.487 | 22.437 | 24.807 |
| 0.33669E-5 | 2.4650 | 4.8471 | 7.2658 | 9.3016 | 10.893 | 12.577 | 13.488 |
| 0.72148E-5 | 1.1636 | 2.2301 | 3.2146 | 4.0046 | 4.5971 | 5.1896 | 5.4631 |
| 0.14429E-4 | 0.26130 | 0.52565 | 0.75962 | 0.92977 | 1.0817 | 1.1850 | 1.2488 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.13885E-7 | -125.48 | -120.32 | -114.02 | -106.86 | -99.113 | -82.979 | -66.753 |
| 0.24993E-7 | -62.980 | -57.857 | -51.580 | -44.470 | -36.843 | -21.134 | -6.1242 |
| 0.47209E-7 | -27.340 | -22.265 | -16.091 | -9.1030 | -1.6282 | 13.321 | 26.204 |
| 0.83310E-7 | -10.928 | -5.9328 | 0.95538E-1 | 6.9078 | 14.103 | 27.897 | 38.411 |
| 0.15273E-6 | -2.1151 | 2.7282 | 8.5135 | 14.985 | 21.609 | 33.459 | 41.359 |
| 0.27770E-6 | 1.7825 | 6.4010 | 11.748 | 17.673 | 23.416 | 32.410 | 38.244 |
| 0.55540E-6 | 3.2568 | 7.3588 | 12.007 | 16.778 | 21.032 | 26.744 | 30.451 |
| 0.83310E-6 | 3.3280 | 7.0046 | 11.082 | 14.916 | 18.307 | 22.257 | 24.627 |
| 0.19439E-5 | 2.4494 | 4.8316 | 7.2502 | 9.2860 | 10.878 | 12.561 | 13.473 |
| 0.41655E-5 | 1.1628 | 2.2293 | 3.2138 | 4.0038 | 4.5963 | 5.1888 | 5.4622 |
| 0.83310E-5 | 0.26127 | 0.52562 | 0.75958 | 0.92974 | 1.0816 | 1.1849 | 1.2487 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.76051E-8 | -243.54 | -238.38 | -232.08 | -224.92 | -217.17 | -201.03 | -184.81 |
| 0.13689E-7 | -127.52 | -122.40 | -116.12 | -109.01 | -101.38 | -85.677 | -70.667 |
| 0.25857E-7 | -60.435 | -55.360 | -49.186 | -42.197 | -34.723 | -19.773 | -6.8905 |
| 0.45630E-7 | -28.742 | -23.747 | -17.718 | -10.906 | -3.7113 | 10.083 | 20.596 |
| 0.83656E-7 | -10.933 | -6.0904 | -0.30516 | 6.1668 | 12.790 | 24.640 | 32.541 |
| 0.15210E-6 | -2.3141 | 2.3043 | 7.6521 | 13.577 | 19.319 | 28.313 | 34.147 |
| 0.30420E-6 | 1.8160 | 5.9180 | 10.566 | 15.337 | 19.591 | 25.303 | 29.010 |
| 0.45630E-6 | 2.6335 | 6.3101 | 10.387 | 14.222 | 17.613 | 21.563 | 23.933 |
| 0.10647E-5 | 2.3500 | 4.7322 | 7.1509 | 9.1867 | 10.778 | 12.462 | 13.373 |
| 0.22815E-5 | 1.1536 | 2.2201 | 3.2046 | 3.9946 | 4.5871 | 5.1796 | 5.4531 |
| 0.45630E-5 | 0.26068 | 0.52503 | 0.75899 | 0.92915 | 1.0810 | 1.1843 | 1.2481 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.43908E-8 | -436.32 | -431.16 | -424.86 | -417.70 | -409.95 | -393.81 | -377.59 |
| 0.79035E-8 | -233.65 | -228.53 | -222.25 | -215.14 | -207.51 | -191.80 | -176.79 |
| 0.14928E-7 | -115.61 | -110.53 | -104.36 | -97.375 | -89.900 | -74.951 | -62.067 |
| 0.26345E-7 | -59.107 | -54.112 | -48.083 | -41.271 | -34.076 | -20.281 | -9.7681 |
| 0.48299E-7 | -26.598 | -21.755 | -15.970 | -9.4981 | -2.8741 | 8.9759 | 16.876 |
| 0.87816E-7 | -10.122 | -5.5038 | -0.15612 | 5.7689 | 11.511 | 20.505 | 26.339 |
| 0.17563E-6 | -1.3467 | 2.7552 | 7.4041 | 12.174 | 16.428 | 22.140 | 25.847 |
| 0.26345E-6 | 0.90782 | 4.5844 | 8.6620 | 12.496 | 15.887 | 19.837 | 22.207 |
| 0.61471E-6 | 1.9895 | 4.3717 | 6.7903 | 8.8261 | 10.418 | 12.101 | 13.013 |
| 0.13172E-5 | 1.1008 | 2.1673 | 3.1518 | 3.9418 | 4.5343 | 5.1268 | 5.4003 |
| 0.26345E-5 | 0.25538 | 0.51973 | 0.75370 | 0.92385 | 1.0757 | 1.1790 | 1.2429 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.24049E-8 | -814.84 | -809.69 | -803.38 | -796.22 | -788.48 | -772.34 | -756.12 |
| 0.43289E-8 | -442.87 | -437.75 | -431.47 | -424.36 | -416.73 | -401.02 | -386.01 |
| 0.81768E-8 | -225.25 | -220.17 | -214.00 | -207.01 | -199.54 | -184.59 | -171.70 |
| 0.14429E-7 | -120.21 | -115.22 | -109.19 | -102.38 | -95.187 | -81.392 | -70.879 |
| 0.26454E-7 | -58.896 | -54.052 | -48.267 | -41.795 | -35.171 | -23.321 | -15.421 |
| 0.48099E-7 | -26.915 | -22.296 | -16.949 | -11.023 | -5.2811 | 3.7127 | 9.5466 |
| 0.96198E-7 | -8.7781 | -4.6761 | -0.27249E-1 | 4.7431 | 8.9970 | 14.709 | 18.416 |
| 0.14429E-6 | -3.4928 | 0.18370 | 4.2613 | 8.0959 | 11.486 | 15.436 | 17.807 |
| 0.33669E-6 | 0.77749 | 3.1596 | 5.5783 | 7.6141 | 9.2062 | 10.889 | 11.801 |
| 0.72148E-6 | 0.83771 | 1.9042 | 2.8887 | 3.6787 | 4.2712 | 4.8637 | 5.1371 |
| 0.14429E-5 | 0.21381 | 0.47816 | 0.71212 | 0.88228 | 1.0342 | 1.1375 | 1.2013 |

25°C 200 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.48099E-7 | -34.262 | 6.9636 | 57.427 | 114.69 | 176.68 | 305.75 | 435.56 |
| 0.86578E-7 | 0.78649 | 41.769 | 91.990 | 148.87 | 209.88 | 335.55 | 455.63 |
| 0.16353E-6 | 20.166 | 60.761 | 110.15 | 166.06 | 225.86 | 345.45 | 448.52 |
| 0.28859E-6 | 28.490 | 68.452 | 116.67 | 171.17 | 228.73 | 339.09 | 423.20 |
| 0.52909E-6 | 32.181 | 70.928 | 117.21 | 168.98 | 221.97 | 316.77 | 379.98 |
| 0.96198E-6 | 32.720 | 69.668 | 112.45 | 159.85 | 205.79 | 277.74 | 324.41 |
| 0.19239E-5 | 30.716 | 63.531 | 100.72 | 138.88 | 172.91 | 218.61 | 248.27 |
| 0.28859E-5 | 28.392 | 57.805 | 90.426 | 121.10 | 148.23 | 179.83 | 198.79 |
| 0.67338E-5 | 19.735 | 38.793 | 58.142 | 74.428 | 87.166 | 100.63 | 107.92 |
| 0.14429E-4 | 9.3098 | 17.841 | 25.717 | 32.037 | 36.777 | 41.517 | 43.705 |
| 0.28859E-4 | 2.0904 | 4.2052 | 6.0769 | 7.4382 | 8.6536 | 9.4801 | 9.9905 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.27770E-7 | -93.747 | -52.521 | -2.0578 | 55.211 | 117.19 | 246.27 | 376.07 |
| 0.49986E-7 | -31.331 | 9.6516 | 59.871 | 116.75 | 177.76 | 303.43 | 423.51 |
| 0.94418E-7 | 4.0962 | 44.690 | 94.084 | 149.99 | 209.79 | 329.38 | 432.45 |
| 0.16662E-6 | 20.167 | 60.130 | 108.35 | 162.85 | 220.41 | 330.77 | 414.88 |
| 0.30547E-6 | 28.342 | 67.089 | 113.37 | 165.14 | 218.13 | 312.94 | 376.14 |
| 0.55540E-6 | 31.134 | 68.082 | 110.86 | 158.26 | 204.20 | 276.15 | 322.83 |
| 0.11108E-5 | 30.269 | 63.084 | 100.27 | 138.43 | 172.47 | 218.16 | 247.82 |
| 0.16662E-5 | 28.213 | 57.626 | 90.247 | 120.92 | 148.05 | 179.65 | 198.61 |
| 0.38878E-5 | 19.720 | 38.777 | 58.126 | 74.413 | 87.150 | 100.61 | 107.90 |
| 0.83310E-5 | 9.3090 | 17.841 | 25.716 | 32.037 | 36.777 | 41.517 | 43.704 |
| 0.16662E-4 | 2.0904 | 4.2052 | 6.0769 | 7.4382 | 8.6536 | 9.4800 | 9.9905 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.15210E-7 | -211.80 | -170.58 | -120.11 | -62.848 | -0.86342 | 128.21 | 258.01 |
| 0.27378E-7 | -95.874 | -54.891 | -4.6710 | 52.209 | 113.22 | 238.89 | 358.97 |
| 0.51715E-7 | -28.998 | 11.595 | 60.989 | 116.89 | 176.69 | 296.29 | 399.35 |
| 0.91261E-7 | 2.3534 | 42.315 | 90.542 | 145.04 | 202.60 | 312.96 | 397.06 |
| 0.16731E-6 | 19.524 | 58.271 | 104.55 | 156.32 | 209.32 | 304.12 | 367.32 |
| 0.30420E-6 | 27.037 | 63.985 | 106.76 | 154.16 | 200.11 | 272.06 | 318.73 |
| 0.60841E-6 | 28.828 | 61.644 | 98.835 | 136.99 | 171.03 | 216.72 | 246.38 |
| 0.91261E-6 | 27.518 | 56.931 | 89.552 | 120.22 | 147.35 | 178.95 | 197.91 |
| 0.21294E-5 | 19.620 | 38.678 | 58.027 | 74.313 | 87.051 | 100.51 | 107.81 |
| 0.45630E-5 | 9.2998 | 17.831 | 25.707 | 32.027 | 36.767 | 41.507 | 43.695 |
| 0.91261E-5 | 2.0898 | 4.2046 | 6.0763 | 7.4376 | 8.6530 | 9.4794 | 9.9899 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.87816E-8 | -404.58 | -363.36 | -312.89 | -255.62 | -193.64 | -64.567 | 65.237 |
| 0.15807E-7 | -202.00 | -161.02 | -110.80 | -53.920 | 7.0924 | 132.76 | 252.84 |
| 0.29857E-7 | -84.176 | -43.581 | 5.8122 | 61.720 | 121.51 | 241.11 | 344.17 |
| 0.52690E-7 | -28.011 | 11.951 | 60.178 | 114.67 | 172.23 | 282.59 | 366.70 |
| 0.96598E-7 | 3.8591 | 42.606 | 88.888 | 140.66 | 193.65 | 288.45 | 351.65 |
| 0.17563E-6 | 19.229 | 56.177 | 98.959 | 146.36 | 192.30 | 264.25 | 310.92 |
| 0.35126E-6 | 25.665 | 58.481 | 95.672 | 133.83 | 167.86 | 213.56 | 243.22 |
| 0.52690E-6 | 25.793 | 55.205 | 87.827 | 118.50 | 145.63 | 177.23 | 196.19 |
| 0.12294E-5 | 19.260 | 38.317 | 57.667 | 73.953 | 86.690 | 100.15 | 107.44 |
| 0.26345E-5 | 9.2470 | 17.779 | 25.654 | 31.975 | 36.715 | 41.455 | 43.642 |
| 0.52690E-5 | 2.0845 | 4.1993 | 6.0710 | 7.4323 | 8.6477 | 9.4741 | 9.9846 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.48099E-8 | -783.11 | -741.88 | -691.42 | -634.15 | -572.16 | -443.09 | -313.28 |
| 0.86578E-8 | -411.22 | -370.24 | -320.02 | -263.14 | -202.12 | -76.456 | 43.625 |
| 0.16353E-7 | -193.81 | -153.22 | -103.82 | -47.919 | 11.878 | 131.47 | 234.53 |
| 0.28859E-7 | -89.122 | -49.160 | -0.93338 | 53.565 | 111.12 | 221.48 | 305.59 |
| 0.52909E-7 | -28.438 | 10.308 | 56.590 | 108.36 | 161.35 | 256.15 | 319.36 |
| 0.96198E-7 | 2.4365 | 39.384 | 82.166 | 129.56 | 175.50 | 247.46 | 294.13 |
| 0.19239E-6 | 18.234 | 51.049 | 88.241 | 126.40 | 160.43 | 206.13 | 235.79 |
| 0.28859E-6 | 21.392 | 50.805 | 83.426 | 114.10 | 141.23 | 172.83 | 191.79 |
| 0.67338E-6 | 18.048 | 37.105 | 56.454 | 72.741 | 85.478 | 98.945 | 106.23 |
| 0.14429E-5 | 8.9839 | 17.516 | 25.391 | 31.711 | 36.451 | 41.192 | 43.379 |
| 0.28859E-5 | 2.0429 | 4.1577 | 6.0295 | 7.3907 | 8.6061 | 9.4326 | 9.9430 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.24049E-7 | -142.94 | -132.63 | -120.02 | -105.70 | -90.207 | -57.939 | -25.487 |
| 0.43289E-7 | -70.431 | -60.185 | -47.630 | -33.410 | -18.157 | 13.261 | 43.281 |
| 0.81768E-7 | -28.934 | -18.785 | -6.4374 | 7.5396 | 22.489 | 52.387 | 78.154 |
| 0.14429E-6 | -9.7159 | 0.27466 | 12.331 | 25.956 | 40.346 | 67.935 | 88.962 |
| 0.26454E-6 | 0.67833 | 10.365 | 21.935 | 34.879 | 48.127 | 71.827 | 87.628 |
| 0.48099E-6 | 5.2837 | 14.520 | 25.216 | 37.066 | 48.551 | 66.539 | 78.207 |
| 0.96198E-6 | 6.8934 | 15.097 | 24.395 | 33.936 | 42.443 | 53.868 | 61.282 |
| 0.14429E-5 | 6.7840 | 14.137 | 22.292 | 29.961 | 36.743 | 44.643 | 49.383 |
| 0.33669E-5 | 4.9055 | 9.6699 | 14.507 | 18.578 | 21.763 | 25.129 | 26.952 |
| 0.72148E-5 | 2.3257 | 4.4588 | 6.4277 | 8.0077 | 9.1927 | 10.377 | 10.924 |
| 0.14429E-4 | 0.52254 | 1.0512 | 1.5191 | 1.8594 | 2.1633 | 2.3699 | 2.4975 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.13885E-7 | -264.06 | -253.75 | -241.14 | -226.82 | -211.32 | -179.06 | -146.60 |
| 0.24993E-7 | -136.76 | -126.51 | -113.96 | -99.741 | -84.488 | -53.070 | -23.049 |
| 0.47209E-7 | -63.062 | -52.914 | -40.565 | -26.588 | -11.639 | 18.259 | 44.025 |
| 0.83310E-7 | -28.186 | -18.196 | -6.1395 | 7.4851 | 21.875 | 49.465 | 70.491 |
| 0.15273E-6 | -8.5579 | 1.1288 | 12.699 | 25.643 | 38.891 | 62.591 | 78.391 |
| 0.27770E-6 | 0.91987 | 10.156 | 20.852 | 32.702 | 44.188 | 62.176 | 73.843 |
| 0.55540E-6 | 5.3072 | 13.511 | 22.808 | 32.349 | 40.857 | 52.282 | 59.696 |
| 0.83310E-6 | 5.9978 | 13.351 | 21.506 | 29.175 | 35.957 | 43.857 | 48.597 |
| 0.19439E-5 | 4.7837 | 9.5480 | 14.385 | 18.456 | 21.641 | 25.007 | 26.831 |
| 0.41655E-5 | 2.3134 | 4.4465 | 6.4154 | 7.9954 | 9.1804 | 10.365 | 10.912 |
| 0.83310E-5 | 0.52169 | 1.0503 | 1.5183 | 1.8586 | 2.1624 | 2.3691 | 2.4967 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.76051E-8 | -502.58 | -492.27 | -479.65 | -465.34 | -449.84 | -417.57 | -385.12 |
| 0.13689E-7 | -268.20 | -257.95 | -245.40 | -231.18 | -215.93 | -184.51 | -154.49 |
| 0.25857E-7 | -131.53 | -121.39 | -109.04 | -95.065 | -80.116 | -50.217 | -24.451 |
| 0.45630E-7 | -65.994 | -56.003 | -43.947 | -30.322 | -15.932 | 11.657 | 32.683 |
| 0.83656E-7 | -28.183 | -18.497 | -6.9264 | 6.0175 | 19.265 | 42.965 | 58.765 |
| 0.15210E-6 | -8.9688 | 0.26816 | 10.963 | 22.813 | 34.299 | 52.287 | 63.955 |
| 0.30420E-6 | 1.2104 | 9.4144 | 18.712 | 28.253 | 36.760 | 48.185 | 55.599 |
| 0.45630E-6 | 3.7159 | 11.069 | 19.224 | 26.893 | 33.675 | 41.575 | 46.315 |
| 0.10647E-5 | 4.2730 | 9.0373 | 13.874 | 17.946 | 21.130 | 24.497 | 26.320 |
| 0.22815E-5 | 2.2312 | 4.3642 | 6.3332 | 7.9132 | 9.0982 | 10.283 | 10.830 |
| 0.45630E-5 | 0.51251 | 1.0412 | 1.5091 | 1.8494 | 2.1533 | 2.3599 | 2.4875 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.43908E-8 | -890.34 | -880.03 | -867.41 | -853.10 | -837.60 | -805.33 | -772.88 |
| 0.79035E-8 | -482.64 | -472.40 | -459.84 | -445.62 | -430.37 | -398.95 | -368.93 |
| 0.14928E-7 | -244.04 | -233.89 | -221.54 | -207.56 | -192.61 | -162.71 | -136.95 |
| 0.26345E-7 | -128.81 | -118.82 | -106.76 | -93.140 | -78.749 | -51.160 | -30.133 |
| 0.48299E-7 | -61.495 | -51.808 | -40.238 | -27.294 | -14.046 | 9.6539 | 25.454 |
| 0.87816E-7 | -26.392 | -17.155 | -6.4598 | 5.3903 | 16.875 | 34.863 | 46.531 |
| 0.17563E-6 | -6.5977 | 1.6062 | 10.904 | 20.444 | 28.952 | 40.377 | 47.791 |
| 0.26345E-6 | -0.96310 | 6.3900 | 14.545 | 22.214 | 28.996 | 36.896 | 41.636 |
| 0.61471E-6 | 2.9301 | 7.6945 | 12.531 | 16.603 | 19.787 | 23.154 | 24.977 |
| 0.13172E-5 | 1.9211 | 4.0542 | 6.0231 | 7.6031 | 8.7882 | 9.9732 | 10.520 |
| 0.26345E-5 | 0.45972 | 0.98842 | 1.4563 | 1.7966 | 2.1005 | 2.3071 | 2.4347 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.24049E-8 | -1649.8 | -1639.5 | -1626.8 | -1612.5 | -1597.0 | -1564.8 | -1532.3 |
| 0.43289E-8 | -903.50 | -893.25 | -880.70 | -866.48 | -851.22 | -819.81 | -789.79 |
| 0.81768E-8 | -465.71 | -455.56 | -443.21 | -429.23 | -414.28 | -384.38 | -358.62 |
| 0.14429E-7 | -253.38 | -243.39 | -231.34 | -217.71 | -203.32 | -175.73 | -154.70 |
| 0.26454E-7 | -128.37 | -118.68 | -107.11 | -94.173 | -80.925 | -57.224 | -41.424 |
| 0.48099E-7 | -62.144 | -52.906 | -42.211 | -30.361 | -18.875 | -0.88785 | 10.779 |
| 0.96198E-7 | -23.390 | -15.186 | -5.8888 | 3.6519 | 12.159 | 23.584 | 30.998 |
| 0.14429E-6 | -11.490 | -4.1372 | 4.0180 | 11.687 | 18.469 | 26.369 | 31.109 |
| 0.33669E-6 | -0.62945 | 4.1349 | 8.9722 | 13.043 | 16.228 | 19.594 | 21.417 |
| 0.72148E-6 | 0.84736 | 2.9803 | 4.9493 | 6.5293 | 7.7143 | 8.8993 | 9.4463 |
| 0.14429E-5 | 0.19658 | 0.72528 | 1.1932 | 1.5335 | 1.8373 | 2.0439 | 2.1716 |

25°C 400 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.48099E-7 | -79.475 | 2.9768 | 103.90 | 218.44 | 342.41 | 600.56 | 860.17 |
| 0.86578E-7 | -7.1333 | 74.833 | 175.27 | 289.03 | 411.06 | 662.40 | 902.56 |
| 0.16353E-6 | 33.938 | 115.12 | 213.91 | 325.73 | 445.32 | 684.51 | 890.64 |
| 0.28859E-6 | 52.476 | 132.40 | 228.85 | 337.85 | 452.97 | 673.69 | 841.90 |
| 0.52909E-6 | 61.594 | 139.08 | 231.65 | 335.20 | 441.18 | 630.79 | 757.19 |
| 0.96198E-6 | 63.987 | 137.88 | 223.44 | 318.24 | 410.13 | 554.03 | 647.37 |
| 0.19239E-5 | 60.917 | 126.54 | 200.93 | 277.25 | 345.32 | 436.71 | 496.03 |
| 0.28859E-5 | 56.554 | 115.38 | 180.62 | 241.97 | 296.23 | 359.43 | 397.35 |
| 0.67338E-5 | 39.447 | 77.562 | 116.26 | 148.83 | 174.30 | 201.24 | 215.82 |
| 0.14429E-4 | 18.618 | 35.682 | 51.434 | 64.074 | 73.554 | 83.034 | 87.409 |
| 0.28859E-4 | 4.1809 | 8.4104 | 12.153 | 14.876 | 17.307 | 18.960 | 19.981 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.27770E-7 | -200.59 | -118.14 | -17.217 | 97.321 | 221.29 | 479.44 | 739.05 |
| 0.49986E-7 | -73.464 | 8.5018 | 108.94 | 222.70 | 344.73 | 596.07 | 836.23 |
| 0.94418E-7 | -0.19033 | 80.998 | 179.78 | 291.60 | 411.19 | 650.38 | 856.52 |
| 0.16662E-6 | 34.005 | 113.92 | 210.38 | 319.38 | 434.50 | 655.22 | 823.43 |
| 0.30547E-6 | 52.357 | 129.85 | 222.41 | 325.96 | 431.95 | 621.55 | 747.95 |
| 0.55540E-6 | 59.623 | 133.52 | 219.08 | 313.88 | 405.76 | 549.67 | 643.01 |
| 0.11108E-5 | 59.331 | 124.96 | 199.34 | 275.67 | 343.73 | 435.13 | 494.44 |
| 0.16662E-5 | 55.768 | 114.59 | 179.83 | 241.18 | 295.44 | 358.64 | 396.56 |
| 0.38878E-5 | 39.325 | 77.440 | 116.13 | 148.71 | 174.18 | 201.11 | 215.70 |
| 0.83310E-5 | 18.605 | 35.670 | 51.421 | 64.061 | 73.542 | 83.022 | 87.397 |
| 0.16662E-4 | 4.1800 | 8.4096 | 12.153 | 14.875 | 17.306 | 18.959 | 19.980 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.15210E-7 | -439.11 | -356.65 | -255.73 | -141.19 | -17.222 | 240.92 | 500.53 |
| 0.27378E-7 | -204.90 | -122.94 | -22.500 | 91.260 | 213.28 | 464.63 | 704.79 |
| 0.51715E-7 | -68.667 | 12.521 | 111.30 | 223.12 | 342.72 | 581.91 | 788.04 |
| 0.91261E-7 | -3.8024 | 76.122 | 172.57 | 281.57 | 396.69 | 617.41 | 785.62 |
| 0.16731E-6 | 32.732 | 110.22 | 202.79 | 306.34 | 412.32 | 601.92 | 728.32 |
| 0.30420E-6 | 49.734 | 123.63 | 209.19 | 303.99 | 395.88 | 539.78 | 633.12 |
| 0.60841E-6 | 55.235 | 120.86 | 195.24 | 271.57 | 339.63 | 431.03 | 490.34 |
| 0.91261E-6 | 53.486 | 112.31 | 177.55 | 238.90 | 293.16 | 356.36 | 394.28 |
| 0.21294E-5 | 38.814 | 76.929 | 115.62 | 148.20 | 173.67 | 200.60 | 215.19 |
| 0.45630E-5 | 18.523 | 35.587 | 51.339 | 63.979 | 73.459 | 82.939 | 87.315 |
| 0.91261E-5 | 4.1708 | 8.4004 | 12.143 | 14.866 | 17.297 | 18.950 | 19.971 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.87816E-8 | -826.87 | -744.41 | -643.49 | -528.95 | -404.98 | -146.83 | 112.77 |
| 0.15807E-7 | -419.35 | -337.38 | -236.94 | -123.18 | -1.1563 | 250.18 | 490.35 |
| 0.29857E-7 | -181.16 | -99.979 | -1.1917 | 110.62 | 230.22 | 469.41 | 675.54 |
| 0.52690E-7 | -66.620 | 13.304 | 109.75 | 218.75 | 333.87 | 554.59 | 722.80 |
| 0.96598E-7 | -0.57971 | 76.914 | 169.47 | 273.03 | 379.01 | 568.61 | 695.01 |
| 0.17563E-6 | 32.311 | 106.20 | 191.77 | 286.57 | 378.45 | 522.36 | 615.70 |
| 0.35126E-6 | 47.426 | 113.05 | 187.44 | 263.76 | 331.83 | 423.22 | 482.53 |
| 0.52690E-6 | 48.807 | 107.63 | 172.87 | 234.22 | 288.48 | 351.68 | 389.60 |
| 0.12294E-5 | 37.471 | 75.586 | 114.28 | 146.85 | 172.33 | 199.26 | 213.85 |
| 0.26345E-5 | 18.213 | 35.277 | 51.029 | 63.669 | 73.149 | 82.629 | 87.005 |
| 0.52690E-5 | 4.1180 | 8.3476 | 12.091 | 14.813 | 17.244 | 18.897 | 19.918 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.48099E-8 | -1586.3 | -1503.8 | -1402.9 | -1288.4 | -1164.4 | -906.30 | -646.69 |
| 0.86578E-8 | -840.20 | -758.23 | -657.79 | -544.03 | -422.01 | -170.66 | 69.496 |
| 0.16353E-7 | -402.83 | -321.64 | -222.86 | -111.04 | 8.5510 | 247.74 | 453.87 |
| 0.28859E-7 | -191.19 | -111.27 | -14.817 | 94.180 | 209.30 | 430.01 | 598.23 |
| 0.52909E-7 | -67.458 | 10.035 | 102.60 | 206.15 | 312.13 | 501.73 | 628.13 |
| 0.96198E-7 | -3.4401 | 70.456 | 156.02 | 250.82 | 342.70 | 486.60 | 579.95 |
| 0.19239E-6 | 30.633 | 96.265 | 170.64 | 246.97 | 315.03 | 406.43 | 465.74 |
| 0.28859E-6 | 38.280 | 97.105 | 162.34 | 223.70 | 277.95 | 341.15 | 379.07 |
| 0.67338E-6 | 33.912 | 72.027 | 110.72 | 143.29 | 168.77 | 195.70 | 210.29 |
| 0.14429E-5 | 17.139 | 34.204 | 49.955 | 62.595 | 72.075 | 81.556 | 85.931 |
| 0.28859E-5 | 3.8549 | 8.0845 | 11.827 | 14.550 | 16.981 | 18.634 | 19.655 |

| $H_0$ | V/kT: Z = 2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.24049E-7 | -299.55 | -278.94 | -253.71 | -225.07 | -194.08 | -129.54 | -64.647 |
| 0.43289E-7 | -152.22 | -131.73 | -106.62 | -78.180 | -47.674 | 15.162 | 75.202 |
| 0.81768E-7 | -66.789 | -46.492 | -21.795 | 6.1584 | 36.057 | 95.854 | 147.38 |
| 0.14429E-6 | -26.269 | -6.2880 | 17.825 | 45.074 | 73.855 | 129.03 | 171.08 |
| 0.26454E-6 | -3.4237 | 15.949 | 39.090 | 64.978 | 91.474 | 138.87 | 170.47 |
| 0.48099E-6 | 7.5504 | 26.024 | 47.415 | 71.115 | 94.086 | 130.06 | 153.39 |
| 0.96198E-6 | 12.333 | 28.740 | 47.336 | 66.418 | 83.433 | 106.28 | 121.11 |
| 0.14429E-5 | 12.740 | 27.446 | 43.757 | 59.095 | 72.659 | 88.459 | 97.939 |
| 0.33669E-5 | 9.6480 | 19.176 | 28.851 | 36.994 | 43.363 | 50.096 | 53.742 |
| 0.72148E-5 | 4.6319 | 8.8980 | 12.835 | 15.995 | 18.365 | 20.736 | 21.829 |
| 0.14429E-4 | 1.0435 | 2.1009 | 3.0367 | 3.7174 | 4.3251 | 4.7383 | 4.9935 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.13885E-7 | -543.99 | -523.37 | -498.14 | -469.51 | -438.51 | -373.98 | -309.07 |
| 0.24993E-7 | -287.04 | -266.55 | -241.44 | -213.00 | -182.49 | -119.65 | -59.618 |
| 0.47209E-7 | -137.14 | -116.85 | -92.154 | -64.200 | -34.301 | 25.495 | 77.028 |
| 0.83310E-7 | -65.224 | -45.243 | -21.129 | 6.1195 | 34.900 | 90.079 | 132.13 |
| 0.15273E-6 | -23.751 | -4.3783 | 18.762 | 44.650 | 71.146 | 118.54 | 150.14 |
| 0.27770E-6 | -2.7861 | 15.687 | 37.078 | 60.779 | 83.750 | 119.72 | 143.06 |
| 0.55540E-6 | 7.9691 | 24.377 | 42.972 | 62.054 | 79.070 | 101.91 | 116.74 |
| 0.83310E-6 | 10.267 | 24.973 | 41.284 | 56.622 | 70.186 | 85.986 | 95.466 |
| 0.19439E-5 | 9.0626 | 18.591 | 28.265 | 36.409 | 42.777 | 49.511 | 53.157 |
| 0.41655E-5 | 4.5303 | 8.7963 | 12.734 | 15.894 | 18.264 | 20.634 | 21.728 |
| 0.83310E-5 | 1.0312 | 2.0886 | 3.0244 | 3.7051 | 4.3128 | 4.7260 | 4.9812 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.76051E-8 | -1023.4 | -1002.8 | -977.58 | -948.95 | -917.96 | -853.42 | -788.52 |
| 0.13689E-7 | -552.32 | -531.83 | -506.72 | -478.28 | -447.77 | -384.94 | -324.90 |
| 0.25857E-7 | -276.46 | -256.16 | -231.47 | -203.51 | -173.61 | -113.81 | -62.286 |
| 0.45630E-7 | -143.14 | -123.16 | -99.049 | -71.799 | -43.019 | 12.159 | 54.212 |
| 0.83656E-7 | -65.202 | -45.829 | -22.688 | 3.1999 | 29.695 | 77.096 | 108.69 |
| 0.15210E-6 | -24.588 | -6.1143 | 15.276 | 38.977 | 61.948 | 97.923 | 121.25 |
| 0.30420E-6 | -1.9195 | 14.488 | 33.083 | 52.165 | 69.181 | 92.030 | 106.85 |
| 0.45630E-6 | 4.2728 | 18.979 | 35.289 | 50.628 | 64.192 | 79.992 | 89.472 |
| 0.10647E-5 | 7.2696 | 16.798 | 26.472 | 34.616 | 40.984 | 47.718 | 51.364 |
| 0.22815E-5 | 4.0879 | 8.3540 | 12.291 | 15.451 | 17.821 | 20.192 | 21.285 |
| 0.45630E-5 | 0.94899 | 2.0063 | 2.9422 | 3.6228 | 4.2305 | 4.6438 | 4.8990 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.43908E-8 | -1801.1 | -1780.5 | -1755.3 | -1726.6 | -1695.6 | -1631.1 | -1566.2 |
| 0.79035E-8 | -983.41 | -962.92 | -937.81 | -909.37 | -878.87 | -816.03 | -755.99 |
| 0.14928E-7 | -503.65 | -483.35 | -458.65 | -430.70 | -400.80 | -341.00 | -289.47 |
| 0.26345E-7 | -270.93 | -250.95 | -226.84 | -199.59 | -170.81 | -115.63 | -73.578 |
| 0.48299E-7 | -133.92 | -114.55 | -91.410 | -65.522 | -39.027 | 8.3735 | 39.973 |
| 0.87816E-7 | -61.437 | -42.963 | -21.572 | 2.1274 | 25.098 | 61.074 | 84.410 |
| 0.17563E-6 | -19.343 | -2.9351 | 15.660 | 34.742 | 51.757 | 74.607 | 89.435 |
| 0.26345E-6 | -6.7198 | 7.9864 | 24.297 | 39.635 | 53.199 | 68.999 | 78.479 |
| 0.61471E-6 | 3.4633 | 12.992 | 22.666 | 30.809 | 37.178 | 43.911 | 47.558 |
| 0.13172E-5 | 2.8928 | 7.1588 | 11.096 | 14.256 | 16.626 | 18.996 | 20.090 |
| 0.26345E-5 | 0.63894 | 1.6963 | 2.6322 | 3.3128 | 3.9205 | 4.3337 | 4.5889 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.24049E-8 | -3322.5 | -3301.9 | -3276.7 | -3248.0 | -3217.0 | -3152.5 | -3087.6 |
| 0.43289E-8 | -1827.5 | -1807.0 | -1781.9 | -1753.5 | -1723.0 | -1660.1 | -1600.1 |
| 0.81768E-8 | -949.40 | -929.10 | -904.41 | -876.45 | -846.55 | -786.76 | -735.22 |
| 0.14429E-7 | -522.48 | -502.49 | -478.38 | -451.13 | -422.35 | -367.17 | -325.12 |
| 0.26454E-7 | -270.04 | -250.66 | -227.52 | -201.64 | -175.14 | -127.74 | -96.143 |
| 0.48099E-7 | -135.23 | -116.76 | -95.373 | -71.673 | -48.701 | -12.726 | 10.609 |
| 0.96198E-7 | -55.094 | -38.686 | -20.091 | -1.0093 | 16.006 | 38.855 | 53.683 |
| 0.14429E-6 | -29.818 | -15.111 | 1.1987 | 16.537 | 30.100 | 45.901 | 55.381 |
| 0.33669E-6 | -5.2898 | 4.2389 | 13.913 | 22.056 | 28.425 | 35.158 | 38.804 |
| 0.72148E-6 | -0.33562 | 3.9304 | 7.8683 | 11.028 | 13.398 | 15.768 | 16.862 |
| 0.14429E-5 | -0.43487 | 0.62252 | 1.5583 | 2.2390 | 2.8467 | 3.2599 | 3.5151 |

25°C 800 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.48099E-7 | -172.62 | -7.7178 | 194.13 | 423.21 | 671.15 | 1187.4 | 1706.6 |
| 0.86578E-7 | -25.626 | 138.30 | 339.18 | 566.71 | 810.76 | 1313.4 | 1793.7 |
| 0.16353E-6 | 58.955 | 221.33 | 418.90 | 642.54 | 881.73 | 1360.1 | 1772.3 |
| 0.28859E-6 | 98.114 | 257.96 | 450.87 | 668.86 | 899.11 | 1340.5 | 1676.9 |
| 0.52909E-6 | 118.40 | 273.39 | 458.52 | 665.62 | 877.59 | 1256.8 | 1509.6 |
| 0.96198E-6 | 124.95 | 272.75 | 443.87 | 633.48 | 817.24 | 1105.0 | 1291.7 |
| 0.19239E-5 | 120.38 | 251.64 | 400.41 | 553.06 | 689.18 | 871.98 | 990.60 |
| 0.28859E-5 | 112.28 | 229.93 | 360.41 | 483.12 | 591.63 | 718.03 | 793.87 |
| 0.67338E-5 | 78.731 | 154.96 | 232.35 | 297.50 | 348.45 | 402.31 | 431.48 |
| 0.14429E-4 | 37.216 | 71.345 | 102.84 | 128.12 | 147.08 | 166.04 | 174.80 |
| 0.28859E-4 | 8.3602 | 16.819 | 24.306 | 29.751 | 34.612 | 37.918 | 39.960 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.27770E-7 | -417.05 | -252.14 | -50.295 | 178.78 | 426.72 | 943.02 | 1462.2 |
| 0.49986E-7 | -160.44 | 3.4849 | 204.36 | 431.88 | 675.94 | 1178.6 | 1658.9 |
| 0.94418E-7 | -11.403 | 150.97 | 348.54 | 572.18 | 811.37 | 1289.7 | 1702.0 |
| 0.16662E-6 | 59.159 | 219.00 | 411.91 | 629.91 | 860.15 | 1301.5 | 1638.0 |
| 0.30547E-6 | 98.079 | 253.06 | 438.19 | 645.30 | 857.26 | 1236.4 | 1489.2 |
| 0.55540E-6 | 114.62 | 262.41 | 433.54 | 623.14 | 806.91 | 1094.7 | 1281.4 |
| 0.11108E-5 | 116.01 | 247.28 | 396.04 | 548.70 | 684.82 | 867.62 | 986.24 |
| 0.16662E-5 | 109.80 | 227.45 | 357.94 | 480.65 | 589.16 | 715.56 | 791.40 |
| 0.38878E-5 | 78.145 | 154.37 | 231.77 | 296.91 | 347.86 | 401.73 | 430.90 |
| 0.83310E-5 | 37.115 | 71.243 | 102.74 | 128.02 | 146.98 | 165.94 | 174.69 |
| 0.16662E-4 | 8.3479 | 16.807 | 24.293 | 29.738 | 34.600 | 37.906 | 39.948 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.15210E-7 | -896.49 | -731.59 | -529.73 | -300.65 | -52.718 | 463.58 | 982.80 |
| 0.27378E-7 | -425.73 | -261.79 | -60.917 | 166.60 | 410.65 | 913.34 | 1393.6 |
| 0.51715E-7 | -150.71 | 11.658 | 209.23 | 432.86 | 672.05 | 1150.4 | 1562.7 |
| 0.91261E-7 | -18.759 | 141.08 | 333.99 | 551.99 | 782.23 | 1223.6 | 1560.0 |
| 0.16731E-6 | 56.628 | 211.61 | 396.74 | 603.85 | 815.81 | 1195.0 | 1447.8 |
| 0.30420E-6 | 92.819 | 240.61 | 411.74 | 601.34 | 785.11 | 1072.9 | 1259.6 |
| 0.60841E-6 | 106.12 | 237.39 | 386.15 | 538.81 | 674.93 | 857.73 | 976.35 |
| 0.91261E-6 | 103.81 | 221.46 | 351.95 | 474.65 | 583.16 | 709.56 | 785.41 |
| 0.21294E-5 | 76.352 | 152.58 | 229.97 | 295.12 | 346.07 | 399.94 | 429.11 |
| 0.45630E-5 | 36.672 | 70.801 | 102.30 | 127.58 | 146.54 | 165.50 | 174.25 |
| 0.91261E-5 | 8.2657 | 16.724 | 24.211 | 29.656 | 34.518 | 37.824 | 39.866 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.87816E-8 | -1674.2 | -1509.3 | -1307.4 | -1078.3 | -830.45 | -314.15 | 205.06 |
| 0.15807E-7 | -856.82 | -692.89 | -492.00 | -264.48 | -20.434 | 482.25 | 962.58 |
| 0.29857E-7 | -377.90 | -215.52 | -17.953 | 205.68 | 444.87 | 923.25 | 1335.5 |
| 0.52690E-7 | -146.55 | 13.298 | 206.20 | 424.20 | 654.44 | 1095.8 | 1432.3 |
| 0.96598E-7 | -12.093 | 142.89 | 328.02 | 535.12 | 747.09 | 1126.2 | 1379.1 |
| 0.17563E-6 | 55.969 | 203.76 | 374.89 | 564.49 | 748.26 | 1036.0 | 1222.7 |
| 0.35126E-6 | 88.706 | 219.96 | 368.73 | 521.38 | 657.51 | 840.30 | 958.93 |
| 0.52690E-6 | 92.821 | 210.47 | 340.95 | 463.66 | 572.17 | 698.57 | 774.41 |
| 0.12294E-5 | 72.546 | 148.77 | 226.17 | 291.31 | 342.26 | 396.13 | 425.30 |
| 0.26345E-5 | 35.477 | 69.606 | 101.10 | 126.38 | 145.34 | 164.31 | 173.06 |
| 0.52690E-5 | 7.9556 | 16.414 | 23.901 | 29.346 | 34.208 | 37.514 | 39.556 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.48099E-8 | -3195.6 | -3030.7 | -2828.8 | -2599.7 | -2351.8 | -1835.5 | -1316.3 |
| 0.86578E-8 | -1700.9 | -1537.0 | -1336.1 | -1108.6 | -864.56 | -361.87 | 118.44 |
| 0.16353E-7 | -823.65 | -661.28 | -463.70 | -240.07 | -0.88247 | 477.49 | 889.76 |
| 0.28859E-7 | -398.09 | -238.24 | -45.339 | 172.65 | 402.90 | 844.33 | 1180.7 |
| 0.52909E-7 | -148.21 | 6.7766 | 191.90 | 399.01 | 610.97 | 990.18 | 1242.9 |
| 0.96198E-7 | -17.830 | 129.96 | 301.09 | 490.69 | 674.46 | 962.26 | 1148.9 |
| 0.19239E-6 | 52.954 | 184.21 | 332.98 | 485.63 | 621.76 | 804.55 | 923.18 |
| 0.28859E-6 | 69.723 | 187.37 | 317.85 | 440.56 | 549.07 | 675.47 | 751.31 |
| 0.67338E-6 | 63.793 | 140.02 | 217.42 | 282.56 | 333.51 | 387.38 | 416.55 |
| 0.14429E-5 | 32.249 | 66.377 | 97.880 | 123.16 | 142.12 | 161.08 | 169.83 |
| 0.28859E-5 | 6.8818 | 15.341 | 22.827 | 28.272 | 33.134 | 36.440 | 38.482 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.24049E-7 | -615.55 | -574.32 | -523.86 | -466.59 | -404.60 | -275.53 | -145.72 |
| 0.43289E-7 | -318.53 | -277.55 | -227.33 | -170.45 | -109.43 | 16.234 | 136.31 |
| 0.81768E-7 | -145.16 | -104.56 | -55.174 | 0.73400 | 60.531 | 180.12 | 283.19 |
| 0.14429E-6 | -61.932 | -21.970 | 26.256 | 80.755 | 138.31 | 248.67 | 332.78 |
| 0.26454E-6 | -13.996 | 24.750 | 71.033 | 122.80 | 175.80 | 270.60 | 333.80 |
| 0.48099E-6 | 10.012 | 46.960 | 89.742 | 137.14 | 183.08 | 255.03 | 301.70 |
| 0.96198E-6 | 21.649 | 54.464 | 91.656 | 129.81 | 163.85 | 209.54 | 239.20 |
| 0.14429E-5 | 23.449 | 52.862 | 85.483 | 116.16 | 143.28 | 174.88 | 193.84 |
| 0.33669E-5 | 18.648 | 37.706 | 57.055 | 73.341 | 86.079 | 99.545 | 106.83 |
| 0.72148E-5 | 9.1255 | 17.657 | 25.533 | 31.853 | 36.593 | 41.333 | 43.521 |
| 0.14429E-4 | 2.0674 | 4.1822 | 6.0539 | 7.4152 | 8.6306 | 9.4571 | 9.9675 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.13885E-7 | -1106.6 | -1065.3 | -1014.9 | -957.66 | -895.67 | -766.60 | -636.79 |
| 0.24993E-7 | -590.37 | -549.38 | -499.16 | -442.28 | -381.27 | -255.60 | -135.51 |
| 0.47209E-7 | -288.04 | -247.44 | -198.05 | -142.14 | -82.348 | 37.246 | 140.31 |
| 0.83310E-7 | -141.95 | -101.99 | -53.769 | 0.72912 | 58.290 | 168.64 | 252.75 |
| 0.15273E-6 | -56.682 | -17.935 | 28.347 | 80.123 | 133.11 | 227.91 | 291.11 |
| 0.27770E-6 | -12.546 | 24.401 | 67.183 | 114.58 | 160.52 | 232.47 | 279.14 |
| 0.55540E-6 | 11.312 | 44.128 | 81.319 | 119.48 | 153.51 | 199.21 | 228.86 |
| 0.83310E-6 | 17.123 | 46.535 | 79.157 | 109.83 | 136.96 | 168.56 | 187.52 |
| 0.19439E-5 | 16.690 | 35.747 | 55.096 | 71.383 | 84.120 | 97.587 | 104.87 |
| 0.41655E-5 | 8.6154 | 17.147 | 25.023 | 31.343 | 36.083 | 40.823 | 43.011 |
| 0.83310E-5 | 1.9658 | 4.0806 | 5.9523 | 7.3135 | 8.5289 | 9.3554 | 9.8659 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.76051E-8 | -2067.9 | -2026.7 | -1976.2 | -1918.9 | -1856.9 | -1727.9 | -1598.1 |
| 0.13689E-7 | -1123.3 | -1082.3 | -1032.1 | -975.27 | -914.25 | -788.58 | -668.50 |
| 0.25857E-7 | -569.07 | -528.47 | -479.08 | -423.17 | -363.37 | -243.78 | -140.71 |
| 0.45630E-7 | -300.16 | -260.20 | -211.97 | -157.48 | -99.918 | 10.439 | 94.545 |
| 0.83656E-7 | -141.89 | -103.15 | -56.869 | -5.0937 | 47.897 | 142.69 | 205.89 |
| 0.15210E-6 | -58.371 | -21.422 | 21.359 | 68.759 | 114.70 | 186.65 | 233.32 |
| 0.30420E-6 | -10.489 | 22.326 | 59.517 | 97.680 | 131.71 | 177.41 | 207.06 |
| 0.45630E-6 | 3.2838 | 32.696 | 65.317 | 95.994 | 123.12 | 154.72 | 173.68 |
| 0.10647E-5 | 11.786 | 30.844 | 50.193 | 66.479 | 79.217 | 92.683 | 99.976 |
| 0.22815E-5 | 7.0120 | 15.544 | 23.419 | 29.740 | 34.480 | 39.220 | 41.407 |
| 0.45630E-5 | 1.5234 | 3.6382 | 5.5099 | 6.8712 | 8.0866 | 8.9130 | 9.4235 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.43908E-8 | -3625.6 | -3584.3 | -3533.9 | -3476.6 | -3414.6 | -3285.5 | -3155.7 |
| 0.79035E-8 | -1987.7 | -1946.7 | -1896.5 | -1839.6 | -1778.6 | -1652.9 | -1532.8 |
| 0.14928E-7 | -1025.6 | -985.05 | -935.66 | -879.75 | -819.95 | -700.36 | -597.29 |
| 0.26345E-7 | -557.94 | -517.97 | -469.75 | -415.25 | -357.69 | -247.33 | -163.22 |
| 0.48299E-7 | -281.50 | -242.75 | -196.47 | -144.70 | -91.709 | 3.0921 | 66.292 |
| 0.87816E-7 | -134.18 | -97.232 | -54.450 | -7.0497 | 38.892 | 110.84 | 157.51 |
| 0.17563E-6 | -47.339 | -14.523 | 22.667 | 60.831 | 94.862 | 140.56 | 170.21 |
| 0.26345E-6 | -20.603 | 8.8093 | 41.430 | 72.107 | 99.235 | 130.83 | 149.79 |
| 0.61471E-6 | 2.6180 | 21.675 | 41.024 | 57.311 | 70.048 | 83.515 | 90.807 |
| 0.13172E-5 | 3.5504 | 12.082 | 19.958 | 26.278 | 31.018 | 35.758 | 37.946 |
| 0.26345E-5 | 0.32830 | 2.4431 | 4.3148 | 5.6760 | 6.8914 | 7.7179 | 8.2284 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.24049E-8 | -6670.8 | -6629.5 | -6579.1 | -6521.8 | -6459.8 | -6330.7 | -6200.9 |
| 0.43289E-8 | -3678.4 | -3637.4 | -3587.2 | -3530.3 | -3469.3 | -3343.6 | -3223.5 |
| 0.81768E-8 | -1919.5 | -1878.9 | -1829.5 | -1773.6 | -1713.8 | -1594.2 | -1491.2 |
| 0.14429E-7 | -1063.4 | -1023.4 | -975.26 | -920.76 | -863.20 | -752.84 | -668.73 |
| 0.26454E-7 | -556.13 | -517.39 | -471.10 | -419.33 | -366.34 | -271.54 | -208.33 |
| 0.48099E-7 | -284.14 | -247.20 | -204.41 | -157.01 | -111.07 | -39.123 | 7.5475 |
| 0.96198E-7 | -121.13 | -88.324 | -51.132 | -12.969 | 21.061 | 66.761 | 96.416 |
| 0.14429E-6 | -69.030 | -39.617 | -6.9963 | 23.680 | 50.808 | 82.408 | 101.36 |
| 0.33669E-6 | -16.874 | 2.1831 | 21.532 | 37.818 | 50.556 | 64.022 | 71.315 |
| 0.72148E-6 | -4.4966 | 4.0354 | 11.911 | 18.231 | 22.971 | 27.711 | 29.899 |
| 0.14429E-5 | -2.9001 | -0.78532 | 1.0863 | 2.4476 | 3.6630 | 4.4895 | 4.9999 |

25°C 1600 Å z = 1

| $H_0$ | V/kT Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.48099E-7 | -361.68 | -31.870 | 371.83 | 829.99 | 1325.8 | 2358.4 | 3396.9 |
| 0.86578E-7 | -65.342 | 262.52 | 664.28 | 1119.3 | 1607.4 | 2612.8 | 3573.4 |
| 0.16353E-6 | 106.32 | 431.08 | 826.23 | 1273.5 | 1751.8 | 2708.6 | 3533.1 |
| 0.28859E-6 | 186.83 | 506.53 | 892.35 | 1328.3 | 1788.8 | 2671.6 | 3344.5 |
| 0.52909E-6 | 229.66 | 539.64 | 909.90 | 1324.1 | 1748.0 | 2506.4 | 3012.0 |
| 0.96198E-6 | 244.82 | 540.41 | 882.66 | 1261.8 | 1629.4 | 2205.0 | 2578.3 |
| 0.19239E-5 | 237.74 | 500.27 | 797.80 | 1103.1 | 1375.3 | 1740.9 | 1978.1 |
| 0.28859E-5 | 222.53 | 457.83 | 718.80 | 964.21 | 1181.2 | 1434.0 | 1585.7 |
| 0.67338E-5 | 156.81 | 309.27 | 464.06 | 594.35 | 696.25 | 803.99 | 862.33 |
| 0.14429E-4 | 74.295 | 142.55 | 205.55 | 256.11 | 294.03 | 331.96 | 349.46 |
| 0.28859E-4 | 16.700 | 33.619 | 48.592 | 59.482 | 69.206 | 75.817 | 79.901 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.27770E-7 | -852.75 | -522.94 | -119.23 | 338.92 | 834.80 | 1867.4 | 2905.8 |
| 0.49986E-7 | -337.17 | -9.3118 | 392.45 | 847.49 | 1335.6 | 2340.9 | 3301.6 |
| 0.94418E-7 | -36.552 | 288.20 | 683.35 | 1130.6 | 1609.0 | 2565.7 | 3390.2 |
| 0.16662E-6 | 106.80 | 426.50 | 812.32 | 1248.3 | 1708.8 | 2591.6 | 3264.5 |
| 0.30547E-6 | 186.98 | 496.95 | 867.21 | 1281.4 | 1705.3 | 2463.7 | 2969.3 |
| 0.55540E-6 | 222.26 | 517.85 | 860.11 | 1239.3 | 1606.8 | 2182.4 | 2555.8 |
| 0.11108E-5 | 227.41 | 489.93 | 787.46 | 1092.7 | 1365.0 | 1730.6 | 1967.8 |
| 0.16662E-5 | 216.20 | 451.50 | 712.47 | 957.89 | 1174.9 | 1427.7 | 1579.3 |
| 0.38878E-5 | 154.85 | 307.31 | 462.10 | 592.40 | 694.29 | 802.03 | 860.37 |
| 0.83310E-5 | 73.785 | 142.04 | 205.04 | 255.60 | 293.52 | 331.44 | 348.95 |
| 0.16662E-4 | 16.599 | 33.517 | 48.491 | 59.381 | 69.104 | 75.716 | 79.800 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.15210E-7 | -1814.0 | -1484.2 | -1080.5 | -622.38 | -126.50 | 906.09 | 1944.5 |
| 0.27378E-7 | -870.16 | -542.29 | -140.53 | 314.51 | 802.61 | 1807.9 | 2768.6 |
| 0.51715E-7 | -317.58 | 7.1721 | 402.32 | 849.59 | 1327.9 | 2284.7 | 3109.2 |
| 0.91261E-7 | -51.400 | 268.29 | 654.11 | 1090.1 | 1550.5 | 2433.4 | 3106.3 |
| 0.16731E-6 | 101.76 | 411.73 | 781.99 | 1196.2 | 1620.1 | 2378.5 | 2884.1 |
| 0.30420E-6 | 176.44 | 472.02 | 814.28 | 1193.4 | 1561.0 | 2136.6 | 2510.0 |
| 0.60841E-6 | 205.60 | 468.13 | 765.66 | 1070.9 | 1343.2 | 1708.8 | 1946.0 |
| 0.91261E-6 | 202.36 | 437.66 | 698.63 | 944.05 | 1161.0 | 1413.8 | 1565.5 |
| 0.21294E-5 | 149.95 | 302.41 | 457.20 | 587.49 | 689.39 | 797.12 | 855.46 |
| 0.45630E-5 | 72.181 | 140.43 | 203.44 | 254.00 | 291.92 | 329.84 | 347.34 |
| 0.91261E-5 | 16.156 | 33.075 | 48.048 | 58.938 | 68.662 | 75.273 | 79.357 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.87816E-8 | -3371.7 | -3041.9 | -2638.2 | -2180.0 | -1684.1 | -651.58 | 386.85 |
| 0.15807E-7 | -1734.5 | -1406.6 | -1004.9 | -549.88 | -61.777 | 943.60 | 1904.2 |
| 0.29857E-7 | -774.16 | -449.40 | -54.256 | 393.01 | 871.39 | 1828.1 | 2652.6 |
| 0.52690E-7 | -309.17 | 10.526 | 396.34 | 832.33 | 1292.8 | 2175.6 | 2848.5 |
| 0.96598E-7 | -37.842 | 272.13 | 642.39 | 1056.6 | 1480.5 | 2238.9 | 2744.5 |
| 0.17563E-6 | 100.63 | 396.22 | 738.47 | 1117.6 | 1485.2 | 2060.8 | 2434.2 |
| 0.35126e-6 | 168.75 | 431.28 | 728.81 | 1034.1 | 1306.3 | 1671.9 | 1909.2 |
| 0.52690E-6 | 178.47 | 413.78 | 674.75 | 920.16 | 1137.1 | 1389.9 | 1541.6 |
| 0.12294E-5 | 140.78 | 293.24 | 448.03 | 578.32 | 680.22 | 787.96 | 846.30 |
| 0.26345E-5 | 68.720 | 136.97 | 199.98 | 250.54 | 288.46 | 326.38 | 343.88 |
| 0.52690E-5 | 14.961 | 31.880 | 46.853 | 57.743 | 67.467 | 74.078 | 78.162 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.48099E-8 | -6416.9 | -6087.1 | -5683.4 | -5225.2 | -4729.3 | -3696.7 | -2658.3 |
| 0.86578e-8 | -3425.2 | -3097.3 | -2695.6 | -2240.5 | -1752.4 | -747.07 | 213.57 |
| 0.16353E-7 | -1668.0 | -1343.3 | -948.18 | -500.91 | -22.534 | 934.22 | 1758.7 |
| 0.28859E-7 | -814.68 | -494.98 | -109.16 | 326.82 | 787.31 | 1670.1 | 2343.0 |
| 0.52909E-7 | -312.47 | -2.4998 | 367.75 | 781.96 | 1205.8 | 1964.3 | 2469.9 |
| 0.96198E-7 | -49.333 | 246.25 | 588.50 | 967.71 | 1335.2 | 1910.8 | 2284.2 |
| 0.19239E-6 | 94.958 | 357.48 | 655.01 | 960.32 | 1232.5 | 1598.1 | 1835.4 |
| 0.28859E-6 | 130.05 | 365.35 | 626.32 | 871.73 | 1088.7 | 1341.5 | 1493.2 |
| 0.67338E-6 | 121.29 | 273.75 | 428.54 | 558.83 | 660.73 | 768.46 | 826.80 |
| 0.14429E-5 | 60.673 | 128.92 | 191.93 | 242.49 | 280.41 | 318.33 | 335.83 |
| 0.28859E-5 | 11.733 | 28.651 | 43.625 | 54.515 | 64.238 | 70.850 | 74.934 |

| $H_0$ | V/kT: Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.24049E-7 | -1250.3 | -1167.8 | -1066.9 | -952.41 | -828.43 | -570.28 | -310.67 |
| 0.43289E-7 | -653.92 | -571.96 | -471.52 | -357.75 | -235.73 | 15.612 | 255.77 |
| 0.81768E-7 | -304.64 | -223.45 | -124.66 | -12.848 | 106.74 | 345.93 | 552.06 |
| 0.14429E-6 | -135.93 | -56.012 | 40.441 | 149.43 | 264.56 | 485.27 | 653.48 |
| 0.26454E-6 | -37.717 | 39.776 | 132.34 | 235.89 | 341.87 | 531.47 | 657.88 |
| 0.48099E-6 | 12.530 | 86.427 | 171.99 | 266.79 | 358.67 | 502.58 | 595.92 |
| 0.96198E-6 | 38.209 | 103.84 | 178.22 | 254.55 | 322.61 | 414.01 | 473.32 |
| 0.14429E-5 | 43.074 | 101.89 | 167.14 | 228.49 | 282.75 | 345.95 | 383.87 |
| 0.33669E-5 | 35.589 | 73.704 | 112.40 | 144.97 | 170.45 | 197.38 | 211.96 |
| 0.72148E-5 | 17.675 | 34.739 | 50.491 | 63.131 | 72.611 | 82.091 | 86.466 |
| 0.14429E-4 | 3.9965 | 8.2261 | 11.969 | 14.692 | 17.122 | 18.775 | 19.796 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.13885E-7 | -2234.6 | -2152.2 | -2051.3 | -1936.7 | -1812.7 | -1554.6 | -1295.0 |
| 0.24993E-7 | -1199.8 | -1117.8 | -1017.3 | -903.63 | -781.61 | -530.26 | -290.10 |
| 0.47209E-7 | -592.59 | -511.40 | -412.61 | -300.80 | -181.20 | 57.983 | 264.11 |
| 0.83310E-7 | -298.16 | -218.23 | -121.78 | -12.784 | 102.33 | 323.05 | 491.26 |
| 0.15273E-6 | -125.21 | -47.720 | 44.844 | 148.39 | 254.37 | 443.98 | 570.38 |
| 0.27770E-6 | -34.633 | 39.262 | 124.82 | 219.62 | 311.51 | 455.41 | 548.75 |
| 0.55540E-6 | 15.650 | 81.281 | 155.66 | 231.99 | 300.05 | 391.45 | 450.76 |
| 0.83310E-6 | 28.680 | 87.505 | 152.74 | 214.10 | 268.35 | 331.55 | 369.47 |
| 0.19439E-5 | 30.390 | 68.505 | 107.20 | 139.77 | 165.25 | 192.18 | 206.76 |
| 0.41655E-5 | 15.916 | 32.981 | 48.732 | 61.372 | 70.852 | 80.333 | 84.708 |
| 0.83310E-5 | 3.4864 | 7.7160 | 11.459 | 14.181 | 16.612 | 18.265 | 19.286 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.76051E-8 | -4159.7 | -4077.2 | -3976.3 | -3861.8 | -3737.8 | -3479.7 | -3220.0 |
| 0.13689E-7 | -2268.2 | -2186.2 | -2085.7 | -1972.0 | -1850.0 | -1598.6 | -1358.4 |
| 0.25857E-7 | -1157.0 | -1075.8 | -977.09 | -865.28 | -745.68 | -506.49 | -300.36 |
| 0.45630E-7 | -616.98 | -537.05 | -440.60 | -331.60 | -216.48 | 4.2324 | 172.44 |
| 0.83656E-7 | -298.02 | -220.53 | -127.96 | -24.413 | 81.569 | 271.17 | 397.57 |
| 0.15210E-6 | -128.60 | -54.712 | 30.852 | 125.65 | 217.53 | 361.44 | 454.78 |
| 0.30420E-6 | -30.173 | 35.457 | 109.84 | 186.16 | 254.22 | 345.62 | 404.93 |
| 0.45630E-6 | -1.1175 | 57.707 | 122.95 | 184.30 | 238.55 | 301.76 | 339.68 |
| 0.10647E-5 | 18.812 | 56.927 | 95.626 | 128.19 | 153.67 | 180.60 | 195.19 |
| 0.22815E-5 | 11.445 | 28.509 | 44.261 | 56.901 | 66.381 | 75.861 | 80.236 |
| 0.45630E-5 | 1.8830 | 6.1126 | 9.8561 | 12.578 | 15.009 | 16.662 | 17.683 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.43908E-8 | -7277.3 | -7194.8 | -7093.9 | -6979.4 | -6855.4 | -6597.2 | -6337.6 |
| 0.79035E-8 | -3999.2 | -3917.2 | -3816.7 | -3703.0 | -3581.0 | -3329.6 | -3089.5 |
| 0.14928E-7 | -2072.4 | -1991.2 | -1892.4 | -1780.6 | -1661.0 | -1421.8 | -1215.7 |
| 0.26345E-7 | -1134.7 | -1054.8 | -958.35 | -849.35 | -734.23 | -513.51 | -345.30 |
| 0.48299E-7 | -579.43 | -501.93 | -409.37 | -305.81 | -199.83 | -10.234 | 116.16 |
| 0.87816E-7 | -282.39 | -208.49 | -122.93 | -28.132 | 63.751 | 207.65 | 300.99 |
| 0.17563E-6 | -105.98 | -40.351 | 34.030 | 110.35 | 178.42 | 269.81 | 329.12 |
| 0.26345E-6 | -50.947 | 7.8778 | 73.120 | 134.47 | 188.72 | 251.93 | 289.85 |
| 0.61471E-6 | -1.3782 | 36.736 | 75.435 | 108.00 | 133.48 | 160.41 | 175.00 |
| 0.13172E-5 | 3.0030 | 20.067 | 35.818 | 48.458 | 57.939 | 67.419 | 71.794 |
| 0.26345E-5 | -1.5785 | 2.6510 | 6.3944 | 9.1169 | 11.547 | 13.200 | 14.221 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.24049E-8 | -13370 | -13287 | -13186 | -13072 | -12948 | -12690 | -12430 |
| 0.43289E-8 | -7383.0 | -7301.0 | -7200.6 | -7086.8 | -6964.8 | -6713.5 | -6473.3 |
| 0.81768E-8 | -3862.7 | -3781.5 | -3682.7 | -3570.9 | -3451.3 | -3212.1 | -3006.0 |
| 0.14429E-7 | -2148.1 | -2068.2 | -1971.8 | -1862.8 | -1747.6 | -1526.9 | -1358.7 |
| 0.26454E-7 | -1131.1 | -1053.6 | -961.05 | -857.50 | -751.52 | -561.92 | -435.51 |
| 0.48099E-7 | -584.73 | -510.83 | -425.27 | -330.47 | -238.58 | -94.682 | -1.3397 |
| 0.96198E-7 | -255.95 | -190.31 | -115.93 | -39.609 | 28.452 | 119.85 | 179.16 |
| 0.14429E-6 | -150.13 | -91.307 | -26.065 | 35.288 | 89.543 | 152.74 | 190.66 |
| 0.33669E-6 | -42.560 | -4.4456 | 34.252 | 66.825 | 92.300 | 119.23 | 133.81 |
| 0.72148E-6 | -15.048 | 2.0152 | 17.766 | 30.407 | 39.887 | 49.367 | 53.742 |
| 0.14429E-5 | -9.6256 | -5.3960 | -1.6526 | 1.0698 | 3.5006 | 5.1536 | 6.1745 |

25°C 3200 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.48099E-7 | -742.58 | -82.962 | 724.45 | 1640.7 | 2632.5 | 4697.7 | 6774.6 |
| 0.86578E-7 | -147.54 | 508.18 | 1311.7 | 2221.8 | 3198.0 | 5208.7 | 7130.0 |
| 0.16353E-6 | 198.33 | 847.84 | 1638.1 | 2532.6 | 3489.4 | 5402.9 | 7052.0 |
| 0.28859E-6 | 361.59 | 1000.9 | 1772.6 | 2644.6 | 3565.5 | 5331.3 | 6677.0 |
| 0.52909E-6 | 449.60 | 1069.5 | 1810.0 | 2638.4 | 3486.3 | 5003.1 | 6014.3 |
| 0.96198E-6 | 482.16 | 1073.3 | 1757.8 | 2516.2 | 3251.3 | 4402.5 | 5149.2 |
| 0.19239E-5 | 470.40 | 995.45 | 1590.5 | 2201.1 | 2745.6 | 3476.8 | 3951.3 |
| 0.28859E-5 | 441.23 | 911.84 | 1433.7 | 1924.6 | 2358.6 | 2864.2 | 3167.6 |
| 0.67338E-5 | 311.92 | 616.84 | 926.42 | 1187.0 | 1390.8 | 1606.2 | 1722.9 |
| 0.14429E-4 | 148.01 | 284.52 | 410.54 | 511.66 | 587.50 | 663.34 | 698.34 |
| 0.28859E-4 | 33.263 | 67.100 | 97.047 | 118.82 | 138.27 | 151.49 | 159.66 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.27770E-7 | -1726.9 | -1067.3 | -259.90 | 656.41 | 1648.1 | 3713.3 | 5790.2 |
| 0.49986E-7 | -693.42 | -37.688 | 765.83 | 1675.9 | 2652.1 | 4662.8 | 6584.2 |
| 0.94418E-7 | -89.615 | 559.89 | 1350.1 | 2244.7 | 3201.4 | 5115.0 | 6764.0 |
| 0.16662E-6 | 199.37 | 838.77 | 1610.4 | 2482.3 | 3403.3 | 5169.0 | 6514.7 |
| 0.30547E-6 | 362.11 | 982.06 | 1722.5 | 2550.9 | 3398.8 | 4915.6 | 5926.8 |
| 0.55540E-6 | 434.99 | 1026.1 | 1710.6 | 2469.0 | 3204.1 | 4355.3 | 5102.1 |
| 0.11108E-5 | 447.84 | 972.89 | 1567.9 | 2178.5 | 2723.0 | 3454.2 | 3928.7 |
| 0.16662E-5 | 426.84 | 897.44 | 1419.3 | 1910.2 | 2344.2 | 2849.8 | 3153.2 |
| 0.38878E-5 | 306.72 | 611.64 | 921.23 | 1181.8 | 1385.6 | 1601.0 | 1717.7 |
| 0.83310E-5 | 146.25 | 282.77 | 408.78 | 509.90 | 585.74 | 661.58 | 696.58 |
| 0.16662E-4 | 32.753 | 66.590 | 96.537 | 118.31 | 137.76 | 150.98 | 159.15 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.15210E-7 | -3652.0 | -2992.3 | -2184.9 | -1268.6 | -276.88 | 1788.3 | 3865.1 |
| 0.27378E-7 | -1761.8 | -1106.0 | -302.55 | 607.53 | 1583.7 | 3594.4 | 5515.8 |
| 0.51715E-7 | -654.09 | -4.5847 | 785.71 | 1680.2 | 2637.0 | 4550.5 | 6199.5 |
| 0.91261E-7 | -119.44 | 519.95 | 1291.5 | 2163.5 | 3084.5 | 4850.2 | 6195.9 |
| 0.16731E-6 | 189.30 | 809.25 | 1549.7 | 2378.1 | 3226.0 | 4742.8 | 5754.0 |
| 0.30420E-6 | 341.02 | 932.19 | 1616.7 | 2375.1 | 3110.1 | 4261.4 | 5008.1 |
| 0.60841E-6 | 402.02 | 927.07 | 1522.1 | 2132.7 | 2677.2 | 3408.4 | 3882.9 |
| 0.91261E-6 | 397.04 | 867.65 | 1389.5 | 1880.4 | 2314.4 | 2820.0 | 3123.4 |
| 0.21294E-5 | 295.14 | 600.06 | 909.65 | 1170.2 | 1374.0 | 1589.4 | 1706.1 |
| 0.45630E-5 | 141.78 | 278.29 | 404.31 | 505.43 | 581.27 | 657.11 | 692.11 |
| 0.91261E-5 | 31.149 | 64.986 | 94.934 | 116.71 | 136.16 | 149.38 | 157.55 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.87816E-8 | -6769.5 | -6109.9 | -5302.5 | -4386.2 | -3394.4 | -1329.2 | 747.61 |
| 0.15807E-7 | -3492.8 | -2837.0 | -2033.5 | -1123.4 | -147.26 | 1863.4 | 3784.7 |
| 0.29857E-7 | -1569.4 | -919.95 | -129.65 | 764.88 | 1721.6 | 3635.1 | 5284.2 |
| 0.52690E-7 | -637.19 | 2.1989 | 773.83 | 1645.8 | 2566.7 | 4332.5 | 5678.2 |
| 0.96598E-7 | -92.103 | 527.84 | 1268.3 | 2096.7 | 2944.6 | 4461.4 | 5472.6 |
| 0.17563E-6 | 187.23 | 778.40 | 1462.9 | 2221.3 | 2956.4 | 4107.6 | 4854.3 |
| 0.35126E-6 | 326.21 | 851.26 | 1446.3 | 2056.9 | 2601.4 | 3332.6 | 3807.1 |
| 0.52690E-6 | 347.21 | 817.82 | 1339.7 | 1830.5 | 2264.6 | 2770.2 | 3073.6 |
| 0.12294E-5 | 274.95 | 579.87 | 889.46 | 1150.0 | 1353.8 | 1569.3 | 1685.9 |
| 0.26345E-5 | 133.34 | 269.85 | 395.86 | 496.99 | 572.83 | 648.67 | 683.67 |
| 0.52690E-5 | 27.688 | 61.524 | 91.472 | 113.25 | 132.69 | 145.92 | 154.08 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.48099E-8 | -12862 | -12202 | -11395 | -10479 | -9487.3 | -7422.0 | -5345.2 |
| 0.86578E-8 | -6876.6 | -6220.9 | -5417.4 | -4507.3 | -3531.1 | -1520.3 | 400.94 |
| 0.16353E-7 | -3359.7 | -2710.2 | -1919.9 | -1025.4 | -68.640 | 1844.8 | 3493.9 |
| 0.28859E-7 | -1650.6 | -1011.2 | -239.61 | 632.36 | 1553.3 | 3319.0 | 4664.7 |
| 0.52909E-7 | -643.78 | -23.838 | 716.68 | 1545.0 | 2392.9 | 3909.7 | 4920.9 |
| 0.96198E-7 | -115.10 | 476.06 | 1160.5 | 1918.9 | 2654.0 | 3805.2 | 4552.0 |
| 0.19239E-6 | 176.24 | 701.29 | 1296.3 | 1906.9 | 2451.4 | 3182.6 | 3657.1 |
| 0.28859E-6 | 248.03 | 718.63 | 1240.5 | 1731.4 | 2165.4 | 2671.0 | 2974.4 |
| 0.67338E-6 | 233.77 | 538.69 | 848.27 | 1108.8 | 1312.6 | 1528.1 | 1644.8 |
| 0.14429E-5 | 115.29 | 251.80 | 377.81 | 478.93 | 554.77 | 630.62 | 665.62 |
| 0.28859E-5 | 19.641 | 53.477 | 83.425 | 105.20 | 124.65 | 137.87 | 146.04 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.24049E-7 | -2522.6 | -2357.7 | -2155.9 | -1926.8 | -1678.9 | -1162.6 | -643.38 |
| 0.43289E-7 | -1327.5 | -1163.5 | -962.68 | -735.16 | -491.11 | 11.576 | 491.90 |
| 0.81768E-7 | -626.37 | -463.99 | -266.41 | -42.784 | 196.40 | 674.78 | 1087.0 |
| 0.14429E-6 | -286.68 | -126.84 | 66.067 | 284.06 | 514.30 | 955.74 | 1292.1 |
| 0.26454E-6 | -87.848 | 67.139 | 252.26 | 459.37 | 671.33 | 1050.5 | 1303.3 |
| 0.48099E-6 | 14.971 | 162.76 | 333.89 | 523.49 | 707.26 | 995.07 | 1181.7 |
| 0.96198E-6 | 68.925 | 200.18 | 348.95 | 501.60 | 637.73 | 820.52 | 939.15 |
| 0.14429E-5 | 80.092 | 197.74 | 328.22 | 450.93 | 559.44 | 685.84 | 761.68 |
| 0.33669E-5 | 67.797 | 144.02 | 221.42 | 286.56 | 337.51 | 391.38 | 420.55 |
| 0.72148E-5 | 33.776 | 67.905 | 99.408 | 124.68 | 143.64 | 162.60 | 171.36 |
| 0.14429E-4 | 7.4173 | 15.876 | 23.363 | 28.808 | 33.669 | 36.975 | 39.017 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.13885E-7 | -4493.6 | -4328.6 | -4126.8 | -3897.7 | -3649.8 | -3133.5 | -2614.3 |
| 0.24993E-7 | -2421.4 | -2257.5 | -2056.6 | -1829.1 | -1585.0 | -1082.3 | -602.07 |
| 0.47209E-7 | -1204.4 | -1042.1 | -844.53 | -620.90 | -381.71 | 96.669 | 508.93 |
| 0.83310E-7 | -613.33 | -453.48 | -260.57 | -42.580 | 187.66 | 629.09 | 965.52 |
| 0.15273E-6 | -265.01 | -110.02 | 75.099 | 282.20 | 494.16 | 873.37 | 1126.1 |
| 0.27770e-6 | -81.491 | 66.301 | 237.42 | 427.03 | 610.80 | 898.60 | 1085.2 |
| 0.55540E-6 | 21.760 | 153.02 | 301.78 | 454.44 | 590.56 | 773.36 | 891.98 |
| 0.83310E-6 | 49.341 | 166.99 | 297.47 | 420.18 | 528.69 | 655.09 | 730.93 |
| 0.19439E-5 | 55.726 | 131.95 | 209.35 | 274.49 | 325.44 | 379.31 | 408.48 |
| 0.41655E-5 | 29.024 | 63.152 | 94.656 | 119.93 | 138.89 | 157.85 | 166.60 |
| 0.83310E-5 | 5.6588 | 14.118 | 21.604 | 27.049 | 31.911 | 35.217 | 37.259 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.76051E-8 | -8346.0 | -8181.1 | -7979.3 | -7750.2 | -7502.3 | -6986.0 | -6466.7 |
| 0.13689E-7 | -4560.6 | -4396.7 | -4195.8 | -3968.3 | -3724.3 | -3221.6 | -2741.2 |
| 0.25857E-7 | -2335.8 | -2173.4 | -1975.9 | -1752.2 | -1513.0 | -1034.7 | -622.45 |
| 0.45630E-7 | -1253.3 | -1093.5 | -900.64 | -682.64 | -452.40 | -10.967 | 325.45 |
| 0.83656E-7 | -613.04 | -458.05 | -272.92 | -65.822 | 146.14 | 525.34 | 778.15 |
| 0.15210E-6 | -271.82 | -124.02 | 47.099 | 236.70 | 420.47 | 708.27 | 894.96 |
| 0.30420E-6 | -72.213 | 59.049 | 207.81 | 360.46 | 496.59 | 679.38 | 798.01 |
| 0.45630E-6 | -12.527 | 105.12 | 235.60 | 358.31 | 466.82 | 593.22 | 669.06 |
| 0.10647E-5 | 30.499 | 106.72 | 184.12 | 249.27 | 300.22 | 354.08 | 383.25 |
| 0.22815E-5 | 18.348 | 52.476 | 83.980 | 109.26 | 128.22 | 147.18 | 155.93 |
| 0.45630E-5 | 1.1872 | 9.6464 | 17.133 | 22.578 | 27.439 | 30.745 | 32.787 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.43908E-8 | -14583 | -14418 | -14216 | -13987 | -13739 | -13223 | -12704 |
| 0.79035E-8 | -8024.9 | -7860.9 | -7660.0 | -7432.5 | -7188.5 | -6685.8 | -6205.4 |
| 0.14928E-7 | -4168.8 | -4006.4 | -3808.8 | -3585.2 | -3346.0 | -2867.6 | -2455.4 |
| 0.26345E-7 | -2291.1 | -2131.2 | -1938.3 | -1720.3 | -1490.1 | -1048.6 | -712.26 |
| 0.48299E-7 | -1178.0 | -1023.0 | -837.94 | -630.84 | -418.87 | -39.672 | 213.13 |
| 0.87816E-7 | -581.58 | -433.79 | -262.66 | -73.065 | 110.70 | 398.50 | 585.19 |
| 0.17563E-6 | -225.99 | -94.736 | 54.028 | 206.68 | 342.80 | 525.60 | 644.22 |
| 0.26345E-6 | -114.32 | 3.3253 | 133.81 | 256.51 | 365.02 | 491.42 | 567.27 |
| 0.61471E-6 | -11.911 | 64.318 | 141.71 | 206.86 | 257.80 | 311.67 | 340.84 |
| 0.13172E-5 | -0.36597 | 33.762 | 65.265 | 90.545 | 109.50 | 128.46 | 137.21 |
| 0.26345E-5 | -7.2549 | 1.2042 | 8.6910 | 14.136 | 18.997 | 22.303 | 24.345 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.24049E-8 | -26771 | -26606 | -26404 | -26175 | -25927 | -25411 | -24892 |
| 0.43289E-8 | -14794 | -14630 | -14429 | -14202 | -13958 | -13455 | -12975 |
| 0.81768E-8 | -7751.8 | -7589.5 | -7391.9 | -7168.3 | -6929.1 | -6450.7 | -6038.4 |
| 0.14429E-7 | -4320.4 | -4160.6 | -3967.6 | -3749.6 | -3519.4 | -3078.0 | -2741.5 |
| 0.26454E-7 | -2283.8 | -2128.8 | -1943.7 | -1736.6 | -1524.6 | -1145.4 | -892.66 |
| 0.48099E-7 | -1188.6 | -1040.8 | -869.76 | -680.16 | -496.39 | -208.58 | -21.900 |
| 0.96198E-7 | -528.33 | -397.07 | -248.30 | -95.654 | 40.470 | 223.26 | 341.88 |
| 0.14429E-6 | -315.08 | -197.43 | -66.945 | 55.761 | 164.27 | 290.67 | 366.51 |
| 0.33669E-6 | -96.590 | -20.360 | 57.035 | 122.18 | 173.13 | 226.99 | 256.16 |
| 0.72148E-6 | -38.651 | -4.5231 | 26.980 | 52.260 | 71.220 | 90.180 | 98.931 |
| 0.14429E-5 | -25.306 | -16.847 | -9.3608 | -3.9158 | 0.94573 | 4.2516 | 6.2934 |

90°C 50 Å z = 1

| $H_0$ | V/kT Z = 2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.46372E-7 | -2.7510 | 6.5231 | 17.875 | 30.758 | 44.702 | 73.738 | 102.93 |
| 0.83471E-7 | 3.5086 | 12.728 | 24.025 | 36.821 | 50.546 | 78.817 | 105.83 |
| 0.15766E-6 | 6.5128 | 15.644 | 26.756 | 39.333 | 52.785 | 79.688 | 102.87 |
| 0.27823E-6 | 7.5024 | 16.492 | 27.341 | 39.601 | 52.549 | 77.375 | 96.295 |
| 0.51010E-6 | 7.7221 | 16.438 | 26.850 | 38.497 | 50.418 | 71.744 | 85.961 |
| 0.92745E-6 | 7.5290 | 15.840 | 25.464 | 36.127 | 46.462 | 62.648 | 73.148 |
| 0.18549E-5 | 6.9434 | 14.325 | 22.691 | 31.277 | 38.932 | 49.213 | 55.884 |
| 0.27823E-5 | 6.3976 | 13.014 | 20.352 | 27.253 | 33.356 | 40.464 | 44.730 |
| 0.64921E-5 | 4.4402 | 8.7273 | 13.080 | 16.743 | 19.609 | 22.638 | 24.279 |
| 0.13911E-4 | 2.0943 | 4.0136 | 5.7854 | 7.2071 | 8.2734 | 9.3397 | 9.8319 |
| 0.27823E-4 | 0.47026 | 0.94600 | 1.3670 | 1.6732 | 1.9466 | 2.1326 | 2.2474 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.26773E-7 | -14.199 | -4.9250 | 6.4270 | 19.310 | 33.254 | 62.290 | 91.491 |
| 0.48192E-7 | -2.2104 | 7.0089 | 18.306 | 31.102 | 44.827 | 73.098 | 100.11 |
| 0.91029E-7 | 4.0451 | 13.177 | 24.288 | 36.865 | 50.317 | 77.221 | 100.40 |
| 0.16064E-6 | 6.4791 | 15.468 | 26.317 | 38.577 | 51.526 | 76.352 | 95.272 |
| 0.29450E-6 | 7.3977 | 16.114 | 26.525 | 38.173 | 50.093 | 71.420 | 85.637 |
| 0.53546E-6 | 7.4515 | 15.763 | 25.387 | 36.050 | 46.385 | 62.571 | 73.070 |
| 0.10709E-5 | 6.9342 | 14.316 | 22.682 | 31.267 | 38.923 | 49.203 | 55.875 |
| 0.16064E-5 | 6.3956 | 13.012 | 20.350 | 27.251 | 33.354 | 40.462 | 44.728 |
| 0.37482E-5 | 4.4401 | 8.7272 | 13.080 | 16.743 | 19.609 | 22.638 | 24.278 |
| 0.80320E-5 | 2.0943 | 4.0136 | 5.7854 | 7.2071 | 8.2734 | 9.3397 | 9.8319 |
| 0.16064E-4 | 0.47026 | 0.94600 | 1.3670 | 1.6732 | 1.9466 | 2.1326 | 2.2474 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.14664E-7 | -37.937 | -28.663 | -17.311 | -4.4281 | 9.5158 | 38.552 | 67.752 |
| 0.26395E-7 | -14.620 | -5.4014 | 5.8959 | 18.691 | 32.416 | 60.687 | 87.700 |
| 0.49858E-7 | -1.7890 | 7.3429 | 18.454 | 31.031 | 44.483 | 71.387 | 94.572 |
| 0.87986E-7 | 3.7338 | 12.723 | 23.572 | 35.832 | 48.781 | 73.607 | 92.527 |
| 0.16130E-6 | 6.3268 | 15.043 | 25.454 | 37.102 | 49.022 | 70.349 | 84.566 |
| 0.29328E-6 | 7.1093 | 15.421 | 25.045 | 35.708 | 46.043 | 62.229 | 72.728 |
| 0.58657E-6 | 6.8718 | 14.253 | 22.620 | 31.205 | 38.861 | 49.141 | 55.812 |
| 0.87986E-6 | 6.3773 | 12.993 | 20.332 | 27.233 | 33.335 | 40.444 | 44.709 |
| 0.20530E-5 | 4.4394 | 8.7265 | 13.079 | 16.742 | 19.608 | 22.637 | 24.278 |
| 0.43993E-5 | 2.0943 | 4.0136 | 5.7853 | 7.2071 | 8.2734 | 9.3397 | 9.8318 |
| 0.87986E-5 | 0.47026 | 0.94600 | 1.3670 | 1.6732 | 1.9466 | 2.1326 | 2.2474 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.84664E-8 | -77.670 | -68.396 | -57.044 | -44.160 | -30.216 | -1.1805 | 28.019 |
| 0.15239E-7 | -35.942 | -26.722 | -15.425 | -2.6297 | 11.095 | 39.366 | 66.379 |
| 0.28786E-7 | -12.329 | -3.1978 | 7.9136 | 20.490 | 33.942 | 60.846 | 84.031 |
| 0.50798E-7 | -1.6231 | 7.3666 | 18.215 | 30.475 | 43.424 | 68.250 | 87.170 |
| 0.93131E-7 | 3.9382 | 12.654 | 23.066 | 34.713 | 46.634 | 67.960 | 82.177 |
| 0.16932E-6 | 6.1741 | 14.485 | 24.110 | 34.773 | 45.108 | 61.294 | 71.793 |
| 0.33865E-6 | 6.6326 | 14.014 | 22.381 | 30.966 | 38.621 | 48.902 | 55.573 |
| 0.50798E-6 | 6.2882 | 12.904 | 20.243 | 27.144 | 33.246 | 40.355 | 44.620 |
| 0.11853E-5 | 4.4330 | 8.7201 | 13.072 | 16.736 | 19.601 | 22.631 | 24.271 |
| 0.25399E-5 | 2.0940 | 4.0133 | 5.7850 | 7.2068 | 8.2731 | 9.3394 | 9.8315 |
| 0.50798E-5 | 0.47025 | 0.94599 | 1.3670 | 1.6732 | 1.9466 | 2.1326 | 2.2474 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.46372E-8 | -156.79 | -147.52 | -136.17 | -123.29 | -109.34 | -80.309 | -51.109 |
| 0.83471E-8 | -79.050 | -69.831 | -58.533 | -45.738 | -32.012 | -3.7418 | 23.271 |
| 0.15766E-7 | -34.281 | -25.149 | -14.038 | -1.4614 | 11.990 | 38.894 | 62.079 |
| 0.27823E-7 | -13.310 | -4.3208 | 6.5281 | 18.787 | 31.736 | 56.562 | 75.482 |
| 0.51010E-7 | -1.7316 | 6.9847 | 17.396 | 29.043 | 40.964 | 62.290 | 76.508 |
| 0.92745E-7 | 3.6279 | 11.939 | 21.563 | 32.226 | 42.561 | 58.747 | 69.246 |
| 0.18549E-6 | 5.7940 | 13.176 | 21.542 | 30.127 | 37.783 | 48.063 | 54.734 |
| 0.27823E-6 | 5.9057 | 12.522 | 19.860 | 26.761 | 32.864 | 39.972 | 44.238 |
| 0.64921E-6 | 4.3862 | 8.6733 | 13.026 | 16.689 | 19.555 | 22.584 | 24.225 |
| 0.13911E-5 | 2.0903 | 4.0097 | 5.7814 | 7.2032 | 8.2695 | 9.3358 | 9.8279 |
| 0.27823E-5 | 0.47005 | 0.94579 | 1.3668 | 1.6730 | 1.9464 | 2.1324 | 2.2472 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.23186E-7 | -24.672 | -22.353 | -19.515 | -16.294 | -12.808 | -5.5497 | 1.7503 |
| 0.41735E-7 | -10.552 | -8.2471 | -5.4228 | -2.2239 | 1.2074 | 8.2751 | 15.028 |
| 0.78833E-7 | -3.0359 | -0.75290 | 2.0249 | 5.1692 | 8.5321 | 15.258 | 21.054 |
| 0.13911E-6 | 0.26420E-1 | 2.2738 | 4.9861 | 8.0510 | 11.288 | 17.494 | 22.224 |
| 0.25505E-6 | 1.3612 | 3.5403 | 6.1432 | 9.0551 | 12.035 | 17.366 | 20.921 |
| 0.46372E-6 | 1.7460 | 3.8239 | 6.2299 | 8.8957 | 11.479 | 15.525 | 18.150 |
| 0.92745E-6 | 1.7189 | 3.5645 | 5.6561 | 7.8024 | 9.7163 | 12.286 | 13.954 |
| 0.13911E-5 | 1.5955 | 3.2496 | 5.0842 | 6.8094 | 8.3351 | 10.112 | 11.178 |
| 0.32460E-5 | 1.1099 | 2.1817 | 3.2699 | 4.1858 | 4.9021 | 5.6595 | 6.0696 |
| 0.69559E-5 | 0.52358 | 1.0034 | 1.4463 | 1.8017 | 2.0683 | 2.3349 | 2.4579 |
| 0.13911E-4 | 0.11756 | 0.23650 | 0.34176 | 0.41832 | 0.48667 | 0.53315 | 0.56186 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.13386E-7 | -49.175 | -46.857 | -44.019 | -40.798 | -37.312 | -30.053 | -22.753 |
| 0.24096E-7 | -23.444 | -21.139 | -18.315 | -15.116 | -11.685 | -4.6176 | 2.1356 |
| 0.45514E-7 | -9.1714 | -6.8884 | -4.1106 | -0.96635 | 2.3966 | 9.1225 | 14.918 |
| 0.80320E-7 | -2.9142 | -0.66684 | 2.0454 | 5.1103 | 8.3475 | 14.554 | 19.284 |
| 0.14725E-6 | 0.17794 | 2.3570 | 4.9599 | 7.8717 | 10.851 | 16.183 | 19.737 |
| 0.26773E-6 | 1.3504 | 3.4283 | 5.8343 | 8.5001 | 11.083 | 15.130 | 17.755 |
| 0.53546E-6 | 1.6415 | 3.4870 | 5.5786 | 7.7249 | 9.6388 | 12.208 | 13.876 |
| 0.80320E-6 | 1.5717 | 3.2259 | 5.0605 | 6.7857 | 8.3113 | 10.088 | 11.154 |
| 0.18741E-5 | 1.1088 | 2.1806 | 3.2688 | 4.1847 | 4.9010 | 5.6584 | 6.0685 |
| 0.40160E-5 | 0.52354 | 1.0033 | 1.4463 | 1.8017 | 2.0683 | 2.3349 | 2.4579 |
| 0.80320E-5 | 0.11756 | 0.23650 | 0.34176 | 0.41832 | 0.48667 | 0.53315 | 0.56186 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.73321E-8 | -98.514 | -96.195 | -93.357 | -90.136 | -86.650 | -79.391 | -72.091 |
| 0.13197E-7 | -50.023 | -47.718 | -44.894 | -41.695 | -38.264 | -31.196 | -24.443 |
| 0.24929E-7 | -22.411 | -20.128 | -17.350 | -14.206 | -10.843 | -4.1174 | 1.6789 |
| 0.43993E-7 | -9.7234 | -7.4760 | -4.7637 | -1.6988 | 1.5383 | 7.7448 | 12.474 |
| 0.80654E-7 | -2.9238 | -0.74480 | 1.8580 | 4.7699 | 7.7501 | 13.081 | 16.636 |
| 0.14664E-6 | 0.93355E-1 | 2.1712 | 4.5773 | 7.2430 | 9.8268 | 13.873 | 16.498 |
| 0.29328E-6 | 1.2993 | 3.1448 | 5.2364 | 7.3827 | 9.2966 | 11.866 | 13.534 |
| 0.43993E-6 | 1.4378 | 3.0919 | 4.9265 | 6.6517 | 8.1774 | 9.9546 | 11.020 |
| 0.10265E-5 | 1.0979 | 2.1697 | 3.2579 | 4.1738 | 4.8901 | 5.6475 | 6.0576 |
| 0.21996E-5 | 0.52298 | 1.0028 | 1.4457 | 1.8011 | 2.0677 | 2.3343 | 2.4573 |
| 0.43993E-5 | 0.11754 | 0.23647 | 0.34174 | 0.41829 | 0.48665 | 0.53313 | 0.56183 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.42332E-8 | -179.73 | -177.41 | -174.57 | -171.35 | -167.86 | -160.61 | -153.31 |
| 0.76198E-8 | -94.364 | -92.059 | -89.234 | -86.035 | -82.604 | -75.536 | -68.783 |
| 0.14393E-7 | -45.084 | -42.801 | -40.023 | -36.879 | -33.516 | -26.790 | -20.994 |
| 0.25399E-7 | -21.874 | -19.627 | -16.914 | -13.849 | -10.612 | -4.4062 | 0.32377 |
| 0.46565E-7 | -8.8901 | -6.7110 | -4.1081 | -1.1963 | 1.7838 | 7.1154 | 10.669 |
| 0.84664E-7 | -2.6400 | -0.56208 | 1.8439 | 4.5097 | 7.0934 | 11.139 | 13.764 |
| 0.16932E-6 | 0.36415 | 2.2096 | 4.3012 | 6.4475 | 8.3614 | 10.931 | 12.599 |
| 0.25399E-6 | 0.99770 | 2.6518 | 4.4864 | 6.2116 | 7.7373 | 9.5145 | 10.580 |
| 0.59265E-6 | 1.0393 | 2.1111 | 3.1993 | 4.1152 | 4.8315 | 5.5889 | 5.9990 |
| 0.12699E-5 | 0.51800 | 0.99784 | 1.4407 | 1.7962 | 2.0627 | 2.3293 | 2.4523 |
| 0.25399E-5 | 0.11724 | 0.23618 | 0.34144 | 0.41800 | 0.48635 | 0.53283 | 0.56154 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.23186E-8 | -339.94 | -337.62 | -334.79 | -331.57 | -328.08 | -320.82 | -313.52 |
| 0.41735E-8 | -182.50 | -180.19 | -177.37 | -174.17 | -170.74 | -163.67 | -156.92 |
| 0.78833E-8 | -90.840 | -88.557 | -85.779 | -82.635 | -79.272 | -72.546 | -66.750 |
| 0.13911E-7 | -46.995 | -44.748 | -42.035 | -38.970 | -35.733 | -29.527 | -24.797 |
| 0.25505E-7 | -21.793 | -19.613 | -17.011 | -14.099 | -11.118 | -5.7874 | -2.2330 |
| 0.46372E-7 | -9.0231 | -6.9451 | -4.5391 | -1.8733 | 0.71037 | 4.7568 | 7.3816 |
| 0.92745E-7 | -2.1820 | -0.33653 | 1.7550 | 3.9013 | 5.8152 | 8.3853 | 10.053 |
| 0.13911E-6 | -0.37276 | 1.2813 | 3.1159 | 4.8412 | 6.3668 | 8.1440 | 9.2103 |
| 0.32460E-6 | 0.76492 | 1.8367 | 2.9248 | 3.8408 | 4.5571 | 5.3145 | 5.7246 |
| 0.69559E-6 | 0.47989 | 0.95973 | 1.4026 | 1.7580 | 2.0246 | 2.2912 | 2.4142 |
| 0.13911E-5 | 0.11362 | 0.23255 | 0.33781 | 0.41437 | 0.48272 | 0.52920 | 0.55791 |

90°C 100 Å z = 1

| $H_0$ | V/kT: Z = 2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.46372E-7 | -10.394 | 8.1536 | 30.857 | 56.624 | 84.512 | 142.58 | 200.98 |
| 0.83471E-7 | 3.6872 | 22.126 | 44.721 | 70.312 | 97.763 | 154.30 | 208.33 |
| 0.15766E-6 | 11.107 | 29.371 | 51.594 | 76.748 | 103.65 | 157.45 | 203.83 |
| 0.27823E-6 | 14.016 | 31.996 | 53.694 | 78.214 | 104.11 | 153.76 | 191.60 |
| 0.51010E-6 | 15.064 | 32.497 | 53.320 | 76.615 | 100.45 | 143.10 | 171.54 |
| 0.92745E-6 | 14.951 | 31.575 | 50.823 | 72.149 | 92.819 | 125.19 | 146.18 |
| 0.18549E-5 | 13.872 | 28.636 | 45.369 | 62.539 | 77.850 | 98.411 | 111.75 |
| 0.27823E-5 | 12.791 | 26.024 | 40.701 | 54.503 | 66.708 | 80.926 | 89.456 |
| 0.64921E-5 | 8.8803 | 17.454 | 26.160 | 33.487 | 39.218 | 45.277 | 48.557 |
| 0.13911E-4 | 4.1886 | 8.0273 | 11.570 | 14.414 | 16.546 | 18.679 | 19.663 |
| 0.27823E-4 | 0.94053 | 1.8920 | 2.7341 | 3.3465 | 3.8933 | 4.2652 | 4.4949 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.26773E-7 | -34.898 | -16.349 | 6.3544 | 32.120 | 60.008 | 118.08 | 176.48 |
| 0.48192E-7 | -9.2054 | 9.2334 | 31.828 | 57.419 | 84.870 | 141.41 | 195.43 |
| 0.91029E-7 | 4.9721 | 23.236 | 45.459 | 70.613 | 97.516 | 151.32 | 197.69 |
| 0.16064E-6 | 11.076 | 29.055 | 50.753 | 75.273 | 101.17 | 150.82 | 188.66 |
| 0.29450E-6 | 13.881 | 31.314 | 52.137 | 75.432 | 99.273 | 141.92 | 170.36 |
| 0.53546E-6 | 14.556 | 31.179 | 50.427 | 71.754 | 92.424 | 124.79 | 145.79 |
| 0.10709E-5 | 13.794 | 28.559 | 45.291 | 62.462 | 77.773 | 98.333 | 111.67 |
| 0.16064E-5 | 12.768 | 26.001 | 40.677 | 54.479 | 66.684 | 80.902 | 89.432 |
| 0.37482E-5 | 8.8792 | 17.453 | 26.158 | 33.486 | 39.217 | 45.275 | 48.556 |
| 0.80320E-5 | 4.1886 | 8.0273 | 11.570 | 14.414 | 16.546 | 18.679 | 19.663 |
| 0.16064E-4 | 0.94053 | 1.8920 | 2.7341 | 3.3465 | 3.8933 | 4.2652 | 4.4949 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.14664E-7 | -84.236 | -65.688 | -42.983 | -17.217 | 10.670 | 68.743 | 127.14 |
| 0.26395E-7 | -35.784 | -17.345 | 5.2493 | 30.840 | 58.291 | 114.83 | 168.85 |
| 0.49858E-7 | -8.2678 | 9.9961 | 32.219 | 57.373 | 84.276 | 138.08 | 184.45 |
| 0.87986E-7 | 4.2670 | 22.246 | 43.944 | 68.464 | 94.361 | 144.01 | 181.85 |
| 0.16130E-6 | 10.779 | 28.212 | 49.035 | 72.330 | 96.171 | 138.82 | 167.25 |
| 0.29328E-6 | 13.299 | 29.922 | 49.170 | 70.497 | 91.167 | 123.53 | 144.53 |
| 0.58657E-6 | 13.452 | 28.216 | 44.949 | 62.119 | 77.431 | 97.991 | 111.33 |
| 0.87986E-6 | 12.634 | 25.867 | 40.543 | 54.345 | 66.550 | 80.768 | 89.298 |
| 0.20530E-5 | 8.8683 | 17.442 | 26.148 | 33.475 | 39.206 | 45.265 | 48.545 |
| 0.43993E-5 | 4.1880 | 8.0267 | 11.570 | 14.413 | 16.546 | 18.678 | 19.663 |
| 0.87986E-5 | 0.94051 | 1.8919 | 2.7341 | 3.3465 | 3.8933 | 4.2652 | 4.4948 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.84664E-8 | -165.45 | -146.90 | -124.20 | -98.436 | -70.548 | -12.475 | 45.924 |
| 0.15239E-7 | -80.124 | -61.685 | -39.090 | -13.499 | 13.951 | 70.492 | 124.51 |
| 0.28786E-7 | -30.941 | -12.677 | 9.5457 | 34.699 | 61.603 | 115.41 | 161.78 |
| 0.50798E-7 | -7.8840 | 10.095 | 31.793 | 56.313 | 82.210 | 131.86 | 169.70 |
| 0.93131E-7 | 4.8132 | 22.246 | 43.069 | 66.363 | 90.205 | 132.85 | 161.29 |
| 0.16932E-6 | 10.565 | 27.189 | 46.437 | 67.763 | 88.433 | 120.80 | 141.80 |
| 0.33865E-6 | 12.517 | 27.281 | 44.014 | 61.184 | 76.495 | 97.056 | 110.39 |
| 0.50798E-6 | 12.193 | 25.427 | 40.103 | 53.905 | 66.110 | 80.328 | 88.858 |
| 0.11853E-5 | 8.8097 | 17.383 | 26.089 | 33.416 | 39.147 | 45.206 | 48.487 |
| 0.25399E-5 | 4.1830 | 8.0218 | 11.565 | 14.408 | 16.541 | 18.673 | 19.658 |
| 0.50798E-5 | 0.94022 | 1.8916 | 2.7338 | 3.3462 | 3.8930 | 4.2649 | 4.4945 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.46372E-8 | -325.67 | -307.12 | -284.41 | -258.65 | -230.76 | -172.69 | -114.28 |
| 0.83471E-8 | -168.26 | -149.82 | -127.22 | -101.63 | -74.186 | -17.644 | 36.381 |
| 0.15766E-7 | -76.696 | -58.432 | -36.209 | -11.055 | 15.847 | 69.655 | 116.02 |
| 0.27823E-7 | -33.005 | -15.025 | 6.6725 | 31.192 | 57.089 | 106.74 | 144.58 |
| 0.51010E-7 | -8.0895 | 9.3431 | 30.166 | 53.461 | 77.302 | 119.95 | 148.38 |
| 0.92745E-7 | 4.1827 | 20.806 | 40.054 | 61.380 | 82.050 | 114.42 | 135.42 |
| 0.18549E-6 | 9.9711 | 24.735 | 41.468 | 58.638 | 73.949 | 94.510 | 107.85 |
| 0.27823E-6 | 10.823 | 24.056 | 38.733 | 52.535 | 64.740 | 78.957 | 87.488 |
| 0.64921E-6 | 8.5353 | 17.109 | 25.814 | 33.142 | 38.873 | 44.931 | 48.212 |
| 0.13911E-5 | 4.1449 | 7.9837 | 11.527 | 14.370 | 16.503 | 18.635 | 19.620 |
| 0.27823E-5 | 0.93659 | 1.8880 | 2.7301 | 3.3426 | 3.8894 | 4.2612 | 4.4909 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.23186E-7 | -56.281 | -51.644 | -45.968 | -39.526 | -32.554 | -18.036 | -3.4360 |
| 0.41735E-7 | -26.295 | -21.686 | -16.037 | -9.6396 | -2.7769 | 11.358 | 24.865 |
| 0.78833E-7 | -9.5445 | -4.9785 | 0.57721 | 6.8657 | 13.591 | 27.043 | 38.636 |
| 0.13911E-6 | -2.1148 | 2.3800 | 7.8045 | 13.934 | 20.408 | 32.821 | 42.281 |
| 0.25505E-6 | 1.6147 | 5.9729 | 11.178 | 17.002 | 22.962 | 33.625 | 40.734 |
| 0.46372E-6 | 3.0417 | 7.1976 | 12.009 | 17.341 | 22.508 | 30.601 | 35.851 |
| 0.92745E-6 | 3.3317 | 7.0228 | 11.206 | 15.498 | 19.326 | 24.466 | 27.802 |
| 0.13911E-5 | 3.1552 | 6.4635 | 10.132 | 13.583 | 16.634 | 20.188 | 22.321 |
| 0.32460E-5 | 2.2179 | 4.3615 | 6.5378 | 8.3697 | 9.8024 | 11.317 | 12.137 |
| 0.69559E-5 | 1.0470 | 2.0067 | 2.8926 | 3.6035 | 4.1366 | 4.6698 | 4.9158 |
| 0.13911E-4 | 0.23513 | 0.47300 | 0.68352 | 0.83664 | 0.97334 | 1.0663 | 1.1237 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.13386E-7 | -107.00 | -102.36 | -96.687 | -90.245 | -83.273 | -68.755 | -54.155 |
| 0.24096E-7 | -53.708 | -49.099 | -43.450 | -37.052 | -30.189 | -16.054 | -2.5479 |
| 0.45514E-7 | -23.288 | -18.722 | -13.166 | -6.8779 | -0.15203 | 13.299 | 24.892 |
| 0.80320E-7 | -9.2544 | -4.7595 | 0.66498 | 6.7948 | 13.269 | 25.682 | 35.142 |
| 0.14725E-6 | -1.6965 | 2.6616 | 7.8673 | 13.691 | 19.651 | 30.314 | 37.423 |
| 0.26773E-6 | 1.6608 | 5.8167 | 10.628 | 15.960 | 21.127 | 29.220 | 34.470 |
| 0.53546E-6 | 2.9362 | 6.6272 | 10.810 | 15.103 | 18.930 | 24.070 | 27.406 |
| 0.80320E-6 | 2.9942 | 6.3025 | 9.9717 | 13.422 | 16.473 | 20.027 | 22.160 |
| 0.18741E-5 | 2.2035 | 4.3470 | 6.5234 | 8.3553 | 9.7879 | 11.302 | 12.122 |
| 0.40160E-5 | 1.0462 | 2.0059 | 2.8918 | 3.6026 | 4.1358 | 4.6689 | 4.9150 |
| 0.80320E-5 | 0.23509 | 0.47296 | 0.68349 | 0.83660 | 0.97331 | 1.0662 | 1.1236 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.73321E-8 | -207.60 | -202.97 | -197.29 | -190.85 | -183.88 | -169.36 | -154.76 |
| 0.13197E-7 | -108.74 | -104.13 | -98.483 | -92.085 | -85.222 | -71.087 | -57.580 |
| 0.24929E-7 | -51.538 | -46.972 | -41.416 | -35.128 | -28.402 | -14.950 | -3.3579 |
| 0.43993E-7 | -24.488 | -19.993 | -14.569 | -8.4392 | -1.9648 | 10.448 | 19.908 |
| 0.80654E-7 | -9.2632 | -4.9050 | 0.30071 | 6.1244 | 12.084 | 22.747 | 29.856 |
| 0.14664E-6 | -1.8740 | 2.2817 | 7.0938 | 12.425 | 17.592 | 25.685 | 30.935 |
| 0.29328E-6 | 1.6791 | 5.3702 | 9.5534 | 13.846 | 17.673 | 22.813 | 26.149 |
| 0.43993E-6 | 2.3825 | 5.6908 | 9.3600 | 12.810 | 15.861 | 19.416 | 21.548 |
| 0.10265E-5 | 2.1135 | 4.2571 | 6.4334 | 8.2653 | 9.6980 | 11.212 | 12.032 |
| 0.21996E-5 | 1.0377 | 1.9973 | 2.8832 | 3.5941 | 4.1272 | 4.6604 | 4.9064 |
| 0.43993E-5 | 0.23453 | 0.47240 | 0.68292 | 0.83603 | 0.97274 | 1.0657 | 1.1231 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.42332E-8 | -371.83 | -367.19 | -361.52 | -355.08 | -348.10 | -333.59 | -318.99 |
| 0.76198E-8 | -199.18 | -194.57 | -188.92 | -182.52 | -175.66 | -161.52 | -148.02 |
| 0.14393E-7 | -98.589 | -94.023 | -88.468 | -82.179 | -75.453 | -62.001 | -50.409 |
| 0.25399E-7 | -50.408 | -45.913 | -40.488 | -34.358 | -27.884 | -15.471 | -6.0115 |
| 0.46565E-7 | -22.661 | -18.302 | -13.097 | -7.2735 | -1.3131 | 9.3499 | 16.458 |
| 0.84664E-7 | -8.5749 | -4.4191 | 0.39294 | 5.7244 | 10.891 | 18.984 | 24.234 |
| 0.16932E-6 | -1.0542 | 2.6368 | 6.8200 | 11.112 | 14.940 | 20.080 | 23.416 |
| 0.25399E-6 | 0.88165 | 4.1899 | 7.8591 | 11.309 | 14.360 | 17.915 | 20.047 |
| 0.59265E-6 | 1.7934 | 3.9369 | 6.1133 | 7.9452 | 9.3778 | 10.892 | 11.712 |
| 0.12699E-5 | 0.98951 | 1.9491 | 2.8350 | 3.5459 | 4.0790 | 4.6122 | 4.8583 |
| 0.25399E-5 | 0.22955 | 0.46742 | 0.67795 | 0.83106 | 0.96776 | 1.0607 | 1.1181 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.23186E-8 | -694.24 | -689.60 | -683.93 | -677.48 | -670.51 | -655.99 | -641.39 |
| 0.41735E-8 | -377.41 | -372.80 | -367.16 | -360.76 | -353.89 | -339.76 | -326.25 |
| 0.78833E-8 | -192.02 | -187.46 | -181.90 | -175.61 | -168.88 | -155.43 | -143.84 |
| 0.13911E-7 | -102.51 | -98.023 | -92.599 | -86.469 | -79.995 | -67.582 | -58.122 |
| 0.25505E-7 | -50.232 | -45.874 | -40.668 | -34.844 | -28.884 | -18.221 | -11.112 |
| 0.46372E-7 | -22.938 | -18.782 | -13.970 | -8.6393 | -3.4718 | 4.6211 | 9.8707 |
| 0.92745E-7 | -7.4373 | -3.7462 | 0.43696 | 4.7295 | 8.5573 | 13.697 | 17.033 |
| 0.13911E-6 | -2.9132 | 0.39504 | 4.0642 | 7.5147 | 10.565 | 14.120 | 16.252 |
| 0.32460E-6 | 0.73368 | 2.8772 | 5.0536 | 6.8854 | 8.3181 | 9.8328 | 10.653 |
| 0.69559E-6 | 0.75456 | 1.7142 | 2.6000 | 3.3109 | 3.8441 | 4.3772 | 4.6233 |
| 0.13911E-5 | 0.19144 | 0.42931 | 0.63984 | 0.79295 | 0.92965 | 1.0226 | 1.0800 |

90°C 200 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.46372E-7 | -27.726 | 9.3705 | 54.778 | 106.31 | 162.08 | 278.23 | 395.03 |
| 0.83471E-7 | 2.1827 | 39.060 | 84.250 | 135.43 | 190.33 | 303.41 | 411.47 |
| 0.15766E-6 | 18.742 | 55.270 | 99.716 | 150.02 | 203.83 | 311.44 | 404.18 |
| 0.27823E-6 | 25.866 | 61.825 | 105.22 | 154.26 | 206.05 | 305.35 | 381.03 |
| 0.51010E-6 | 29.021 | 63.887 | 105.53 | 152.12 | 199.80 | 285.11 | 341.98 |
| 0.92745E-6 | 29.453 | 62.700 | 101.19 | 143.84 | 185.18 | 249.93 | 291.92 |
| 0.18549E-5 | 27.638 | 57.166 | 90.632 | 124.97 | 155.59 | 196.71 | 223.40 |
| 0.27823E-5 | 25.547 | 52.014 | 81.367 | 108.97 | 133.38 | 161.81 | 178.87 |
| 0.64921E-5 | 17.758 | 34.907 | 52.318 | 66.972 | 78.434 | 90.552 | 97.113 |
| 0.13911E-4 | 8.3772 | 16.054 | 23.141 | 28.828 | 33.093 | 37.359 | 39.327 |
| 0.27823E-4 | 1.8810 | 3.7840 | 5.4682 | 6.6931 | 7.7867 | 8.5304 | 8.9898 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.26773E-7 | -78.445 | -41.348 | 4.0595 | 55.592 | 111.36 | 227.51 | 344.31 |
| 0.48192E-7 | -25.230 | 11.647 | 56.837 | 108.02 | 162.92 | 276.00 | 384.05 |
| 0.91029E-7 | 4.9990 | 41.526 | 85.972 | 136.28 | 190.08 | 297.70 | 390.44 |
| 0.16064E-6 | 18.726 | 54.685 | 98.081 | 147.12 | 198.91 | 298.21 | 373.90 |
| 0.29450E-6 | 25.710 | 60.575 | 102.22 | 148.81 | 196.49 | 281.79 | 338.66 |
| 0.53546E-6 | 28.072 | 61.319 | 99.815 | 142.46 | 183.80 | 248.55 | 290.54 |
| 0.10709E-5 | 27.242 | 56.771 | 90.236 | 124.57 | 155.19 | 196.32 | 223.00 |
| 0.16064E-5 | 25.386 | 51.853 | 81.206 | 108.81 | 133.22 | 161.65 | 178.71 |
| 0.37482E-5 | 17.744 | 34.892 | 52.303 | 66.958 | 78.419 | 90.537 | 97.099 |
| 0.80320E-5 | 8.3764 | 16.053 | 23.140 | 28.827 | 33.092 | 37.358 | 39.326 |
| 0.16064E-4 | 1.8810 | 3.7839 | 5.4682 | 6.6931 | 7.7867 | 8.5304 | 8.9897 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.14664E-7 | -179.05 | -141.95 | -96.547 | -45.014 | 10.761 | 126.90 | 243.70 |
| 0.26395E-7 | -80.263 | -43.385 | 1.8043 | 52.987 | 107.88 | 220.97 | 329.02 |
| 0.49858E-7 | -23.251 | 13.276 | 57.722 | 108.03 | 161.83 | 269.45 | 362.19 |
| 0.87986E-7 | 3.4924 | 39.451 | 82.847 | 131.88 | 183.68 | 282.98 | 358.66 |
| 0.16130E-6 | 18.143 | 53.009 | 94.655 | 141.24 | 188.92 | 274.23 | 331.10 |
| 0.29328E-6 | 24.537 | 57.784 | 96.281 | 138.93 | 180.27 | 245.01 | 287.01 |
| 0.58657E-6 | 25.985 | 55.514 | 88.979 | 123.32 | 153.94 | 195.06 | 221.74 |
| 0.87986E-6 | 24.775 | 51.241 | 80.594 | 108.19 | 132.60 | 161.04 | 178.10 |
| 0.20530E-5 | 17.654 | 34.802 | 52.213 | 66.868 | 78.330 | 90.447 | 97.009 |
| 0.43993E-5 | 8.3678 | 16.045 | 23.132 | 28.819 | 33.084 | 37.349 | 39.318 |
| 0.87986E-5 | 1.8804 | 3.7834 | 5.4676 | 6.6925 | 7.7861 | 8.5298 | 8.9892 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.84664E-8 | -343.28 | -306.18 | -260.77 | -209.24 | -153.46 | -37.321 | 79.480 |
| 0.15239E-7 | -170.70 | -133.82 | -88.637 | -37.454 | 17.446 | 130.53 | 238.58 |
| 0.28786E-7 | -70.302 | -33.774 | 10.671 | 60.979 | 114.78 | 222.40 | 315.14 |
| 0.50798E-7 | -22.427 | 13.531 | 56.928 | 105.96 | 157.76 | 257.06 | 332.74 |
| 0.93131E-7 | 4.7456 | 39.611 | 81.257 | 127.84 | 175.53 | 260.83 | 317.70 |
| 0.16932E-6 | 17.836 | 51.083 | 89.580 | 132.23 | 173.57 | 238.31 | 280.31 |
| 0.33865E-6 | 23.252 | 52.780 | 86.246 | 120.58 | 151.20 | 192.33 | 219.01 |
| 0.50798E-6 | 23.274 | 49.740 | 79.094 | 106.69 | 131.10 | 159.54 | 176.60 |
| 0.11853E-5 | 17.334 | 34.482 | 51.893 | 66.548 | 78.009 | 90.127 | 96.689 |
| 0.25399E-5 | 8.3197 | 15.997 | 23.083 | 28.770 | 33.036 | 37.301 | 39.270 |
| 0.50798E-5 | 1.8754 | 3.7784 | 5.4626 | 6.6875 | 7.7812 | 8.5248 | 8.9842 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.46372E-8 | -665.68 | -628.59 | -583.18 | -531.65 | -475.87 | -359.72 | -242.92 |
| 0.83471E-8 | -348.94 | -312.06 | -266.87 | -215.68 | -160.78 | -47.705 | 60.347 |
| 0.15766E-7 | -163.73 | -127.21 | -82.765 | -32.457 | 21.350 | 128.96 | 221.70 |
| 0.27823E-7 | -74.537 | -38.578 | 4.8174 | 53.856 | 105.65 | 204.95 | 280.63 |
| 0.51010E-7 | -22.825 | 12.039 | 53.686 | 100.27 | 147.95 | 233.26 | 290.13 |
| 0.92745E-7 | 3.4728 | 36.719 | 75.216 | 117.86 | 159.20 | 223.95 | 265.94 |
| 0.18549E-6 | 16.869 | 46.397 | 79.863 | 114.20 | 144.82 | 185.94 | 212.63 |
| 0.27823E-6 | 19.479 | 45.945 | 75.299 | 102.90 | 127.31 | 155.74 | 172.80 |
| 0.64921E-6 | 16.274 | 33.422 | 50.833 | 65.488 | 76.950 | 89.067 | 95.629 |
| 0.13911E-5 | 8.0847 | 15.762 | 22.849 | 28.536 | 32.801 | 37.066 | 39.035 |
| 0.27823E-5 | 1.8373 | 3.7403 | 5.4245 | 6.6494 | 7.7430 | 8.4867 | 8.9461 |

| $H_0$ | V/kT: Z = 2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.23186E-7 | -121.66 | -112.39 | -101.04 | -88.159 | -74.215 | -45.179 | -15.978 |
| 0.41735E-7 | -59.852 | -50.632 | -39.335 | -26.539 | -12.814 | 15.456 | 42.469 |
| 0.78833E-7 | -24.445 | -15.313 | -4.2016 | 8.3753 | 21.827 | 48.730 | 71.916 |
| 0.13911E-6 | -8.0225 | 0.96727 | 11.816 | 24.076 | 37.024 | 61.850 | 80.770 |
| 0.25505E-6 | 0.87943 | 9.5958 | 20.007 | 31.654 | 43.575 | 64.901 | 79.119 |
| 0.46372E-6 | 4.8348 | 13.146 | 22.770 | 33.433 | 43.768 | 59.954 | 70.453 |
| 0.92745E-6 | 6.2133 | 13.595 | 21.961 | 30.547 | 38.202 | 48.482 | 55.154 |
| 0.13911E-5 | 6.1052 | 12.721 | 20.060 | 26.961 | 33.063 | 40.172 | 44.437 |
| 0.32460E-5 | 4.4134 | 8.7005 | 13.053 | 16.716 | 19.582 | 22.611 | 24.252 |
| 0.69559E-5 | 2.0927 | 4.0120 | 5.7837 | 7.2055 | 8.2718 | 9.3381 | 9.8302 |
| 0.13911E-4 | 0.47019 | 0.94593 | 1.3669 | 1.6732 | 1.9466 | 2.1325 | 2.2473 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.13386E-7 | -224.87 | -215.60 | -204.25 | -191.36 | -177.42 | -148.38 | -119.18 |
| 0.24096E-7 | -116.40 | -107.18 | -95.885 | -83.089 | -69.364 | -41.093 | -14.080 |
| 0.45514E-7 | -53.570 | -44.438 | -33.326 | -20.749 | -7.2980 | 19.605 | 42.791 |
| 0.80320E-7 | -23.811 | -14.821 | -3.9722 | 8.2875 | 21.236 | 46.062 | 64.982 |
| 0.14725E-6 | -7.0393 | 1.6770 | 12.088 | 23.735 | 35.656 | 56.982 | 71.200 |
| 0.26773E-6 | 1.0742 | 9.3659 | 19.010 | 29.673 | 40.008 | 56.194 | 66.693 |
| 0.53546E-6 | 4.8324 | 12.214 | 20.581 | 29.166 | 36.821 | 47.102 | 53.773 |
| 0.80320E-6 | 5.4146 | 12.031 | 19.369 | 26.270 | 32.373 | 39.481 | 43.747 |
| 0.18741E-5 | 4.3035 | 8.5906 | 12.943 | 16.607 | 19.472 | 22.501 | 24.142 |
| 0.40160E-5 | 2.0812 | 4.0006 | 5.7723 | 7.1940 | 8.2603 | 9.3267 | 9.8188 |
| 0.80320E-5 | 0.46937 | 0.94511 | 1.3661 | 1.6723 | 1.9458 | 2.1317 | 2.2465 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.73321E-8 | -428.05 | -418.78 | -407.43 | -394.54 | -380.60 | -351.56 | -322.36 |
| 0.13197E-7 | -228.40 | -219.18 | -207.88 | -195.09 | -181.36 | -153.09 | -126.08 |
| 0.24929E-7 | -111.95 | -102.82 | -91.709 | -79.132 | -65.680 | -38.777 | -15.591 |
| 0.43993E-7 | -56.075 | -47.085 | -36.236 | -23.976 | -11.027 | 13.797 | 32.718 |
| 0.80654E-7 | -23.816 | -15.100 | -4.6888 | 6.9584 | 18.879 | 40.205 | 54.422 |
| 0.14664E-6 | -7.4049 | 0.90677 | 10.530 | 21.193 | 31.528 | 47.714 | 58.214 |
| 0.29328E-6 | 1.2975 | 8.6796 | 17.046 | 25.631 | 33.286 | 43.567 | 50.238 |
| 0.43993E-6 | 3.4343 | 10.050 | 17.389 | 24.290 | 30.392 | 37.501 | 41.766 |
| 0.10265E-5 | 3.8518 | 8.1389 | 12.491 | 16.155 | 19.020 | 22.050 | 23.690 |
| 0.21996E-5 | 2.0065 | 3.9259 | 5.6976 | 7.1194 | 8.1857 | 9.2520 | 9.7441 |
| 0.43993E-5 | 0.46080 | 0.93654 | 1.3575 | 1.6638 | 1.9372 | 2.1231 | 2.2379 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.42332E-8 | -758.32 | -749.04 | -737.69 | -724.81 | -710.86 | -681.83 | -652.63 |
| 0.76198E-8 | -411.08 | -401.86 | -390.56 | -377.76 | -364.04 | -335.77 | -308.75 |
| 0.14393E-7 | -207.81 | -198.68 | -187.57 | -174.99 | -161.54 | -134.64 | -111.45 |
| 0.25399E-7 | -109.63 | -100.64 | -89.794 | -77.534 | -64.585 | -39.759 | -20.839 |
| 0.46565E-7 | -52.246 | -43.530 | -33.118 | -21.471 | -9.5503 | 11.775 | 25.993 |
| 0.84664E-7 | -22.301 | -13.989 | -4.3653 | 6.2977 | 16.632 | 32.818 | 43.317 |
| 0.16932E-6 | -5.4034 | 1.9787 | 10.345 | 18.930 | 26.585 | 36.866 | 43.537 |
| 0.25399E-6 | -0.59557 | 6.0210 | 13.359 | 20.260 | 26.362 | 33.471 | 37.736 |
| 0.59265E-6 | 2.6804 | 6.9675 | 11.320 | 14.983 | 17.849 | 20.878 | 22.519 |
| 0.12699E-5 | 1.7307 | 3.6500 | 5.4217 | 6.8435 | 7.9098 | 8.9761 | 9.4682 |
| 0.25399E-5 | 0.41261 | 0.88835 | 1.3094 | 1.6156 | 1.8890 | 2.0749 | 2.1897 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.23186E-8 | -1405.1 | -1395.8 | -1384.5 | -1371.6 | -1357.6 | -1328.6 | -1299.4 |
| 0.41735E-8 | -769.53 | -760.31 | -749.01 | -736.22 | -722.49 | -694.22 | -667.21 |
| 0.78833E-8 | -396.65 | -387.52 | -376.41 | -363.83 | -350.38 | -323.47 | -300.29 |
| 0.13911E-7 | -215.78 | -206.79 | -195.94 | -183.68 | -170.74 | -145.91 | -126.99 |
| 0.25505E-7 | -109.26 | -100.55 | -90.140 | -78.493 | -66.572 | -45.246 | -31.028 |
| 0.46372E-7 | -52.814 | -44.502 | -34.878 | -24.215 | -13.880 | 2.3055 | 12.804 |
| 0.92745E-7 | -19.767 | -12.385 | -4.0186 | 4.5665 | 12.222 | 22.502 | 29.173 |
| 0.13911E-6 | -9.6192 | -3.0026 | 4.3357 | 11.236 | 17.339 | 24.447 | 28.713 |
| 0.32460E-6 | -0.39499 | 3.8921 | 8.2448 | 11.908 | 14.773 | 17.803 | 19.443 |
| 0.69559E-6 | 0.79037 | 2.7097 | 4.4814 | 5.9031 | 6.9694 | 8.0358 | 8.5279 |
| 0.13911E-5 | 0.17766 | 0.65339 | 1.0744 | 1.3806 | 1.6540 | 1.8400 | 1.9548 |

90°C 400 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.46372E-7 | -64.558 | 9.6344 | 100.45 | 203.51 | 315.06 | 547.36 | 780.96 |
| 0.83471E-7 | -2.8948 | 70.860 | 161.24 | 263.60 | 373.40 | 599.57 | 815.68 |
| 0.15766E-6 | 32.129 | 105.18 | 194.07 | 294.69 | 402.30 | 617.53 | 803.02 |
| 0.27823E-6 | 47.939 | 119.85 | 206.65 | 304.72 | 408.31 | 606.92 | 758.28 |
| 0.51010E-6 | 55.693 | 125.42 | 208.71 | 301.89 | 397.26 | 567.87 | 681.61 |
| 0.92745E-6 | 57.658 | 124.15 | 201.14 | 286.44 | 369.12 | 498.61 | 582.61 |
| 0.18549E-5 | 54.826 | 113.88 | 180.81 | 249.49 | 310.74 | 392.98 | 446.35 |
| 0.27823E-5 | 50.890 | 103.82 | 162.53 | 217.73 | 266.55 | 323.42 | 357.54 |
| 0.64921E-5 | 35.494 | 69.791 | 104.61 | 133.92 | 156.84 | 181.08 | 194.20 |
| 0.13911E-4 | 16.753 | 32.107 | 46.281 | 57.655 | 66.186 | 74.716 | 78.653 |
| 0.27823E-4 | 3.7620 | 7.5679 | 10.936 | 13.386 | 15.573 | 17.060 | 17.979 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.26773E-7 | -167.76 | -93.573 | -2.7563 | 100.30 | 211.86 | 444.15 | 677.75 |
| 0.48192E-7 | -59.444 | 14.311 | 104.69 | 207.05 | 316.85 | 543.02 | 759.13 |
| 0.91029E-7 | 3.0041 | 76.059 | 164.95 | 265.56 | 373.18 | 588.41 | 773.89 |
| 0.16064E-6 | 32.150 | 104.06 | 190.86 | 288.93 | 392.53 | 591.13 | 742.49 |
| 0.29450E-6 | 47.774 | 117.50 | 200.79 | 293.97 | 389.34 | 559.95 | 673.69 |
| 0.53546E-6 | 53.897 | 120.39 | 197.38 | 282.68 | 365.36 | 494.85 | 578.84 |
| 0.10709E-5 | 53.445 | 112.50 | 179.43 | 248.11 | 309.35 | 391.60 | 444.97 |
| 0.16064E-5 | 50.199 | 103.13 | 161.83 | 217.04 | 265.86 | 322.73 | 356.85 |
| 0.37482E-5 | 35.385 | 69.681 | 104.50 | 133.81 | 156.73 | 180.97 | 194.09 |
| 0.80320E-5 | 16.741 | 32.096 | 46.270 | 57.644 | 66.174 | 74.705 | 78.642 |
| 0.16064E-4 | 3.7612 | 7.5671 | 10.935 | 13.385 | 15.572 | 17.060 | 17.978 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.14664E-7 | -370.94 | -296.75 | -205.93 | -102.87 | 8.6814 | 240.97 | 474.57 |
| 0.26395E-7 | -171.44 | -97.691 | -7.3126 | 95.052 | 204.85 | 431.02 | 647.12 |
| 0.49858E-7 | -55.378 | 17.677 | 106.56 | 207.18 | 314.79 | 530.03 | 715.51 |
| 0.87986E-7 | -0.11328 | 71.805 | 158.59 | 256.67 | 360.26 | 558.87 | 710.23 |
| 0.16130E-6 | 30.996 | 100.72 | 184.02 | 277.19 | 372.56 | 543.17 | 656.91 |
| 0.29328E-6 | 45.418 | 111.91 | 188.90 | 274.20 | 356.88 | 486.37 | 570.37 |
| 0.58657E-6 | 49.910 | 108.96 | 175.89 | 244.57 | 305.82 | 388.06 | 441.43 |
| 0.87986E-6 | 48.219 | 101.15 | 159.85 | 215.06 | 263.88 | 320.75 | 354.87 |
| 0.20530E-5 | 34.933 | 69.230 | 104.05 | 133.36 | 156.28 | 180.52 | 193.64 |
| 0.43993E-5 | 16.666 | 32.021 | 46.195 | 57.569 | 66.099 | 74.630 | 78.567 |
| 0.87986E-5 | 3.7526 | 7.5585 | 10.927 | 13.376 | 15.564 | 17.051 | 17.970 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.84664E-8 | -701.21 | -627.01 | -536.20 | -433.13 | -321.58 | -89.292 | 144.31 |
| 0.15239E-7 | -354.12 | -280.36 | -189.98 | -87.623 | 22.178 | 248.34 | 464.45 |
| 0.28786E-7 | -151.24 | -78.189 | 10.702 | 111.31 | 218.93 | 434.16 | 619.64 |
| 0.50798E-7 | -53.670 | 18.247 | 105.03 | 203.11 | 306.70 | 505.31 | 656.67 |
| 0.93131E-7 | 2.5672 | 72.298 | 155.59 | 248.76 | 344.13 | 514.74 | 628.48 |
| 0.16932E-6 | 30.522 | 97.016 | 174.00 | 259.31 | 341.99 | 471.48 | 555.47 |
| 0.33865E-6 | 43.209 | 102.26 | 169.19 | 237.87 | 299.12 | 381.36 | 434.73 |
| 0.50798E-6 | 44.189 | 97.122 | 155.82 | 211.03 | 259.85 | 316.72 | 350.84 |
| 0.11853E-5 | 33.761 | 68.058 | 102.88 | 132.19 | 155.11 | 179.34 | 192.47 |
| 0.25399E-5 | 16.391 | 31.745 | 45.919 | 57.293 | 65.824 | 74.354 | 78.291 |
| 0.50798E-5 | 3.7045 | 7.5104 | 10.878 | 13.328 | 15.515 | 17.003 | 17.921 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.46372E-8 | -1348.0 | -1273.8 | -1183.0 | -1079.9 | -968.38 | -736.09 | -502.49 |
| 0.83471E-8 | -712.57 | -638.82 | -548.44 | -446.07 | -336.27 | -110.10 | 105.99 |
| 0.15766E-7 | -340.08 | -267.02 | -178.13 | -77.517 | 30.097 | 245.32 | 430.81 |
| 0.27823E-7 | -159.82 | -87.907 | -1.1154 | 96.963 | 200.55 | 399.16 | 550.52 |
| 0.51010E-7 | -54.454 | 15.276 | 98.568 | 191.74 | 287.11 | 457.72 | 571.46 |
| 0.92745E-7 | 0.89108E-2 | 66.502 | 143.49 | 228.80 | 311.48 | 440.96 | 524.96 |
| 0.18549E-6 | 28.845 | 87.902 | 154.83 | 223.51 | 284.75 | 367.00 | 420.37 |
| 0.27823E-6 | 35.165 | 88.098 | 146.80 | 202.01 | 250.83 | 307.70 | 341.82 |
| 0.64921E-6 | 30.686 | 64.983 | 99.805 | 129.11 | 152.03 | 176.27 | 189.39 |
| 0.13911E-5 | 15.450 | 30.805 | 44.979 | 56.353 | 64.883 | 73.414 | 77.351 |
| 0.27823E-5 | 3.4695 | 7.2754 | 10.643 | 13.093 | 15.280 | 16.768 | 17.686 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.23186E-7 | -254.68 | -236.13 | -213.42 | -187.66 | -159.77 | -101.70 | -43.300 |
| 0.41735E-7 | -129.14 | -110.70 | -88.113 | -62.522 | -35.071 | 21.469 | 75.496 |
| 0.78833E-7 | -56.327 | -38.063 | -15.840 | 9.3135 | 36.217 | 90.024 | 136.39 |
| 0.13911E-6 | -21.765 | -3.7858 | 17.912 | 42.431 | 68.329 | 117.98 | 155.82 |
| 0.25505E-6 | -2.2622 | 15.170 | 35.993 | 59.288 | 83.129 | 125.78 | 154.21 |
| 0.46372E-6 | 7.1121 | 23.735 | 42.983 | 64.310 | 84.980 | 117.35 | 138.35 |
| 0.92745E-6 | 11.178 | 25.942 | 42.675 | 59.845 | 75.156 | 95.717 | 109.05 |
| 0.13911E-5 | 11.491 | 24.724 | 39.401 | 53.203 | 65.408 | 79.626 | 88.156 |
| 0.32460E-5 | 8.6810 | 17.255 | 25.960 | 33.288 | 39.018 | 45.077 | 48.358 |
| 0.69559E-5 | 4.1673 | 8.0060 | 11.549 | 14.392 | 16.525 | 18.658 | 19.642 |
| 0.13911E-4 | 0.93891 | 1.8903 | 2.7325 | 3.3449 | 3.8917 | 4.2636 | 4.4932 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.13386E-7 | -462.89 | -444.34 | -421.64 | -395.87 | -367.98 | -309.91 | -251.51 |
| 0.24096E-7 | -244.02 | -225.58 | -202.98 | -177.39 | -149.94 | -93.403 | -39.377 |
| 0.45514E-7 | -116.30 | -98.042 | -75.820 | -50.666 | -23.762 | 30.045 | 76.416 |
| 0.80320E-7 | -55.001 | -37.021 | -15.323 | 9.1958 | 35.093 | 84.745 | 122.58 |
| 0.14725E-6 | -19.632 | -2.2001 | 18.622 | 41.917 | 65.759 | 108.41 | 136.84 |
| 0.26773E-6 | -1.7446 | 14.878 | 34.127 | 55.453 | 76.123 | 108.49 | 129.49 |
| 0.53546E-6 | 7.4174 | 22.181 | 38.914 | 56.084 | 71.395 | 91.956 | 105.29 |
| 0.80320E-6 | 9.3493 | 22.582 | 37.259 | 51.061 | 63.266 | 77.483 | 86.014 |
| 0.18741E-5 | 8.1648 | 16.739 | 25.444 | 32.771 | 38.502 | 44.561 | 47.842 |
| 0.40160E-5 | 4.0753 | 7.9141 | 11.457 | 14.301 | 16.433 | 18.566 | 19.550 |
| 0.80320E-5 | 0.92746 | 1.8789 | 2.7210 | 3.3334 | 3.8803 | 4.2521 | 4.4818 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.73321E-8 | -871.23 | -852.68 | -829.98 | -804.21 | -776.33 | -718.25 | -659.85 |
| 0.13197E-7 | -469.99 | -451.55 | -428.96 | -403.37 | -375.92 | -319.37 | -265.35 |
| 0.24929E-7 | -235.01 | -216.74 | -194.52 | -169.37 | -142.46 | -88.661 | -42.290 |
| 0.43993E-7 | -121.42 | -103.44 | -81.747 | -57.228 | -31.330 | 18.321 | 56.161 |
| 0.80654E-7 | -55.000 | -37.567 | -16.744 | 6.5505 | 30.392 | 73.044 | 101.47 |
| 0.14664E-6 | -20.376 | -3.7528 | 15.495 | 36.821 | 57.491 | 89.863 | 110.86 |
| 0.29328E-6 | -1.0617 | 13.702 | 30.435 | 47.605 | 62.916 | 83.477 | 96.819 |
| 0.43993E-6 | 4.1930 | 17.426 | 32.102 | 45.904 | 58.109 | 72.327 | 80.857 |
| 0.10265E-5 | 6.6045 | 15.178 | 23.884 | 31.211 | 36.942 | 43.001 | 46.282 |
| 0.21996E-5 | 3.6833 | 7.5220 | 11.065 | 13.908 | 16.041 | 18.174 | 19.158 |
| 0.43993E-5 | 0.85279 | 1.8042 | 2.6463 | 3.2588 | 3.8056 | 4.1774 | 4.4071 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.42332E-8 | -1533.5 | -1515.0 | -1492.3 | -1466.5 | -1438.6 | -1380.6 | -1322.2 |
| 0.76198E-8 | -837.16 | -818.72 | -796.12 | -770.53 | -743.08 | -686.54 | -632.51 |
| 0.14393E-7 | -428.54 | -410.27 | -388.05 | -362.90 | -335.99 | -282.18 | -235.81 |
| 0.25399E-7 | -230.31 | -212.33 | -190.63 | -166.11 | -140.21 | -90.565 | -52.725 |
| 0.46565E-7 | -113.58 | -96.153 | -75.330 | -52.035 | -28.194 | 14.458 | 42.893 |
| 0.84664E-7 | -51.818 | -35.195 | -15.947 | 5.3789 | 26.048 | 58.420 | 79.419 |
| 0.16932E-6 | -15.957 | -1.1937 | 15.539 | 32.709 | 48.020 | 68.581 | 81.923 |
| 0.25399E-6 | -5.2232 | 8.0099 | 22.686 | 36.488 | 48.693 | 62.911 | 71.441 |
| 0.59265E-6 | 3.3206 | 11.894 | 20.600 | 27.927 | 33.658 | 39.717 | 42.998 |
| 0.12699E-5 | 2.6392 | 6.4780 | 10.021 | 12.864 | 14.997 | 17.130 | 18.114 |
| 0.25399E-5 | 0.57691 | 1.5283 | 2.3705 | 2.9829 | 3.5297 | 3.9016 | 4.1312 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.23186E-8 | -2829.1 | -2810.6 | -2787.9 | -2762.1 | -2734.2 | -2676.2 | -2617.8 |
| 0.41735E-8 | -1556.0 | -1537.6 | -1515.0 | -1489.4 | -1461.9 | -1405.4 | -1351.4 |
| 0.78833E-8 | -808.19 | -789.93 | -767.70 | -742.55 | -715.65 | -661.84 | -615.47 |
| 0.13911E-7 | -444.59 | -426.61 | -404.91 | -380.39 | -354.49 | -304.84 | -267.00 |
| 0.25505E-7 | -229.56 | -212.13 | -191.31 | -168.01 | -144.17 | -101.52 | -73.090 |
| 0.46372E-7 | -114.73 | -98.111 | -78.863 | -57.537 | -36.867 | -4.4954 | 16.502 |
| 0.92745E-7 | -46.471 | -31.706 | -14.974 | 2.1962 | 17.507 | 38.067 | 51.410 |
| 0.13911E-6 | -24.958 | -11.725 | 2.9510 | 16.752 | 28.957 | 43.175 | 51.705 |
| 0.32460E-6 | -4.1900 | 4.3841 | 13.089 | 20.417 | 26.147 | 32.206 | 35.487 |
| 0.69559E-6 | -0.15256 | 3.6861 | 7.2295 | 10.073 | 12.205 | 14.338 | 15.322 |
| 0.13911E-5 | -0.36342 | 0.58804 | 1.4301 | 2.0426 | 2.5894 | 2.9612 | 3.1909 |

90°C 800 Å z = 1

| $H_0$ | V/kT Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.46372E-7 | -140.46 | 7.9259 | 189.55 | 395.69 | 618.79 | 1083.3 | 1550.5 |
| 0.83471E-7 | -15.233 | 132.27 | 313.03 | 517.76 | 737.37 | 1189.7 | 1621.9 |
| 0.15766E-6 | 56.821 | 202.93 | 380.71 | 581.94 | 797.17 | 1227.6 | 1598.6 |
| 0.27823E-6 | 90.158 | 233.99 | 407.57 | 603.73 | 810.91 | 1208.1 | 1510.8 |
| 0.51010E-6 | 107.36 | 246.82 | 413.41 | 599.77 | 790.50 | 1131.7 | 1359.2 |
| 0.92745E-6 | 112.75 | 245.74 | 399.73 | 570.34 | 735.70 | 994.67 | 1162.6 |
| 0.18549E-5 | 108.40 | 226.51 | 360.38 | 497.74 | 620.23 | 784.71 | 891.45 |
| 0.27823E-5 | 101.06 | 206.92 | 324.34 | 434.75 | 532.39 | 646.13 | 714.38 |
| 0.64921E-5 | 70.844 | 139.43 | 209.08 | 267.70 | 313.54 | 362.01 | 388.26 |
| 0.13911E-4 | 33.488 | 64.197 | 92.545 | 115.29 | 132.35 | 149.41 | 157.28 |
| 0.27823E-4 | 7.5226 | 15.134 | 21.871 | 26.770 | 31.145 | 34.120 | 35.957 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.26773E-7 | -348.67 | -200.28 | -18.653 | 187.47 | 410.58 | 875.16 | 1342.3 |
| 0.48192E-7 | -130.10 | 17.404 | 198.16 | 402.89 | 622.49 | 1074.8 | 1507.0 |
| 0.91029E-7 | -3.1579 | 142.95 | 320.73 | 521.96 | 737.19 | 1167.6 | 1538.6 |
| 0.16064E-6 | 56.922 | 200.75 | 374.34 | 570.50 | 777.68 | 1174.8 | 1477.6 |
| 0.29450E-6 | 89.994 | 229.45 | 396.04 | 582.39 | 773.13 | 1114.3 | 1341.8 |
| 0.53546E-6 | 103.90 | 236.88 | 390.87 | 561.48 | 726.84 | 985.82 | 1153.8 |
| 0.10709E-5 | 104.64 | 222.75 | 356.61 | 493.98 | 616.47 | 780.95 | 887.69 |
| 0.16064E-5 | 98.919 | 204.78 | 322.19 | 432.61 | 530.25 | 643.99 | 712.23 |
| 0.37482E-5 | 70.327 | 138.92 | 208.56 | 267.18 | 313.03 | 361.50 | 387.74 |
| 0.80320E-5 | 33.396 | 64.105 | 92.453 | 115.20 | 132.26 | 149.32 | 157.19 |
| 0.16064E-4 | 7.5112 | 15.123 | 21.859 | 26.759 | 31.134 | 34.108 | 35.946 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.14664E-7 | -757.01 | -608.63 | -426.99 | -220.86 | 2.2386 | 466.82 | 934.02 |
| 0.26395E-7 | -356.08 | -208.57 | -27.812 | 176.91 | 396.52 | 848.85 | 1281.0 |
| 0.49858E-7 | -121.86 | 24.246 | 202.03 | 403.26 | 618.49 | 1048.9 | 1419.9 |
| 0.87986E-7 | -9.5013 | 134.33 | 307.91 | 504.07 | 711.25 | 1108.4 | 1411.1 |
| 0.16130E-6 | 54.627 | 194.08 | 360.67 | 547.03 | 737.76 | 1078.9 | 1306.4 |
| 0.29328E-6 | 85.270 | 218.25 | 372.24 | 542.85 | 708.21 | 967.18 | 1135.1 |
| 0.58657E-6 | 96.163 | 214.27 | 348.14 | 485.50 | 607.99 | 772.47 | 879.21 |
| 0.87986E-6 | 93.762 | 199.62 | 317.04 | 427.45 | 525.09 | 638.83 | 707.08 |
| 0.20530E-5 | 68.767 | 137.36 | 207.00 | 265.62 | 311.47 | 359.94 | 386.18 |
| 0.43993E-5 | 33.004 | 63.713 | 92.061 | 114.80 | 131.87 | 148.93 | 156.80 |
| 0.87986E-5 | 7.4365 | 15.048 | 21.785 | 26.684 | 31.059 | 34.034 | 35.871 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.84664E-8 | -1419.3 | -1270.9 | -1089.3 | -883.21 | -660.10 | -195.52 | 271.68 |
| 0.15239E-7 | -723.24 | -575.73 | -394.97 | -190.24 | 29.360 | 481.69 | 913.90 |
| 0.28786E-7 | -315.39 | -169.28 | 8.5024 | 209.73 | 424.96 | 855.42 | 1226.3 |
| 0.50798E-7 | -118.38 | 25.448 | 199.03 | 395.18 | 602.37 | 999.58 | 1302.3 |
| 0.93131E-7 | -3.9588 | 135.50 | 302.08 | 488.44 | 679.17 | 1020.3 | 1247.8 |
| 0.16932E-6 | 53.827 | 186.81 | 340.80 | 511.41 | 676.77 | 935.74 | 1103.7 |
| 0.33865E-6 | 81.267 | 199.38 | 333.24 | 470.60 | 593.09 | 757.58 | 864.32 |
| 0.50798E-6 | 84.346 | 190.21 | 307.62 | 418.04 | 515.68 | 629.42 | 697.66 |
| 0.11853E-5 | 65.483 | 134.07 | 203.72 | 262.34 | 308.18 | 356.65 | 382.90 |
| 0.25399E-5 | 31.960 | 62.669 | 91.017 | 113.76 | 130.82 | 147.88 | 155.76 |
| 0.50798E-5 | 7.1606 | 14.772 | 21.509 | 26.408 | 30.783 | 33.758 | 35.595 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.46372E-8 | -2714.9 | -2566.5 | -2384.9 | -2178.8 | -1955.7 | -1491.1 | -1023.9 |
| 0.83471E-8 | -1442.1 | -1294.6 | -1113.8 | -909.13 | -689.53 | -237.19 | 195.01 |
| 0.15766E-7 | -695.04 | -548.93 | -371.15 | -169.91 | 45.310 | 475.77 | 846.73 |
| 0.27823E-7 | -332.66 | -188.82 | -15.245 | 180.91 | 388.09 | 785.30 | 1088.0 |
| 0.51010E-7 | -119.94 | 19.519 | 186.10 | 372.46 | 563.19 | 904.41 | 1131.8 |
| 0.92745E-7 | -9.0888 | 123.89 | 277.88 | 448.49 | 613.85 | 872.83 | 1040.8 |
| 0.18549E-6 | 50.754 | 168.86 | 302.73 | 440.09 | 562.58 | 727.06 | 833.80 |
| 0.27823E-6 | 64.610 | 170.47 | 287.89 | 398.30 | 495.94 | 609.68 | 677.92 |
| 0.64921E-6 | 57.973 | 126.56 | 196.21 | 254.83 | 300.67 | 349.14 | 375.39 |
| 0.13911E-5 | 29.168 | 59.877 | 88.225 | 110.97 | 128.03 | 145.09 | 152.96 |
| 0.27823E-5 | 6.2203 | 13.832 | 20.569 | 25.468 | 29.843 | 32.817 | 34.655 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.23186E-7 | -522.97 | -485.87 | -440.47 | -388.93 | -333.16 | -217.01 | -100.21 |
| 0.41735E-7 | -269.98 | -233.10 | -187.91 | -136.73 | -81.830 | 31.253 | 139.30 |
| 0.78833E-7 | -122.28 | -85.753 | -41.307 | 9.0006 | 62.808 | 170.42 | 263.16 |
| 0.13911E-6 | -51.357 | -15.398 | 27.997 | 77.037 | 128.83 | 228.13 | 303.81 |
| 0.25505E-6 | -10.501 | 24.364 | 66.010 | 112.59 | 160.28 | 245.58 | 302.45 |
| 0.46372E-6 | 9.9480 | 43.194 | 81.691 | 124.34 | 165.68 | 230.42 | 272.42 |
| 0.92745E-6 | 19.798 | 49.327 | 82.792 | 117.13 | 147.75 | 188.87 | 215.56 |
| 0.13911E-5 | 21.250 | 47.716 | 77.070 | 104.67 | 129.08 | 157.51 | 174.57 |
| 0.32460E-5 | 16.797 | 33.946 | 51.357 | 66.012 | 77.473 | 89.591 | 96.153 |
| 0.69559E-5 | 8.2105 | 15.888 | 22.974 | 28.661 | 32.927 | 37.192 | 39.160 |
| 0.13911E-4 | 1.8597 | 3.7626 | 5.4469 | 6.6717 | 7.7654 | 8.5091 | 8.9684 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.13386E-7 | -941.21 | -904.11 | -858.70 | -807.17 | -751.39 | -635.25 | -518.45 |
| 0.24096E-7 | -501.52 | -464.65 | -419.46 | -368.27 | -313.37 | -200.29 | -92.242 |
| 0.45514E-7 | -244.01 | -207.48 | -163.04 | -112.73 | -58.928 | 48.686 | 141.42 |
| 0.80320E-7 | -119.56 | -83.610 | -40.214 | 8.8250 | 60.620 | 159.92 | 235.60 |
| 0.14725E-6 | -46.915 | -12.049 | 29.596 | 76.186 | 123.86 | 209.17 | 266.04 |
| 0.26773E-6 | -9.3229 | 23.923 | 62.420 | 105.07 | 146.41 | 211.15 | 253.15 |
| 0.53546E-6 | 10.941 | 40.470 | 73.935 | 108.27 | 138.89 | 180.01 | 206.70 |
| 0.80320E-6 | 15.813 | 42.279 | 71.633 | 99.237 | 123.64 | 152.08 | 169.14 |
| 0.18741E-5 | 15.096 | 32.245 | 49.656 | 64.310 | 75.772 | 87.890 | 94.451 |
| 0.40160E-5 | 7.7599 | 15.437 | 22.524 | 28.211 | 32.476 | 36.741 | 38.710 |
| 0.80320E-5 | 1.7677 | 3.6707 | 5.3549 | 6.5798 | 7.6735 | 8.4171 | 8.8765 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.73321E-8 | -1759.8 | -1722.7 | -1677.3 | -1625.8 | -1570.0 | -1453.9 | -1337.1 |
| 0.13197E-7 | -955.46 | -918.58 | -873.39 | -822.21 | -767.31 | -654.23 | -546.17 |
| 0.24929E-7 | -483.40 | -446.87 | -402.42 | -352.12 | -298.31 | -190.69 | -97.956 |
| 0.43993E-7 | -254.36 | -218.40 | -175.01 | -125.97 | -74.175 | 25.127 | 100.80 |
| 0.80654E-7 | -119.55 | -84.687 | -43.041 | 3.5478 | 51.230 | 136.53 | 193.40 |
| 0.14664E-6 | -48.414 | -15.167 | 23.328 | 65.981 | 107.32 | 172.06 | 214.06 |
| 0.29328E-6 | -7.6899 | 21.838 | 55.304 | 89.644 | 120.26 | 161.38 | 188.07 |
| 0.43993E-6 | 3.9665 | 30.432 | 59.786 | 87.390 | 111.80 | 140.23 | 157.29 |
| 0.10265E-5 | 10.872 | 28.020 | 45.431 | 60.086 | 71.547 | 83.665 | 90.227 |
| 0.21996E-5 | 6.3628 | 14.040 | 21.127 | 26.814 | 31.079 | 35.344 | 37.313 |
| 0.43993E-5 | 1.3757 | 3.2786 | 4.9629 | 6.1877 | 7.2814 | 8.0251 | 8.4844 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.42332E-8 | -3086.3 | -3049.3 | -3003.8 | -2952.3 | -2896.5 | -2780.4 | -2663.6 |
| 0.76198E-8 | -1691.6 | -1654.7 | -1609.5 | -1558.3 | -1503.4 | -1390.3 | -1282.3 |
| 0.14393E-7 | -872.27 | -835.74 | -791.29 | -740.98 | -687.18 | -579.56 | -486.82 |
| 0.25399E-7 | -473.93 | -437.97 | -394.58 | -345.54 | -293.74 | -194.44 | -118.76 |
| 0.46565E-7 | -238.50 | -203.63 | -161.99 | -115.40 | -67.717 | 17.586 | 74.456 |
| 0.84664E-7 | -113.03 | -79.788 | -41.292 | 1.3600 | 42.700 | 107.44 | 149.44 |
| 0.16932E-6 | -39.132 | -9.6040 | 23.861 | 58.202 | 88.824 | 129.94 | 156.63 |
| 0.25399E-6 | -16.435 | 10.030 | 39.383 | 66.987 | 91.397 | 119.83 | 136.89 |
| 0.59265E-6 | 3.0109 | 20.159 | 37.570 | 52.225 | 63.686 | 75.804 | 82.366 |
| 0.12699E-5 | 3.3737 | 11.051 | 18.138 | 23.824 | 28.090 | 32.355 | 34.324 |
| 0.25399E-5 | 0.33168 | 2.2346 | 3.9188 | 5.1437 | 6.2373 | 6.9810 | 7.4404 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.23186E-8 | -5679.6 | -5642.5 | -5597.0 | -5545.5 | -5489.7 | -5373.6 | -5256.8 |
| 0.41735E-8 | -3131.3 | -3094.5 | -3049.3 | -2998.1 | -2943.2 | -2830.1 | -2722.1 |
| 0.78833E-8 | -1633.5 | -1597.0 | -1552.5 | -1502.2 | -1448.4 | -1340.8 | -1248.1 |
| 0.13911E-7 | -904.47 | -868.51 | -825.12 | -776.08 | -724.28 | -624.98 | -549.30 |
| 0.25505E-7 | -472.43 | -437.57 | -395.92 | -349.33 | -301.65 | -216.35 | -159.48 |
| 0.46372E-7 | -240.81 | -207.56 | -169.07 | -126.41 | -85.078 | -20.333 | 21.662 |
| 0.92745E-7 | -102.04 | -72.520 | -39.054 | -4.7142 | 25.907 | 67.029 | 93.714 |
| 0.13911E-6 | -57.744 | -31.277 | -1.9242 | 25.679 | 50.089 | 78.524 | 95.585 |
| 0.32460E-6 | -13.652 | 3.4956 | 20.906 | 35.561 | 47.022 | 59.140 | 65.702 |
| 0.69559E-6 | -3.5346 | 4.1427 | 11.229 | 16.916 | 21.181 | 25.447 | 27.415 |
| 0.13911E-5 | -2.4601 | -0.55721 | 1.1270 | 2.3518 | 3.4455 | 4.1892 | 4.6485 |

90°C 1600 Å z = 1

| $H_0$ | V/kT Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.46372E-7 | -294.53 | 2.2386 | 365.50 | 777.76 | 1223.9 | 2153.1 | 3087.5 |
| 0.83471E-7 | -42.152 | 252.87 | 614.38 | 1023.8 | 1463.0 | 2367.7 | 3232.1 |
| 0.15766E-6 | 104.01 | 396.24 | 751.80 | 1154.2 | 1584.7 | 2445.6 | 3187.5 |
| 0.27823E-6 | 172.49 | 460.16 | 807.33 | 1199.6 | 1614.0 | 2408.4 | 3013.8 |
| 0.51010E-6 | 208.75 | 487.67 | 820.84 | 1193.5 | 1575.0 | 2257.4 | 2712.4 |
| 0.92745E-6 | 221.24 | 487.21 | 795.18 | 1136.4 | 1467.1 | 1985.0 | 2321.0 |
| 0.18549E-5 | 214.24 | 450.47 | 718.20 | 992.92 | 1237.9 | 1566.8 | 1780.3 |
| 0.27823E-5 | 200.39 | 412.12 | 646.94 | 867.77 | 1063.0 | 1290.5 | 1427.0 |
| 0.64921E-5 | 141.12 | 278.31 | 417.59 | 534.83 | 626.52 | 723.47 | 775.96 |
| 0.13911E-4 | 66.852 | 128.27 | 184.96 | 230.46 | 264.58 | 298.70 | 314.45 |
| 0.27823E-4 | 15.027 | 30.250 | 43.724 | 53.523 | 62.272 | 68.222 | 71.897 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.26773E-7 | -712.77 | -415.99 | -52.731 | 359.53 | 805.73 | 1734.9 | 2669.3 |
| 0.48192E-7 | -273.70 | 21.322 | 382.83 | 792.30 | 1231.5 | 2136.1 | 3000.6 |
| 0.91029E-7 | -17.719 | 274.50 | 630.07 | 1032.5 | 1462.9 | 2323.9 | 3065.8 |
| 0.16064E-6 | 104.27 | 391.95 | 739.12 | 1131.4 | 1545.7 | 2340.2 | 2945.6 |
| 0.29450E-6 | 172.33 | 451.26 | 784.43 | 1157.1 | 1538.6 | 2221.0 | 2676.0 |
| 0.53546E-6 | 201.97 | 467.94 | 775.91 | 1117.1 | 1447.8 | 1965.8 | 2301.7 |
| 0.10709E-5 | 205.39 | 441.62 | 709.34 | 984.07 | 1229.0 | 1558.0 | 1771.4 |
| 0.16064E-5 | 194.95 | 406.68 | 641.51 | 862.34 | 1057.6 | 1285.1 | 1421.5 |
| 0.37482E-5 | 139.42 | 276.61 | 415.89 | 533.13 | 624.82 | 721.76 | 774.26 |
| 0.80320E-5 | 66.401 | 127.82 | 184.51 | 230.01 | 264.13 | 298.25 | 314.00 |
| 0.16064E-4 | 14.935 | 30.158 | 43.632 | 53.431 | 62.181 | 68.130 | 71.805 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.14664E-7 | -1531.4 | -1234.6 | -871.41 | -459.15 | -12.943 | 916.22 | 1850.6 |
| 0.26395E-7 | -727.63 | -432.61 | -71.098 | 338.36 | 777.57 | 1682.2 | 2546.6 |
| 0.49858E-7 | -257.10 | 35.119 | 390.68 | 793.14 | 1223.6 | 2084.5 | 2826.4 |
| 0.87986E-7 | -30.517 | 257.15 | 604.32 | 996.63 | 1411.0 | 2205.4 | 2810.8 |
| 0.16130E-6 | 99.701 | 378.62 | 711.79 | 1084.5 | 1465.9 | 2148.4 | 2603.3 |
| 0.29328E-6 | 162.87 | 428.85 | 736.82 | 1078.0 | 1408.7 | 1926.7 | 2262.6 |
| 0.58657E-6 | 186.76 | 422.98 | 690.71 | 965.43 | 1210.4 | 1539.3 | 1752.8 |
| 0.87986E-6 | 183.10 | 394.83 | 629.66 | 850.49 | 1045.7 | 1273.2 | 1409.7 |
| 0.20530E-5 | 135.19 | 272.38 | 411.67 | 528.91 | 620.60 | 717.54 | 770.04 |
| 0.43993E-5 | 65.004 | 126.42 | 183.11 | 228.61 | 262.73 | 296.85 | 312.60 |
| 0.87986E-5 | 14.543 | 29.766 | 43.240 | 53.039 | 61.788 | 67.738 | 71.413 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.84664E-8 | -2857.9 | -2561.1 | -2197.9 | -1785.6 | -1339.4 | -410.28 | 524.13 |
| 0.15239E-7 | -1463.7 | -1168.7 | -807.24 | -397.77 | 41.430 | 946.09 | 1810.5 |
| 0.28786E-7 | -645.97 | -353.74 | 1.8178 | 404.28 | 834.74 | 1695.6 | 2437.5 |
| 0.50798E-7 | -250.09 | 37.583 | 384.75 | 777.06 | 1191.4 | 1985.8 | 2591.3 |
| 0.93131E-7 | -19.247 | 259.67 | 592.84 | 965.56 | 1347.0 | 2029.4 | 2484.4 |
| 0.16932E-6 | 98.257 | 364.23 | 672.20 | 1013.4 | 1344.1 | 1862.0 | 2198.0 |
| 0.33865E-6 | 155.31 | 391.54 | 659.27 | 933.99 | 1178.9 | 1507.9 | 1721.4 |
| 0.50798E-6 | 162.70 | 374.43 | 609.26 | 830.09 | 1025.3 | 1252.8 | 1389.3 |
| 0.11853E-5 | 127.33 | 264.52 | 403.81 | 521.05 | 612.74 | 709.68 | 762.17 |
| 0.25399E-5 | 62.015 | 123.43 | 180.12 | 225.62 | 259.74 | 293.86 | 309.61 |
| 0.50798E-5 | 13.499 | 28.722 | 42.196 | 51.995 | 60.744 | 66.694 | 70.369 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.46372E-8 | -5451.1 | -5154.3 | -4791.1 | -4378.8 | -3932.6 | -3003.4 | -2069.0 |
| 0.83471E-8 | -2903.5 | -2608.5 | -2247.0 | -1837.5 | -1398.3 | -493.68 | 370.73 |
| 0.15766E-7 | -1407.2 | -1115.0 | -759.47 | -357.01 | 73.445 | 934.36 | 1676.2 |
| 0.27823E-7 | -680.63 | -392.95 | -45.788 | 346.52 | 760.88 | 1555.3 | 2160.7 |
| 0.51010E-7 | -253.18 | 25.740 | 358.90 | 731.62 | 1113.0 | 1795.5 | 2250.4 |
| 0.92745E-7 | -29.520 | 236.45 | 544.42 | 885.64 | 1216.3 | 1734.3 | 2070.2 |
| 0.18549E-6 | 92.401 | 328.63 | 596.35 | 871.08 | 1116.0 | 1445.0 | 1658.5 |
| 0.27823E-6 | 121.39 | 333.12 | 567.95 | 788.78 | 984.06 | 1211.5 | 1348.0 |
| 0.64921E-6 | 110.67 | 247.86 | 387.14 | 504.38 | 596.07 | 693.02 | 745.51 |
| 0.13911E-5 | 55.106 | 116.52 | 173.22 | 218.71 | 252.83 | 286.96 | 302.70 |
| 0.27823E-5 | 10.707 | 25.930 | 39.404 | 49.203 | 57.953 | 63.902 | 67.577 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.23186E-7 | -1061.8 | -987.65 | -896.84 | -793.77 | -682.22 | -449.93 | -216.32 |
| 0.41735E-7 | -553.92 | -480.16 | -389.78 | -287.42 | -177.62 | 48.546 | 264.65 |
| 0.78833E-7 | -256.43 | -183.37 | -94.487 | 6.1281 | 113.74 | 328.97 | 514.45 |
| 0.13911E-6 | -112.74 | -40.825 | 45.966 | 144.04 | 247.63 | 446.24 | 597.60 |
| 0.25505E-6 | -29.101 | 40.629 | 123.92 | 217.10 | 312.46 | 483.07 | 596.81 |
| 0.46372E-6 | 13.634 | 80.128 | 157.12 | 242.42 | 325.10 | 454.59 | 538.58 |
| 0.92745E-6 | 35.320 | 94.377 | 161.30 | 229.99 | 291.23 | 373.47 | 426.84 |
| 0.13911E-5 | 39.270 | 92.203 | 150.91 | 206.11 | 254.93 | 311.80 | 345.93 |
| 0.32460E-5 | 32.133 | 66.429 | 101.25 | 130.56 | 153.48 | 177.71 | 190.84 |
| 0.69559E-5 | 15.918 | 31.272 | 45.446 | 56.820 | 65.351 | 73.881 | 77.818 |
| 0.13911E-4 | 3.5953 | 7.4012 | 10.769 | 13.219 | 15.406 | 16.894 | 17.812 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.13386E-7 | -1900.1 | -1825.9 | -1735.1 | -1632.0 | -1520.5 | -1288.2 | -1054.6 |
| 0.24096E-7 | -1018.8 | -945.07 | -854.69 | -752.33 | -642.52 | -416.36 | -200.25 |
| 0.45514E-7 | -501.71 | -428.65 | -339.76 | -239.14 | -131.53 | 83.698 | 269.18 |
| 0.80320E-7 | -250.95 | -179.03 | -92.240 | 5.8378 | 109.42 | 308.03 | 459.39 |
| 0.14725E-6 | -103.67 | -33.945 | 49.347 | 142.52 | 237.89 | 408.50 | 522.24 |
| 0.26773E-6 | -26.592 | 39.901 | 116.89 | 202.19 | 284.87 | 414.36 | 498.35 |
| 0.53546E-6 | 16.049 | 75.106 | 142.03 | 210.71 | 271.96 | 354.20 | 407.57 |
| 0.80320E-6 | 26.956 | 79.888 | 138.59 | 193.80 | 242.62 | 299.49 | 333.61 |
| 0.18741E-5 | 27.658 | 61.955 | 96.777 | 126.08 | 149.01 | 173.24 | 186.36 |
| 0.40160E-5 | 14.389 | 29.743 | 43.917 | 55.291 | 63.822 | 72.352 | 76.289 |
| 0.80320E-5 | 3.1447 | 6.9506 | 10.319 | 12.768 | 14.956 | 16.443 | 17.362 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.73321E-8 | -3539.4 | -3465.3 | -3374.4 | -3271.4 | -3159.8 | -2927.5 | -2693.9 |
| 0.13197E-7 | -1928.6 | -1854.9 | -1764.5 | -1662.1 | -1552.3 | -1326.2 | -1110.1 |
| 0.24929E-7 | -982.46 | -909.41 | -820.51 | -719.90 | -612.28 | -397.05 | -211.57 |
| 0.43993E-7 | -522.51 | -450.60 | -363.80 | -265.72 | -162.13 | 36.467 | 187.82 |
| 0.80654E-7 | -250.90 | -181.17 | -97.881 | -4.7027 | 90.663 | 261.27 | 375.01 |
| 0.14664E-6 | -106.68 | -40.194 | 36.798 | 122.10 | 204.78 | 334.27 | 418.26 |
| 0.29328E-6 | -23.041 | 36.015 | 102.94 | 171.62 | 232.87 | 315.11 | 368.48 |
| 0.43993E-6 | 1.5137 | 54.446 | 113.15 | 168.36 | 217.18 | 274.05 | 308.17 |
| 0.10265E-5 | 17.739 | 52.036 | 86.858 | 116.16 | 139.09 | 163.32 | 176.45 |
| 0.21996E-5 | 10.533 | 25.888 | 40.062 | 51.436 | 59.966 | 68.496 | 72.434 |
| 0.43993E-5 | 1.7476 | 5.5535 | 8.9219 | 11.371 | 13.559 | 15.046 | 15.965 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.42332E-8 | -6194.3 | -6120.1 | -6029.3 | -5926.2 | -5814.7 | -5582.4 | -5348.8 |
| 0.76198E-8 | -3402.7 | -3329.0 | -3238.6 | -3136.2 | -3026.4 | -2800.3 | -2584.2 |
| 0.14393E-7 | -1762.0 | -1688.9 | -1600.0 | -1499.4 | -1391.8 | -1176.6 | -991.12 |
| 0.25399E-7 | -963.47 | -891.55 | -804.76 | -706.68 | -603.09 | -404.48 | -253.12 |
| 0.46565E-7 | -490.60 | -420.87 | -337.58 | -244.40 | -149.03 | 21.574 | 135.31 |
| 0.84664E-7 | -237.71 | -171.21 | -94.224 | -8.9201 | 73.759 | 203.24 | 287.24 |
| 0.16932E-6 | -87.663 | -28.605 | 38.325 | 107.00 | 168.25 | 250.49 | 303.86 |
| 0.25399E-6 | -40.983 | 11.949 | 70.656 | 125.86 | 174.68 | 231.55 | 265.67 |
| 0.59265E-6 | 0.48557 | 34.782 | 69.604 | 98.914 | 121.83 | 146.07 | 159.19 |
| 0.12699E-5 | 3.2918 | 18.646 | 32.820 | 44.194 | 52.724 | 61.255 | 65.192 |
| 0.25399E-5 | -1.2414 | 2.5644 | 5.9328 | 8.3826 | 10.569 | 12.057 | 12.975 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.23186E-8 | -11382 | -11308 | -11217 | -11114 | -11003 | -10770 | -10537 |
| 0.41735E-8 | -6284.3 | -6210.6 | -6120.2 | -6017.8 | -5908.0 | -5681.8 | -5465.7 |
| 0.78833E-8 | -3286.6 | -3213.5 | -3124.6 | -3024.0 | -2916.4 | -2701.2 | -2515.7 |
| 0.13911E-7 | -1826.5 | -1754.6 | -1667.8 | -1569.7 | -1466.1 | -1267.5 | -1116.1 |
| 0.25505E-7 | -960.46 | -890.73 | -807.44 | -714.26 | -618.89 | -448.28 | -334.54 |
| 0.46372E-7 | -495.24 | -428.74 | -351.75 | -266.44 | -183.76 | -54.281 | 29.711 |
| 0.92745E-7 | -215.44 | -156.38 | -89.452 | -20.771 | 40.472 | 122.71 | 176.08 |
| 0.13911E-6 | -125.51 | -72.584 | -13.877 | 41.329 | 90.150 | 147.02 | 181.14 |
| 0.32460E-6 | -34.652 | -0.35595 | 34.465 | 63.775 | 86.698 | 110.93 | 124.05 |
| 0.69559E-6 | -12.144 | 3.2101 | 17.383 | 28.757 | 37.288 | 45.818 | 49.755 |
| 0.13911E-5 | -8.1498 | -4.3439 | -0.97553 | 1.4742 | 3.6615 | 5.1489 | 6.0675 |

90°C 3200 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.46372E-7 | -604.96 | -11.423 | 715.10 | 1539.6 | 2432.0 | 4290.3 | 6159.2 |
| 0.83471E-7 | -98.265 | 491.78 | 1214.8 | 2033.7 | 2912.1 | 4721.4 | 6450.3 |
| 0.15766E-6 | 196.16 | 780.60 | 1491.7 | 2296.6 | 3157.5 | 4879.4 | 6363.2 |
| 0.27823E-6 | 334.95 | 910.30 | 1604.6 | 2389.2 | 3217.9 | 4806.8 | 6017.7 |
| 0.51010E-6 | 409.40 | 967.25 | 1633.5 | 2379.0 | 3141.9 | 4506.8 | 5416.7 |
| 0.92745E-6 | 436.22 | 968.17 | 1584.1 | 2266.5 | 2927.9 | 3963.8 | 4635.8 |
| 0.18549E-5 | 424.22 | 896.67 | 1432.1 | 1981.5 | 2471.5 | 3129.4 | 3556.4 |
| 0.27823E-5 | 397.55 | 821.01 | 1290.6 | 1732.3 | 2122.8 | 2577.8 | 2850.8 |
| 0.64921E-5 | 280.78 | 555.16 | 833.73 | 1068.2 | 1251.5 | 1445.4 | 1550.4 |
| 0.13911E-4 | 133.20 | 256.03 | 369.42 | 460.42 | 528.66 | 596.90 | 628.40 |
| 0.27823E-4 | 29.930 | 60.377 | 87.325 | 106.92 | 124.42 | 136.32 | 143.67 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.26773E-7 | -1443.2 | -849.71 | -123.18 | 701.34 | 1593.7 | 3452.0 | 5320.9 |
| 0.48192E-7 | -563.17 | 26.871 | 749.90 | 1568.8 | 2447.2 | 4256.5 | 5985.4 |
| 0.91029E-7 | -49.113 | 535.33 | 1246.4 | 2051.3 | 2912.3 | 4634.1 | 6118.0 |
| 0.16064E-6 | 196.74 | 772.09 | 1466.4 | 2251.0 | 3079.7 | 4668.6 | 5879.5 |
| 0.29450E-6 | 334.83 | 892.68 | 1559.0 | 2304.4 | 3067.3 | 4432.2 | 5342.1 |
| 0.53546E-6 | 395.99 | 927.94 | 1543.8 | 2226.3 | 2887.7 | 3923.6 | 4595.6 |
| 0.10709E-5 | 404.95 | 877.40 | 1412.8 | 1962.3 | 2452.2 | 3110.2 | 3537.1 |
| 0.16064E-5 | 385.23 | 808.69 | 1278.3 | 1720.0 | 2110.5 | 2565.5 | 2838.5 |
| 0.37482E-5 | 276.31 | 550.68 | 829.26 | 1063.7 | 1247.1 | 1441.0 | 1545.9 |
| 0.80320E-5 | 131.67 | 254.51 | 367.90 | 458.89 | 527.13 | 595.37 | 626.87 |
| 0.16064E-4 | 29.479 | 59.927 | 86.874 | 106.47 | 123.97 | 135.87 | 143.21 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.14664E-7 | -3082.6 | -2489.0 | -1762.5 | -938.01 | -45.592 | 1812.7 | 3681.5 |
| 0.26395E-7 | -1473.0 | -882.99 | -159.95 | 658.96 | 1537.3 | 3346.7 | 5075.5 |
| 0.49858E-7 | -529.87 | 54.575 | 765.71 | 1570.6 | 2431.5 | 4153.4 | 5637.2 |
| 0.87986E-7 | -74.821 | 500.52 | 1194.8 | 1979.4 | 2808.2 | 4397.0 | 5607.9 |
| 0.16130E-6 | 187.60 | 745.45 | 1411.7 | 2157.2 | 2920.1 | 4285.0 | 5194.9 |
| 0.29328E-6 | 315.89 | 847.84 | 1463.7 | 2146.2 | 2807.6 | 3843.5 | 4515.5 |
| 0.58657E-6 | 365.85 | 838.31 | 1373.7 | 1923.2 | 2413.1 | 3071.1 | 3498.0 |
| 0.87986E-6 | 359.79 | 783.25 | 1252.9 | 1694.5 | 2085.1 | 2540.0 | 2813.0 |
| 0.20530E-5 | 266.39 | 540.76 | 819.34 | 1053.8 | 1237.2 | 1431.0 | 1536.0 |
| 0.43993E-5 | 127.81 | 250.65 | 364.04 | 455.03 | 523.28 | 591.52 | 623.02 |
| 0.87986E-5 | 28.082 | 58.529 | 85.477 | 105.07 | 122.57 | 134.47 | 141.82 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.84664E-8 | -5737.4 | -5143.9 | -4417.3 | -3592.8 | -2700.4 | -842.11 | 1026.7 |
| 0.15239E-7 | -2947.1 | -2357.0 | -1634.0 | -815.12 | 63.293 | 1872.6 | 3601.4 |
| 0.28786E-7 | -1309.4 | -724.97 | -13.838 | 791.08 | 1652.0 | 3373.8 | 4857.7 |
| 0.50798E-7 | -515.77 | 59.568 | 753.90 | 1538.5 | 2367.2 | 3956.1 | 5167.0 |
| 0.93131E-7 | -52.093 | 505.75 | 1172.0 | 1917.5 | 2680.4 | 4045.3 | 4955.2 |
| 0.16932E-6 | 184.87 | 716.82 | 1332.7 | 2015.2 | 2676.6 | 3712.5 | 4384.4 |
| 0.33865E-6 | 301.23 | 773.69 | 1309.1 | 1858.5 | 2348.5 | 3006.4 | 3433.4 |
| 0.50798E-6 | 317.29 | 740.75 | 1210.4 | 1652.0 | 2042.6 | 2497.5 | 2770.5 |
| 0.11853E-5 | 249.13 | 523.51 | 802.08 | 1036.5 | 1219.9 | 1413.8 | 1518.8 |
| 0.25399E-5 | 120.57 | 243.41 | 356.80 | 447.79 | 516.03 | 584.28 | 615.77 |
| 0.50798E-5 | 25.093 | 55.540 | 82.488 | 102.08 | 119.58 | 131.48 | 138.83 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.46372E-8 | -10925 | -10332 | -9605.7 | -8781.1 | -7888.7 | -6030.4 | -4161.6 |
| 0.83471E-8 | -5828.6 | -5238.6 | -4515.6 | -3696.6 | -2818.2 | -1008.9 | 719.90 |
| 0.15766E-7 | -2834.0 | -2249.5 | -1538.4 | -733.51 | 127.40 | 1849.2 | 3333.1 |
| 0.27823E-7 | -1378.8 | -803.50 | -109.16 | 675.46 | 1504.1 | 3093.0 | 4303.9 |
| 0.51010E-7 | -521.95 | 35.894 | 702.23 | 1447.6 | 2210.5 | 3575.4 | 4485.3 |
| 0.92745E-7 | -72.654 | 459.29 | 1075.2 | 1757.6 | 2419.1 | 3455.0 | 4126.9 |
| 0.18549E-6 | 173.46 | 645.91 | 1181.3 | 1730.8 | 2220.7 | 2878.7 | 3305.6 |
| 0.27823E-6 | 232.76 | 656.22 | 1125.8 | 1567.5 | 1958.1 | 2413.0 | 2686.0 |
| 0.64921E-6 | 213.99 | 488.37 | 766.94 | 1001.4 | 1184.8 | 1378.6 | 1483.6 |
| 0.13911E-5 | 105.13 | 227.97 | 341.36 | 432.35 | 500.60 | 568.84 | 600.34 |
| 0.27823E-5 | 18.185 | 48.632 | 75.579 | 95.178 | 112.67 | 124.57 | 131.92 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.23186E-7 | -2141.8 | -1993.5 | -1811.8 | -1605.7 | -1382.6 | -918.06 | -450.85 |
| 0.41735E-7 | -1124.0 | -976.58 | -795.82 | -591.09 | -371.48 | 80.843 | 513.05 |
| 0.78833E-7 | -527.01 | -380.90 | -203.12 | -1.8919 | 213.33 | 643.79 | 1014.7 |
| 0.13911E-6 | -237.76 | -93.932 | 79.651 | 275.80 | 482.98 | 880.20 | 1182.9 |
| 0.25505E-6 | -68.513 | 70.948 | 237.53 | 423.89 | 614.62 | 955.84 | 1183.3 |
| 0.46372E-6 | 18.871 | 151.85 | 305.84 | 476.45 | 641.81 | 900.79 | 1068.7 |
| 0.92745E-6 | 64.380 | 182.49 | 316.35 | 453.71 | 576.20 | 740.69 | 847.43 |
| 0.13911E-5 | 73.466 | 179.33 | 296.74 | 407.16 | 504.80 | 618.54 | 686.78 |
| 0.32460E-5 | 61.404 | 129.99 | 199.64 | 258.26 | 304.10 | 352.57 | 378.82 |
| 0.69559E-5 | 30.486 | 61.196 | 89.543 | 112.29 | 129.35 | 146.41 | 154.28 |
| 0.13911E-4 | 6.6876 | 14.299 | 21.036 | 25.935 | 30.310 | 33.285 | 35.122 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.13386E-7 | -3820.2 | -3671.8 | -3490.2 | -3284.1 | -3061.0 | -2596.4 | -2129.2 |
| 0.24096E-7 | -2055.7 | -1908.2 | -1727.4 | -1522.7 | -1303.1 | -850.79 | -418.58 |
| 0.45514E-7 | -1019.3 | -873.27 | -695.48 | -494.25 | -279.02 | 151.43 | 522.40 |
| 0.80320E-7 | -515.98 | -372.15 | -198.56 | -2.4113 | 204.76 | 601.98 | 904.70 |
| 0.14725E-6 | -219.44 | -79.986 | 86.598 | 272.95 | 463.68 | 804.90 | 1032.3 |
| 0.26773E-6 | -63.338 | 69.649 | 223.63 | 394.24 | 559.60 | 818.58 | 986.56 |
| 0.53546E-6 | 24.152 | 142.26 | 276.12 | 413.49 | 535.98 | 700.46 | 807.20 |
| 0.80320E-6 | 47.217 | 153.08 | 270.49 | 380.91 | 478.55 | 592.29 | 660.53 |
| 0.18741E-5 | 51.069 | 119.66 | 189.30 | 247.92 | 293.77 | 342.24 | 368.49 |
| 0.40160E-5 | 26.393 | 57.103 | 85.450 | 108.19 | 125.25 | 142.32 | 150.19 |
| 0.80320E-5 | 5.1586 | 12.770 | 19.507 | 24.406 | 28.781 | 31.756 | 33.593 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.73321E-8 | -7100.9 | -6952.5 | -6770.9 | -6564.7 | -6341.6 | -5877.0 | -5409.8 |
| 0.13197E-7 | -3877.4 | -3729.9 | -3549.1 | -3344.4 | -3124.8 | -2672.5 | -2240.3 |
| 0.24929E-7 | -1982.8 | -1836.7 | -1658.9 | -1457.7 | -1242.5 | -812.06 | -441.10 |
| 0.43993E-7 | -1061.1 | -917.27 | -743.68 | -547.53 | -340.35 | 56.862 | 359.58 |
| 0.80654E-7 | -515.88 | -376.42 | -209.83 | -23.479 | 167.25 | 508.47 | 735.95 |
| 0.14664E-6 | -225.48 | -92.499 | 61.486 | 232.09 | 397.45 | 656.43 | 824.41 |
| 0.29328E-6 | -55.943 | 62.170 | 196.03 | 333.39 | 455.88 | 620.36 | 727.11 |
| 0.43993E-6 | -5.5376 | 100.32 | 217.74 | 328.15 | 425.79 | 539.53 | 607.78 |
| 0.10265E-5 | 29.520 | 98.114 | 167.75 | 226.37 | 272.22 | 320.69 | 346.94 |
| 0.21996E-5 | 17.243 | 47.953 | 76.300 | 99.048 | 116.10 | 133.17 | 141.04 |
| 0.43993E-5 | 1.3031 | 8.9149 | 15.651 | 20.551 | 24.925 | 27.900 | 29.738 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.42332E-8 | -12412 | -12264 | -12082 | -11876 | -11653 | -11188 | -10721 |
| 0.76198E-8 | -6827.4 | -6679.9 | -6499.1 | -6294.4 | -6074.8 | -5622.5 | -5190.3 |
| 0.14393E-7 | -3543.8 | -3397.7 | -3219.9 | -3018.6 | -2803.4 | -2372.9 | -2002.0 |
| 0.25399E-7 | -1944.8 | -1801.0 | -1627.4 | -1431.2 | -1224.0 | -826.87 | -524.15 |
| 0.46565E-7 | -997.09 | -857.63 | -691.04 | -504.68 | -313.95 | 27.262 | 254.74 |
| 0.84664E-7 | -489.33 | -356.34 | -202.36 | -31.753 | 133.60 | 392.58 | 560.56 |
| 0.16932E-6 | -186.96 | -68.852 | 65.010 | 202.37 | 324.86 | 489.34 | 596.08 |
| 0.25399E-6 | -92.290 | 13.575 | 130.98 | 241.40 | 339.04 | 452.78 | 521.02 |
| 0.59265E-6 | -6.6588 | 61.934 | 131.57 | 190.19 | 236.04 | 284.51 | 310.76 |
| 0.12699E-5 | 1.2473 | 31.957 | 60.304 | 83.052 | 100.11 | 117.17 | 125.04 |
| 0.25399E-5 | -5.9385 | 1.6732 | 8.4101 | 13.309 | 17.684 | 20.659 | 22.496 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.23186E-8 | -22791 | -22642 | -22461 | -22254 | -22031 | -21567 | -21099 |
| 0.41735E-8 | -12592 | -12445 | -12264 | -12059 | -11839 | -11387 | -10955 |
| 0.78833E-8 | -6594.9 | -6448.8 | -6271:0 | -6069.8 | -5854.6 | -5424.1 | -5053.1 |
| 0.13911E-7 | -3672.9 | -3529.1 | -3355.5 | -3159.4 | -2952.2 | -2555.0 | -2252.2 |
| 0.25505E-7 | -1938.8 | -1799.3 | -1632.7 | -1446.4 | -1255.6 | -914.45 | -686.97 |
| 0.46372E-7 | -1006.3 | -873.39 | -719.40 | -548.79 | -383.43 | -124.46 | 43.521 |
| 0.92745E-7 | -444.49 | -326.38 | -192.51 | -55.156 | 67.332 | 231.81 | 338.55 |
| 0.13911E-6 | -263.31 | -157.45 | -40.037 | 70.377 | 168.01 | 281.75 | 350.00 |
| 0.32460E-6 | -78.839 | -10.245 | 59.398 | 118.01 | 163.86 | 212.33 | 238.58 |
| 0.69559E-6 | -31.423 | -0.71428 | 27.633 | 50.381 | 67.441 | 84.502 | 92.377 |
| 0.13911E-5 | -21.375 | -13.763 | -7.0263 | -2.1268 | 2.2477 | 5.2225 | 7.0598 |

150°C 50 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.44665E-7 | -2.6642 | 5.5092 | 15.514 | 26.868 | 39.157 | 64.747 | 90.482 |
| 0.80398E-7 | 2.9611 | 11.086 | 21.042 | 32.320 | 44.416 | 69.331 | 93.138 |
| 0.15186E-6 | 5.6793 | 13.727 | 23.520 | 34.604 | 46.459 | 70.170 | 90.604 |
| 0.26799E-6 | 6.5866 | 14.509 | 24.070 | 34.875 | 46.287 | 68.167 | 84.841 |
| 0.49132E-6 | 6.7980 | 14.479 | 23.655 | 33.920 | 44.426 | 63.221 | 75.751 |
| 0.89331E-6 | 6.6338 | 13.959 | 22.440 | 31.838 | 40.946 | 55.211 | 64.464 |
| 0.17866E-5 | 6.1191 | 12.625 | 19.998 | 27.564 | 34.311 | 43.372 | 49.251 |
| 0.26799E-5 | 5.6383 | 11.469 | 17.937 | 24.018 | 29.397 | 35.662 | 39.421 |
| 0.62532E-5 | 3.9132 | 7.6915 | 11.527 | 14.756 | 17.281 | 19.951 | 21.397 |
| 0.13399E-4 | 1.8457 | 3.5373 | 5.0987 | 6.3517 | 7.2915 | 8.2312 | 8.6650 |
| 0.26799E-4 | 0.41445 | 0.83373 | 1.2048 | 1.4746 | 1.7156 | 1.8795 | 1.9807 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.25787E-7 | -12.915 | -4.7415 | 5.2631 | 16.617 | 28.906 | 54.496 | 80.231 |
| 0.46418E-7 | -2.1790 | 5.9462 | 15.902 | 27.179 | 39.276 | 64.191 | 87.998 |
| 0.87678E-7 | 3.4460 | 11.494 | 21.286 | 32.371 | 44.226 | 67.937 | 88.370 |
| 0.15472E-6 | 5.6511 | 13.574 | 23.135 | 33.940 | 45.352 | 67.231 | 83.906 |
| 0.28366E-6 | 6.4967 | 14.178 | 23.354 | 33.619 | 44.125 | 62.920 | 75.450 |
| 0.51575E-6 | 6.5603 | 13.885 | 22.367 | 31.765 | 40.873 | 55.138 | 64.391 |
| 0.10315E-5 | 6.1102 | 12.616 | 19.989 | 27.555 | 34.302 | 43.363 | 49.242 |
| 0.15472E-5 | 5.6362 | 11.467 | 17.935 | 24.016 | 29.395 | 35.660 | 39.419 |
| 0.36102E-5 | 3.9131 | 7.6914 | 11.527 | 14.756 | 17.281 | 19.951 | 21.397 |
| 0.77363E-5 | 1.8457 | 3.5373 | 5.0987 | 6.3517 | 7.2915 | 8.2312 | 8.6650 |
| 0.15472E-4 | 0.41445 | 0.83373 | 1.2048 | 1.4746 | 1.7156 | 1.8795 | 1.9807 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.14124E-7 | -34.125 | -25.951 | -15.947 | -4.5929 | 7.6960 | 33.286 | 59.021 |
| 0.25424E-7 | -13.291 | -5.1666 | 4.7898 | 16.066 | 28.163 | 53.078 | 76.885 |
| 0.48023E-7 | -1.8000 | 6.2480 | 16.040 | 27.125 | 38.980 | 62.691 | 83.124 |
| 0.84747E-7 | 3.1670 | 11.089 | 20.651 | 31.456 | 42.867 | 64.747 | 81.421 |
| 0.15537E-6 | 5.5172 | 13.199 | 22.375 | 32.640 | 43.145 | 61.941 | 74.471 |
| 0.28249E-6 | 6.2423 | 13.567 | 22.049 | 31.447 | 40.555 | 54.820 | 64.073 |
| 0.56498E-6 | 6.0507 | 12.556 | 19.930 | 27.496 | 34.243 | 43.303 | 49.183 |
| 0.84747E-6 | 5.6185 | 11.449 | 17.917 | 23.999 | 29.377 | 35.642 | 39.401 |
| 0.19774E-5 | 3.9124 | 7.6907 | 11.526 | 14.755 | 17.281 | 19.950 | 21.396 |
| 0.42373E-5 | 1.8457 | 3.5373 | 5.0987 | 6.3517 | 7.2915 | 8.2312 | 8.6649 |
| 0.84747E-5 | 0.41445 | 0.83372 | 1.2048 | 1.4746 | 1.7156 | 1.8795 | 1.9807 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.81548E-8 | -69.583 | -61.410 | -51.405 | -40.051 | -27.762 | -2.1719 | 23.562 |
| 0.14678E-7 | -32.343 | -24.218 | -14.261 | -2.9846 | 9.1116 | 34.027 | 57.834 |
| 0.27726E-7 | -11.241 | -3.1936 | 6.5991 | 17.683 | 29.538 | 53.249 | 73.683 |
| 0.48928E-7 | -1.6497 | 6.2730 | 15.834 | 26.639 | 38.051 | 59.930 | 76.605 |
| 0.89703E-7 | 3.3548 | 11.036 | 20.212 | 30.477 | 40.983 | 59.778 | 72.308 |
| 0.16309E-6 | 5.3865 | 12.711 | 21.193 | 30.591 | 39.699 | 53.964 | 63.217 |
| 0.32619E-6 | 5.8276 | 12.333 | 19.707 | 27.273 | 34.020 | 43.080 | 48.959 |
| 0.48928E-6 | 5.5342 | 11.365 | 17.832 | 23.914 | 29.293 | 35.558 | 39.317 |
| 0.11416E-5 | 3.9061 | 7.6844 | 11.520 | 14.749 | 17.274 | 19.944 | 21.390 |
| 0.24464E-5 | 1.8454 | 3.5370 | 5.0984 | 6.3514 | 7.2912 | 8.2309 | 8.6646 |
| 0.48928E-5 | 0.41444 | 0.83371 | 1.2048 | 1.4746 | 1.7156 | 1.8794 | 1.9806 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.44665E-8 | -140.15 | -131.97 | -121.97 | -110.61 | -98.328 | -72.738 | -47.003 |
| 0.80398E-8 | -70.814 | -62.689 | -52.732 | -41.455 | -29.359 | -4.4439 | 19.363 |
| 0.15186E-7 | -30.860 | -22.811 | -13.019 | -1.9349 | 9.9204 | 33.631 | 54.064 |
| 0.26799E-7 | -12.118 | -4.1952 | 5.3661 | 16.170 | 27.582 | 49.462 | 66.136 |
| 0.49132E-7 | -1.7444 | 5.9373 | 15.113 | 25.378 | 35.884 | 54.679 | 67.209 |
| 0.89331E-7 | 3.0808 | 10.406 | 18.887 | 28.285 | 37.393 | 51.658 | 60.911 |
| 0.17866E-6 | 5.0581 | 11.564 | 18.937 | 26.503 | 33.250 | 42.310 | 48.190 |
| 0.26799E-6 | 5.1794 | 11.010 | 17.478 | 23.560 | 28.938 | 35.203 | 38.962 |
| 0.62532E-6 | 3.8614 | 7.6397 | 11.475 | 14.704 | 17.230 | 19.899 | 21.345 |
| 0.13399E-5 | 1.8418 | 3.5334 | 5.0948 | 6.3478 | 7.2876 | 8.2273 | 8.6611 |
| 0.26799E-5 | 0.41424 | 0.83351 | 1.2045 | 1.4744 | 1.7154 | 1.8792 | 1.9804 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.22332E-7 | -22.201 | -20.157 | -17.656 | -14.818 | -11.745 | -5.3482 | 1.0854 |
| 0.40199E-7 | -9.5649 | -7.5336 | -5.0444 | -2.2252 | 0.79886 | 7.0277 | 12.979 |
| 0.75931E-7 | -2.8150 | -0.80304 | 1.6451 | 4.4162 | 7.3800 | 13.307 | 18.416 |
| 0.13399E-6 | -0.48126E-1 | 1.9325 | 4.3229 | 7.0241 | 9.8771 | 15.346 | 19.515 |
| 0.24566E-6 | 1.1702 | 3.0907 | 5.3847 | 7.9509 | 10.577 | 15.276 | 18.408 |
| 0.44665E-6 | 1.5293 | 3.3606 | 5.4811 | 7.8305 | 10.107 | 13.673 | 15.987 |
| 0.89331E-6 | 1.5133 | 3.1398 | 4.9832 | 6.8747 | 8.5615 | 10.826 | 12.296 |
| 0.13399E-5 | 1.4057 | 2.8635 | 4.4804 | 6.0008 | 7.3454 | 8.9117 | 9.8514 |
| 0.31266E-5 | 0.97820 | 1.9227 | 2.8818 | 3.6890 | 4.3203 | 4.9878 | 5.3492 |
| 0.66998E-5 | 0.46144 | 0.88433 | 1.2746 | 1.5879 | 1.8228 | 2.0578 | 2.1662 |
| 0.13399E-4 | 0.10361 | 0.20843 | 0.30120 | 0.36867 | 0.42891 | 0.46987 | 0.49517 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.12893E-7 | -44.088 | -42.045 | -39.543 | -36.705 | -33.633 | -27.235 | -20.801 |
| 0.23209E-7 | -21.103 | -19.072 | -16.583 | -13.764 | -10.739 | -4.5110 | 1.4407 |
| 0.43839E-7 | -8.3270 | -6.3149 | -3.8667 | -1.0957 | 1.8681 | 7.7957 | 12.904 |
| 0.77363E-7 | -2.7051 | -0.72439 | 1.6659 | 4.3671 | 7.2201 | 12.689 | 16.858 |
| 0.14183E-6 | 0.90530E-1 | 2.0110 | 4.3049 | 6.8712 | 9.4977 | 14.196 | 17.328 |
| 0.25787E-6 | 1.1630 | 2.9943 | 5.1147 | 7.4641 | 9.7412 | 13.307 | 15.620 |
| 0.51575E-6 | 1.4399 | 3.0664 | 4.9097 | 6.8013 | 8.4880 | 10.753 | 12.222 |
| 0.77363E-6 | 1.3827 | 2.8406 | 4.4574 | 5.9779 | 7.3225 | 8.8887 | 9.8285 |
| 0.18051E-5 | 0.97711 | 1.9216 | 2.8807 | 3.6879 | 4.3192 | 4.9867 | 5.3481 |
| 0.38681E-5 | 0.46140 | 0.88429 | 1.2746 | 1.5879 | 1.8228 | 2.0577 | 2.1662 |
| 0.77363E-5 | 0.10361 | 0.20843 | 0.30120 | 0.36867 | 0.42891 | 0.46987 | 0.49517 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.70622E-8 | -88.110 | -86.067 | -83.566 | -80.727 | -77.655 | -71.258 | -64.824 |
| 0.12712E-7 | -44.845 | -42.814 | -40.324 | -37.505 | -34.481 | -28.252 | -22.300 |
| 0.24011E-7 | -20.179 | -18.167 | -15.719 | -12.948 | -9.9844 | -4.0567 | 1.0516 |
| 0.42373E-7 | -8.8216 | -6.8409 | -4.4505 | -1.7493 | 1.1036 | 6.5734 | 10.742 |
| 0.77685E-7 | -2.7129 | -0.79248 | 1.5014 | 4.0677 | 6.6942 | 11.392 | 14.525 |
| 0.14124E-6 | 0.15614E-1 | 1.8469 | 3.9673 | 6.3167 | 8.5938 | 12.160 | 14.473 |
| 0.28249E-6 | 1.1219 | 2.7484 | 4.5917 | 6.4833 | 8.1700 | 10.435 | 11.905 |
| 0.42373E-6 | 1.2566 | 2.7144 | 4.3312 | 5.8517 | 7.1963 | 8.7625 | 9.7023 |
| 0.98872E-6 | 0.96647 | 1.9110 | 2.8700 | 3.6773 | 4.3086 | 4.9760 | 5.3375 |
| 0.21186E-5 | 0.46083 | 0.88372 | 1.2740 | 1.5873 | 1.8222 | 2.0572 | 2.1656 |
| 0.42373E-5 | 0.10358 | 0.20840 | 0.30117 | 0.36864 | 0.42888 | 0.46985 | 0.49515 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.40774E-8 | -160.53 | -158.49 | -155.99 | -153.15 | -150.07 | -143.68 | -137.24 |
| 0.73393E-8 | -84.409 | -82.377 | -79.888 | -77.069 | -74.045 | -67.816 | -61.864 |
| 0.13863E-7 | -40.435 | -38.423 | -35.975 | -33.204 | -30.240 | -24.313 | -19.204 |
| 0.24464E-7 | -19.699 | -17.718 | -15.328 | -12.626 | -9.7739 | -4.3041 | -0.13548 |
| 0.44851E-7 | -8.0737 | -6.1532 | -3.8592 | -1.2930 | 1.3334 | 6.0322 | 9.1647 |
| 0.81548E-7 | -2.4557 | -0.62440 | 1.4960 | 3.8454 | 6.1225 | 9.6887 | 12.002 |
| 0.16309E-6 | 0.26608 | 1.8925 | 3.7359 | 5.6275 | 7.3142 | 9.5792 | 11.049 |
| 0.24464E-6 | 0.84966 | 2.3074 | 3.9243 | 5.4448 | 6.7893 | 8.3556 | 9.2953 |
| 0.57083E-6 | 0.91064 | 1.8552 | 2.8142 | 3.6214 | 4.2527 | 4.9202 | 5.2817 |
| 0.12232E-5 | 0.45593 | 0.87882 | 1.2691 | 1.5824 | 1.8173 | 2.0523 | 2.1607 |
| 0.24464E-5 | 0.10329 | 0.20810 | 0.30087 | 0.36834 | 0.42858 | 0.46955 | 0.49485 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.22332E-8 | -303.34 | -301.30 | -298.80 | -295.96 | -292.89 | -286.49 | -280.06 |
| 0.40199E-8 | -163.00 | -160.97 | -158.48 | -155.66 | -152.63 | -146.40 | -140.45 |
| 0.75931E-8 | -81.266 | -79.254 | -76.805 | -74.034 | -71.070 | -65.143 | -60.034 |
| 0.13399E-7 | -42.141 | -40.161 | -37.770 | -35.069 | -32.216 | -26.746 | -22.577 |
| 0.24566E-7 | -19.625 | -17.705 | -15.411 | -12.845 | -10.218 | -5.5198 | -2.3872 |
| 0.44665E-7 | -8.1918 | -6.3605 | -4.2400 | -1.8907 | 0.38638 | 3.9526 | 6.2658 |
| 0.89331E-7 | -2.0396 | -0.41313 | 1.4302 | 3.3217 | 5.0085 | 7.2735 | 8.7434 |
| 0.13399E-6 | -0.39993 | 1.0578 | 2.6747 | 4.1952 | 5.5397 | 7.1060 | 8.0458 |
| 0.31266E-6 | 0.65484 | 1.5994 | 2.5584 | 3.3656 | 3.9969 | 4.6644 | 5.0259 |
| 0.66998E-6 | 0.41937 | 0.84226 | 1.2326 | 1.5458 | 1.7808 | 2.0157 | 2.1241 |
| 0.13399E-5 | 0.99704E-1 | 0.20452 | 0.29729 | 0.36476 | 0.42500 | 0.46596 | 0.49126 |

150°C 100 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.44665E-7 | -9.6180 | 6.7288 | 26.738 | 49.446 | 74.024 | 125.20 | 176.67 |
| 0.80398E-7 | 2.9843 | 19.234 | 39.148 | 61.702 | 85.894 | 135.72 | 183.34 |
| 0.15186E-6 | 9.6499 | 25.746 | 45.331 | 67.500 | 91.210 | 138.63 | 179.49 |
| 0.26799E-6 | 12.281 | 28.127 | 47.250 | 68.859 | 91.683 | 135.44 | 168.79 |
| 0.49132E-6 | 13.247 | 28.611 | 46.962 | 67.492 | 88.504 | 126.09 | 151.15 |
| 0.89331E-6 | 13.167 | 27.818 | 44.782 | 63.577 | 81.793 | 110.32 | 128.82 |
| 0.17866E-5 | 12.224 | 25.236 | 39.983 | 55.115 | 68.609 | 86.729 | 98.488 |
| 0.26799E-5 | 11.273 | 22.935 | 35.870 | 48.034 | 58.790 | 71.320 | 78.839 |
| 0.62532E-5 | 7.8263 | 15.382 | 23.055 | 29.512 | 34.563 | 39.903 | 42.794 |
| 0.13399E-4 | 3.6915 | 7.0746 | 10.197 | 12.703 | 14.583 | 16.462 | 17.330 |
| 0.26799E-4 | 0.82891 | 1.6674 | 2.4096 | 2.9493 | 3.4313 | 3.7590 | 3.9614 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.25787E-7 | -31.505 | -15.158 | 4.8510 | 27.559 | 52.137 | 103.31 | 154.78 |
| 0.46418E-7 | -8.5544 | 7.6961 | 27.609 | 50.163 | 74.355 | 124.18 | 171.80 |
| 0.87678E-7 | 4.1379 | 20.234 | 39.819 | 61.988 | 85.698 | 133.12 | 173.98 |
| 0.15472E-6 | 9.6249 | 25.470 | 44.593 | 66.202 | 89.026 | 132.78 | 166.13 |
| 0.28366E-6 | 12.167 | 27.531 | 45.883 | 66.413 | 87.424 | 125.01 | 150.07 |
| 0.51575E-6 | 12.801 | 27.452 | 44.415 | 63.210 | 81.427 | 109.95 | 128.46 |
| 0.10315E-5 | 12.150 | 25.162 | 39.909 | 55.042 | 68.535 | 86.656 | 98.415 |
| 0.15472E-5 | 11.250 | 22.912 | 35.847 | 48.011 | 58.768 | 71.298 | 78.816 |
| 0.36102E-5 | 7.8252 | 15.381 | 23.054 | 29.511 | 34.562 | 39.902 | 42.793 |
| 0.77363E-5 | 3.6915 | 7.0746 | 10.197 | 12.703 | 14.583 | 16.462 | 17.329 |
| 0.15472E-4 | 0.82890 | 1.6674 | 2.4096 | 2.9493 | 3.4313 | 3.7590 | 3.9614 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.14124E-7 | -75.527 | -59.180 | -39.171 | -16.463 | 8.1150 | 59.295 | 110.76 |
| 0.25424E-7 | -32.296 | -16.045 | 3.8675 | 26.421 | 50.614 | 100.44 | 148.05 |
| 0.48023E-7 | -7.7145 | 8.3816 | 27.967 | 50.135 | 73.846 | 121.26 | 162.13 |
| 0.84747E-7 | 3.5084 | 19.354 | 38.476 | 60.086 | 82.910 | 126.66 | 160.01 |
| 0.15537E-6 | 9.3640 | 24.727 | 43.079 | 63.609 | 84.621 | 122.21 | 147.27 |
| 0.28249E-6 | 11.654 | 26.304 | 43.268 | 62.063 | 80.280 | 108.81 | 127.31 |
| 0.56498E-6 | 11.832 | 24.844 | 39.591 | 54.724 | 68.217 | 86.338 | 98.097 |
| 0.84747E-6 | 11.124 | 22.786 | 35.721 | 47.885 | 58.641 | 71.171 | 78.689 |
| 0.19774E-5 | 7.8146 | 15.371 | 23.043 | 29.501 | 34.551 | 39.891 | 42.783 |
| 0.42373E-5 | 3.6909 | 7.0740 | 10.196 | 12.702 | 14.582 | 16.461 | 17.329 |
| 0.84747E-5 | 0.82888 | 1.6674 | 2.4096 | 2.9493 | 3.4312 | 3.7589 | 3.9613 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.81548E-8 | -147.95 | -131.60 | -111.59 | -88.886 | -64.308 | -13.128 | 38.341 |
| 0.14678E-7 | -71.859 | -55.609 | -35.696 | -13.142 | 11.050 | 60.881 | 108.49 |
| 0.27726E-7 | -27.970 | -11.874 | 7.7107 | 29.879 | 53.590 | 101.01 | 141.87 |
| 0.48928E-7 | -7.3691 | 8.4765 | 27.599 | 49.208 | 72.032 | 115.79 | 149.14 |
| 0.89703E-7 | 4.0033 | 19.367 | 37.718 | 58.248 | 79.260 | 116.85 | 141.91 |
| 0.16309E-6 | 9.1827 | 23.833 | 40.797 | 59.592 | 77.808 | 106.33 | 124.84 |
| 0.32619E-6 | 10.976 | 23.988 | 38.735 | 53.868 | 67.362 | 85.482 | 97.241 |
| 0.48928E-6 | 10.717 | 22.379 | 35.314 | 47.478 | 58.234 | 70.764 | 78.282 |
| 0.11416E-5 | 7.7588 | 15.315 | 22.987 | 29.445 | 34.496 | 39.835 | 42.727 |
| 0.24464E-5 | 3.6860 | 7.0691 | 10.192 | 12.698 | 14.577 | 16.457 | 17.324 |
| 0.48928E-5 | 0.82858 | 1.6671 | 2.4093 | 2.9490 | 3.4309 | 3.7586 | 3.9610 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.44665E-8 | -290.76 | -274.41 | -254.40 | -231.70 | -207.12 | -155.94 | -104.47 |
| 0.80398E-8 | -150.45 | -134.20 | -114.28 | -91.735 | -67.542 | -17.711 | 29.902 |
| 0.15186E-7 | -68.801 | -52.704 | -33.119 | -10.950 | 12.759 | 60.181 | 101.04 |
| 0.26799E-7 | -29.811 | -13.965 | 5.1568 | 26.766 | 49.590 | 93.349 | 126.69 |
| 0.49132E-7 | -7.5487 | 7.8150 | 26.166 | 46.696 | 67.708 | 105.29 | 130.35 |
| 0.89331E-7 | 3.4466 | 18.097 | 35.060 | 53.855 | 72.072 | 100.60 | 119.10 |
| 0.17866E-6 | 8.6711 | 21.683 | 36.430 | 51.562 | 65.056 | 83.176 | 94.935 |
| 0.26799E-6 | 9.4674 | 21.130 | 34.064 | 46.228 | 56.985 | 69.515 | 77.033 |
| 0.62532E-6 | 7.5030 | 15.059 | 22.731 | 29.189 | 34.240 | 39.579 | 42.471 |
| 0.13399E-5 | 3.6494 | 7.0325 | 10.155 | 12.661 | 14.540 | 16.420 | 17.287 |
| 0.26799E-5 | 0.82500 | 1.6635 | 2.4057 | 2.9454 | 3.4273 | 3.7551 | 3.9575 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.22332E-7 | -50.453 | -46.367 | -41.364 | -35.687 | -29.543 | -16.748 | -3.8807 |
| 0.40199E-7 | -23.677 | -19.615 | -14.636 | -8.9983 | -2.9502 | 9.5075 | 21.411 |
| 0.75931E-7 | -8.6917 | -4.6677 | 0.22864 | 5.7707 | 11.698 | 23.553 | 33.770 |
| 0.13399E-6 | -2.0232 | 1.9381 | 6.7188 | 12.121 | 17.827 | 28.766 | 37.104 |
| 0.24566E-6 | 1.3433 | 5.1842 | 9.7721 | 14.904 | 20.157 | 29.555 | 35.820 |
| 0.44665E-6 | 2.6464 | 6.3090 | 10.549 | 15.248 | 19.802 | 26.935 | 31.561 |
| 0.89331E-6 | 2.9269 | 6.1799 | 9.8666 | 13.649 | 17.023 | 21.553 | 24.493 |
| 0.13399E-5 | 2.7771 | 5.6928 | 8.9265 | 11.967 | 14.656 | 17.789 | 19.668 |
| 0.31266E-5 | 1.9544 | 3.8436 | 5.7616 | 7.3761 | 8.6387 | 9.9737 | 10.696 |
| 0.66998E-5 | 0.92281 | 1.7685 | 2.5493 | 3.1758 | 3.6456 | 4.1155 | 4.3324 |
| 0.13399E-4 | 0.20722 | 0.41686 | 0.60240 | 0.73734 | 0.85782 | 0.93975 | 0.99035 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.12893E-7 | -95.701 | -91.615 | -86.612 | -80.935 | -74.791 | -61.995 | -49.128 |
| 0.23209E-7 | -48.157 | -44.095 | -39.117 | -33.478 | -27.430 | -14.972 | -3.0690 |
| 0.43839E-7 | -20.989 | -16.965 | -12.068 | -6.5266 | -0.59893 | 11.256 | 21.473 |
| 0.77363E-7 | -8.4312 | -4.4697 | 0.31091 | 5.7132 | 11.419 | 22.358 | 30.696 |
| 0.14183E-6 | -1.6453 | 2.1956 | 6.7835 | 11.916 | 17.169 | 26.566 | 32.831 |
| 0.25787E-6 | 1.3887 | 5.0513 | 9.2922 | 13.991 | 18.545 | 25.677 | 30.304 |
| 0.51575E-6 | 2.5605 | 5.8135 | 9.5003 | 13.283 | 16.656 | 21.186 | 24.126 |
| 0.77363E-6 | 2.6261 | 5.5417 | 8.7754 | 11.816 | 14.505 | 17.638 | 19.517 |
| 0.18051E-5 | 1.9404 | 3.8295 | 5.7476 | 7.3621 | 8.6247 | 9.9596 | 10.682 |
| 0.38681E-5 | 0.92199 | 1.7677 | 2.5484 | 3.1749 | 3.6448 | 4.1147 | 4.3316 |
| 0.77363E-5 | 0.20718 | 0.41682 | 0.60236 | 0.73730 | 0.85778 | 0.93971 | 0.99031 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.70622E-8 | -185.40 | -181.31 | -176.31 | -170.63 | -164.49 | -151.69 | -138.83 |
| 0.12712E-7 | -97.254 | -93.191 | -88.213 | -82.575 | -76.526 | -64.069 | -52.165 |
| 0.24011E-7 | -46.220 | -42.196 | -37.300 | -31.758 | -25.830 | -13.974 | -3.7581 |
| 0.42373E-7 | -22.061 | -18.100 | -13.319 | -7.9170 | -2.2111 | 8.7285 | 17.065 |
| 0.77685E-7 | -8.4379 | -4.5969 | -0.90372E-2 | 5.1234 | 10.376 | 19.773 | 26.039 |
| 0.14124E-6 | -1.8024 | 1.8602 | 6.1011 | 10.799 | 15.354 | 22.486 | 27.113 |
| 0.28249E-6 | 1.4131 | 4.6661 | 8.3529 | 12.136 | 15.509 | 20.039 | 22.979 |
| 0.42373E-6 | 2.0624 | 4.9781 | 8.2118 | 11.252 | 13.941 | 17.074 | 18.953 |
| 0.98872E-6 | 1.8552 | 3.7443 | 5.6624 | 7.2768 | 8.5395 | 9.8744 | 10.597 |
| 0.21186E-5 | 0.91360 | 1.7593 | 2.5400 | 3.1665 | 3.6364 | 4.1063 | 4.3232 |
| 0.42373E-5 | 0.20661 | 0.41625 | 0.60179 | 0.73673 | 0.85721 | 0.93914 | 0.98974 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.40774E-8 | -331.79 | -327.70 | -322.70 | -317.02 | -310.87 | -298.08 | -285.21 |
| 0.73393E-8 | -177.89 | -173.83 | -168.85 | -163.21 | -157.16 | -144.70 | -132.80 |
| 0.13863E-7 | -88.199 | -84.175 | -79.279 | -73.737 | -67.809 | -55.954 | -45.737 |
| 0.24464E-7 | -45.211 | -41.249 | -36.468 | -31.066 | -25.360 | -14.420 | -6.0835 |
| 0.44851E-7 | -20.427 | -16.586 | -11.998 | -6.8656 | -1.6127 | 7.7848 | 14.049 |
| 0.81548E-7 | -7.8189 | -4.1563 | 0.84632E-1 | 4.7834 | 9.3375 | 16.470 | 21.096 |
| 0.16309E-6 | -1.0581 | 2.1948 | 5.8815 | 9.6646 | 13.038 | 17.568 | 20.508 |
| 0.24464E-6 | 0.69681 | 3.6124 | 6.8461 | 9.8871 | 12.576 | 15.708 | 17.588 |
| 0.57083E-6 | 1.5578 | 3.4469 | 5.3650 | 6.9794 | 8.2421 | 9.5770 | 10.299 |
| 0.12232E-5 | 0.86757 | 1.7133 | 2.4940 | 3.1205 | 3.5904 | 4.0603 | 4.2771 |
| 0.24464E-5 | 0.20171 | 0.41135 | 0.59689 | 0.73183 | 0.85231 | 0.93424 | 0.98484 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.22332E-8 | -619.11 | -615.02 | -610.02 | -604.35 | -598.20 | -585.41 | -572.54 |
| 0.40199E-8 | -336.76 | -332.70 | -327.72 | -322.08 | -316.03 | -303.57 | -291.67 |
| 0.75931E-8 | -171.51 | -167.49 | -162.59 | -157.05 | -151.12 | -139.26 | -129.05 |
| 0.13399E-7 | -91.703 | -87.742 | -82.961 | -77.559 | -71.853 | -60.913 | -52.576 |
| 0.24566E-7 | -45.053 | -41.212 | -36.624 | -31.491 | -26.238 | -16.841 | -10.576 |
| 0.44665E-7 | -20.673 | -17.010 | -12.769 | -8.0711 | -3.5169 | 3.6155 | 8.2420 |
| 0.89331E-7 | -6.7942 | -3.5413 | 0.14542 | 3.9285 | 7.3020 | 11.832 | 14.771 |
| 0.13399E-6 | -2.7268 | 0.18876 | 3.4224 | 6.4634 | 9.1525 | 12.285 | 14.164 |
| 0.31266E-6 | 0.58845 | 2.4775 | 4.3956 | 6.0101 | 7.2727 | 8.6076 | 9.3305 |
| 0.66998E-6 | 0.64805 | 1.4938 | 2.2745 | 2.9010 | 3.3709 | 3.8408 | 4.0576 |
| 0.13399E-5 | 0.16515 | 0.37479 | 0.56033 | 0.69527 | 0.81575 | 0.89768 | 0.94828 |

150°C 200 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.44665E-7 | -25.287 | 7.4059 | 47.424 | 92.841 | 141.99 | 244.35 | 347.29 |
| 0.80398E-7 | 1.4208 | 33.921 | 73.748 | 118.85 | 167.24 | 266.90 | 362.13 |
| 0.15186E-6 | 16.238 | 48.430 | 87.601 | 131.93 | 179.36 | 274.20 | 355.93 |
| 0.26799E-6 | 22.636 | 54.328 | 92.573 | 135.79 | 181.44 | 268.95 | 335.65 |
| 0.49132E-6 | 25.497 | 56.224 | 92.928 | 133.98 | 176.01 | 251.19 | 301.31 |
| 0.89331E-6 | 25.923 | 55.224 | 89.151 | 126.74 | 163.17 | 220.23 | 257.24 |
| 0.17866E-5 | 24.348 | 50.372 | 79.866 | 110.13 | 137.11 | 173.35 | 196.87 |
| 0.26799E-5 | 22.512 | 45.837 | 71.706 | 96.034 | 117.54 | 142.60 | 157.64 |
| 0.62532E-5 | 15.650 | 30.763 | 46.108 | 59.024 | 69.125 | 79.804 | 85.587 |
| 0.13399E-4 | 7.3830 | 14.149 | 20.394 | 25.407 | 29.166 | 32.925 | 34.659 |
| 0.26799E-4 | 1.6578 | 3.3349 | 4.8192 | 5.8987 | 6.8626 | 7.5180 | 7.9228 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.25787E-7 | -70.535 | -37.841 | 2.1772 | 47.593 | 96.750 | 199.11 | 302.05 |
| 0.46418E-7 | -23.059 | 9.4416 | 49.267 | 94.376 | 142.76 | 242.42 | 337.65 |
| 0.87678E-7 | 3.9407 | 36.133 | 75.304 | 119.64 | 167.06 | 261.90 | 343.64 |
| 0.15472E-6 | 16.228 | 47.920 | 86.165 | 129.38 | 175.03 | 262.55 | 329.24 |
| 0.28366E-6 | 22.508 | 53.236 | 89.939 | 130.99 | 173.02 | 248.20 | 298.32 |
| 0.51575E-6 | 24.665 | 53.966 | 87.894 | 125.48 | 161.91 | 218.97 | 255.98 |
| 0.10315E-5 | 23.982 | 50.006 | 79.499 | 109.76 | 136.75 | 172.99 | 196.51 |
| 0.15472E-5 | 22.360 | 45.686 | 71.555 | 95.883 | 117.39 | 142.45 | 157.49 |
| 0.36102E-5 | 15.636 | 30.749 | 46.094 | 59.010 | 69.111 | 79.790 | 85.573 |
| 0.77363E-5 | 7.3821 | 14.148 | 20.394 | 25.406 | 29.165 | 32.924 | 34.659 |
| 0.15472E-4 | 1.6577 | 3.3348 | 4.8192 | 5.8987 | 6.8625 | 7.5179 | 7.9228 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.14124E-7 | -160.23 | -127.54 | -87.526 | -42.109 | 7.0463 | 109.40 | 212.34 |
| 0.25424E-7 | -72.155 | -39.654 | 0.17146 | 45.279 | 93.664 | 193.32 | 288.55 |
| 0.48023E-7 | -21.290 | 10.901 | 50.072 | 94.409 | 141.83 | 236.67 | 318.40 |
| 0.84747E-7 | 2.5985 | 34.289 | 72.535 | 115.75 | 161.40 | 248.92 | 315.61 |
| 0.15537E-6 | 15.716 | 46.443 | 83.147 | 124.20 | 166.23 | 241.41 | 291.53 |
| 0.28249E-6 | 21.474 | 50.775 | 84.703 | 122.29 | 158.72 | 215.78 | 252.79 |
| 0.56498E-6 | 22.834 | 48.858 | 78.352 | 108.61 | 135.60 | 171.84 | 195.36 |
| 0.84747E-6 | 21.797 | 45.122 | 70.992 | 95.319 | 116.83 | 141.89 | 156.92 |
| 0.19774E-5 | 15.551 | 30.664 | 46.009 | 58.924 | 69.025 | 79.705 | 85.488 |
| 0.42373E-5 | 7.3738 | 14.140 | 20.385 | 25.397 | 29.156 | 32.915 | 34.650 |
| 0.84747E-5 | 1.6572 | 3.3343 | 4.8186 | 5.8981 | 6.8620 | 7.5174 | 7.9222 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.81548E-8 | -306.62 | -273.93 | -233.91 | -188.49 | -139.33 | -36.977 | 65.961 |
| 0.14678E-7 | -152.79 | -120.29 | -80.469 | -35.361 | 13.024 | 112.68 | 207.91 |
| 0.27726E-7 | -63.269 | -31.077 | 8.0936 | 52.430 | 99.852 | 194.69 | 276.42 |
| 0.48928E-7 | -20.550 | 11.140 | 49.386 | 92.605 | 138.25 | 225.77 | 292.46 |
| 0.89703E-7 | 3.7270 | 34.454 | 71.157 | 112.21 | 154.24 | 229.42 | 279.54 |
| 0.16309E-6 | 15.458 | 44.759 | 78.686 | 116.27 | 152.71 | 209.77 | 246.78 |
| 0.32619E-6 | 20.363 | 46.387 | 75.881 | 106.14 | 133.13 | 169.37 | 192.89 |
| 0.48928E-6 | 20.431 | 43.756 | 69.626 | 93.954 | 115.46 | 140.52 | 155.56 |
| 0.11416E-5 | 15.254 | 30.367 | 45.711 | 58.627 | 68.728 | 79.407 | 85.191 |
| 0.24464E-5 | 7.3277 | 14.094 | 20.339 | 25.351 | 29.110 | 32.869 | 34.604 |
| 0.48928E-5 | 1.6523 | 3.3294 | 4.8137 | 5.8932 | 6.8571 | 7.5125 | 7.9173 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.44665E-8 | -593.95 | -561.25 | -521.23 | -475.82 | -426.66 | -324.30 | -221.36 |
| 0.80398E-8 | -311.66 | -279.16 | -239.33 | -194.23 | -145.84 | -46.183 | 49.044 |
| 0.15186E-7 | -146.58 | -114.39 | -75.220 | -30.883 | 16.537 | 111.38 | 193.11 |
| 0.26799E-7 | -67.043 | -35.352 | 2.8934 | 46.112 | 91.760 | 179.27 | 245.97 |
| 0.49132E-7 | -20.899 | 9.8283 | 46.531 | 87.591 | 129.61 | 204.79 | 254.91 |
| 0.89331E-7 | 2.6035 | 31.904 | 65.832 | 103.42 | 139.85 | 196.91 | 233.92 |
| 0.17866E-6 | 14.627 | 40.651 | 70.145 | 100.40 | 127.39 | 163.63 | 187.15 |
| 0.26799E-6 | 17.007 | 40.333 | 66.202 | 90.530 | 112.04 | 137.10 | 152.13 |
| 0.62532E-6 | 14.284 | 29.397 | 44.742 | 57.658 | 67.759 | 78.438 | 84.221 |
| 0.13399E-5 | 7.1082 | 13.874 | 20.120 | 25.132 | 28.891 | 32.650 | 34.385 |
| 0.26799E-5 | 1.6157 | 3.2928 | 4.7771 | 5.8566 | 6.8205 | 7.4759 | 7.8807 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.22332E-7 | -108.82 | -100.65 | -90.647 | -79.293 | -67.004 | -41.414 | -15.679 |
| 0.40199E-7 | -53.685 | -45.560 | -35.603 | -24.326 | -12.230 | 12.684 | 36.492 |
| 0.75931E-7 | -22.073 | -14.025 | -4.2324 | 6.8518 | 18.707 | 42.417 | 62.851 |
| 0.13399E-6 | -7.3854 | 0.53741 | 10.098 | 20.903 | 32.315 | 54.194 | 70.869 |
| 0.24566E-6 | 0.60058 | 8.2824 | 17.458 | 27.723 | 38.229 | 57.024 | 69.554 |
| 0.44665E-6 | 4.1712 | 11.496 | 19.978 | 29.375 | 38.484 | 52.749 | 62.002 |
| 0.89331E-6 | 5.4415 | 11.947 | 19.321 | 26.887 | 33.634 | 42.694 | 48.573 |
| 0.13399E-5 | 5.3636 | 11.194 | 17.662 | 23.744 | 29.122 | 35.387 | 39.146 |
| 0.31266E-5 | 3.8872 | 7.6655 | 11.501 | 14.730 | 17.255 | 19.925 | 21.371 |
| 0.66998E-5 | 1.8441 | 3.5357 | 5.0971 | 6.3501 | 7.2899 | 8.2296 | 8.6633 |
| 0.13399E-4 | 0.41437 | 0.83365 | 1.2047 | 1.4746 | 1.7155 | 1.8794 | 1.9806 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.12893E-7 | -200.84 | -192.66 | -182.66 | -171.30 | -159.01 | -133.42 | -107.69 |
| 0.23209E-7 | -104.12 | -96.003 | -86.046 | -74.769 | -62.673 | -37.757 | -13.950 |
| 0.43839E-7 | -48.079 | -40.031 | -30.238 | -19.154 | -7.2987 | 16.411 | 36.845 |
| 0.77363E-7 | -21.505 | -13.582 | -4.0214 | 6.7833 | 18.195 | 40.074 | 56.749 |
| 0.14183E-6 | -6.5025 | 1.1792 | 10.355 | 20.620 | 31.126 | 49.921 | 62.451 |
| 0.25787E-6 | 0.78081 | 8.1060 | 16.587 | 25.985 | 35.093 | 49.358 | 58.611 |
| 0.51575E-6 | 4.1838 | 10.689 | 18.063 | 21.629 | 32.376 | 41.436 | 47.316 |
| 0.77363E-6 | 4.7291 | 10.560 | 17.027 | 23.109 | 28.488 | 34.753 | 38.512 |
| 0.18051E-5 | 3.7835 | 7.5618 | 11.397 | 14.626 | 17.152 | 19.822 | 21.267 |
| 0.38681E-5 | 1.8329 | 3.5245 | 5.0859 | 6.3389 | 7.2787 | 8.2185 | 8.6522 |
| 0.77363E-5 | 0.41355 | 0.83283 | 1.2039 | 1.4737 | 1.7147 | 1.8786 | 1.9798 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.70622E-8 | -381.93 | -373.76 | -363.75 | -352.40 | -340.11 | -314.52 | -288.79 |
| 0.12712E-7 | -203.98 | -195.86 | -185.90 | -174.62 | -162.53 | -137.61 | -113.80 |
| 0.24011E-7 | -100.16 | -92.112 | -82.319 | -71.235 | -59.380 | -35.669 | -15.235 |
| 0.42373E-7 | -50.313 | -42.390 | -32.829 | -22.024 | -10.612 | 11.266 | 27.941 |
| 0.77685E-7 | -21.508 | -13.826 | -4.6510 | 5.6139 | 16.119 | 34.915 | 47.445 |
| 0.14124E-6 | -6.8259 | 0.49926 | 8.9811 | 18.378 | 27.487 | 41.752 | 51.005 |
| 0.28249E-6 | 0.99274 | 7.4987 | 14.872 | 22.438 | 29.185 | 38.245 | 44.125 |
| 0.42373E-6 | 2.9310 | 8.7623 | 15.229 | 21.311 | 26.689 | 32.955 | 36.714 |
| 0.98872E-6 | 3.3655 | 7.1438 | 10.979 | 14.208 | 16.734 | 19.403 | 20.849 |
| 0.21186E-5 | 1.7620 | 3.4535 | 5.0150 | 6.2680 | 7.2077 | 8.1475 | 8.5812 |
| 0.42373E-5 | 0.40516 | 0.82444 | 1.1955 | 1.4654 | 1.7063 | 1.8702 | 1.9714 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.40774E-8 | -676.25 | -668.08 | -658.07 | -646.72 | -634.43 | -608.84 | -583.11 |
| 0.73393E-8 | -366.80 | -358.68 | -348.72 | -337.44 | -325.35 | -300.43 | -276.62 |
| 0.13863E-7 | -185.63 | -177.58 | -167.79 | -156.71 | -144.85 | -121.14 | -100.71 |
| 0.24464E-7 | -98.090 | -90.167 | -80.606 | -69.801 | -58.389 | -36.510 | -19.835 |
| 0.44851E-7 | -46.894 | -39.212 | -30.037 | -19.772 | -9.2661 | 9.5289 | 22.058 |
| 0.81548E-7 | -20.150 | -12.825 | -4.3436 | 5.0539 | 14.162 | 28.427 | 37.680 |
| 0.16309E-6 | -5.0237 | 1.4822 | 8.8556 | 16.421 | 23.168 | 32.229 | 38.108 |
| 0.24464E-6 | -0.70010 | 5.1311 | 11.598 | 17.680 | 23.058 | 29.323 | 33.082 |
| 0.57083E-6 | 2.2965 | 6.0748 | 9.9109 | 13.139 | 15.665 | 18.335 | 19.780 |
| 0.12232E-5 | 1.5052 | 3.1967 | 4.7582 | 6.0112 | 6.9509 | 7.8907 | 8.3244 |
| 0.24464E-5 | 0.35914 | 0.77841 | 1.1494 | 1.4193 | 1.6603 | 1.8241 | 1.9253 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.22332E-8 | -1252.6 | -1244.4 | -1234.4 | -1223.0 | -1210.7 | -1185.2 | -1159.4 |
| 0.40199E-8 | -686.24 | -678.12 | -668.16 | -656.89 | -644.79 | -619.87 | -596.07 |
| 0.75931E-8 | -353.95 | -345.90 | -336.10 | -325.02 | -313.17 | -289.45 | -269.02 |
| 0.13399E-7 | -192.73 | -184.81 | -175.25 | -164.44 | -153.03 | -131.15 | -114.48 |
| 0.24566E-7 | -97.763 | -90.081 | -80.906 | -70.640 | -60.135 | -41.339 | -28.809 |
| 0.44665E-7 | -47.398 | -40.073 | -31.591 | -22.193 | -13.085 | 1.1794 | 10.432 |
| 0.89331E-7 | -17.878 | -11.372 | -3.9988 | 3.5673 | 10.314 | 19.374 | 25.254 |
| 0.13399E-6 | -8.7926 | -2.9613 | 3.5060 | 9.5879 | 14.966 | 21.231 | 24.990 |
| 0.31266E-6 | -0.48328 | 3.2950 | 7.1311 | 10.360 | 12.885 | 15.555 | 17.000 |
| 0.66998E-6 | 0.64372 | 2.3352 | 3.8967 | 5.1497 | 6.0894 | 7.0292 | 7.4629 |
| 0.13399E-5 | 0.13962 | 0.55890 | 0.92998 | 1.1998 | 1.4408 | 1.6046 | 1.7058 |

150°C 400 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}\,M$ | | | |
| 0.44665E-7 | -58.493 | 6.8939 | 86.932 | 177.76 | 276.07 | 480.79 | 686.67 |
| 0.80398E-7 | -3.4884 | 61.513 | 141.16 | 231.38 | 328.15 | 527.47 | 717.93 |
| 0.15186E-6 | 27.786 | 92.171 | 170.51 | 259.18 | 354.03 | 543.71 | 707.18 |
| 0.26799E-6 | 41.934 | 105.31 | 181.80 | 268.24 | 359.54 | 534.57 | 667.97 |
| 0.49132E-6 | 48.908 | 110.36 | 183.77 | 265.89 | 349.93 | 500.29 | 600.53 |
| 0.89331E-6 | 50.725 | 109.32 | 177.18 | 252.36 | 325.22 | 439.34 | 513.37 |
| 0.17866E-5 | 48.284 | 100.33 | 159.32 | 219.84 | 273.82 | 346.30 | 393.34 |
| 0.26799E-5 | 44.833 | 91.483 | 143.22 | 191.87 | 234.90 | 285.02 | 315.09 |
| 0.62532E-5 | 31.279 | 61.506 | 92.195 | 118.02 | 138.22 | 159.58 | 171.15 |
| 0.13399E-4 | 14.764 | 28.297 | 40.788 | 50.812 | 58.330 | 65.848 | 69.318 |
| 0.26799E-4 | 3.3155 | 6.6697 | 9.6384 | 11.797 | 13.725 | 15.035 | 15.845 |
| | | | | $3 \times 10^{-5}\,M$ | | | |
| 0.25787E-7 | -150.50 | -85.121 | -5.0831 | 85.750 | 184.06 | 388.78 | 594.66 |
| 0.46418E-7 | -53.931 | 11.070 | 90.723 | 180.93 | 277.71 | 477.03 | 667.49 |
| 0.87678E-7 | 1.7807 | 66.165 | 144.50 | 233.18 | 328.02 | 517.71 | 681.17 |
| 0.15472E-6 | 27.814 | 91.197 | 167.68 | 254.12 | 345.42 | 520.45 | 653.85 |
| 0.28366E-6 | 41.805 | 103.26 | 176.66 | 258.78 | 342.83 | 493.19 | 593.43 |
| 0.51575E-6 | 47.334 | 105.93 | 173.79 | 248.97 | 321.83 | 435.95 | 509.98 |
| 0.10315E-5 | 47.027 | 99.074 | 158.06 | 218.59 | 272.56 | 345.04 | 392.08 |
| 0.15472E-5 | 44.198 | 90.849 | 142.58 | 191.24 | 234.27 | 284.39 | 314.46 |
| 0.36102E-5 | 31.176 | 61.402 | 92.091 | 117.92 | 138.12 | 159.48 | 171.05 |
| 0.77363E-5 | 14.753 | 28.285 | 40.777 | 50.801 | 58.319 | 65.837 | 69.307 |
| 0.15472E-4 | 3.3147 | 6.6689 | 9.6376 | 11.796 | 13.724 | 15.035 | 15.844 |
| | | | | $10 \times 10^{-5}\,M$ | | | |
| 0.14124E-7 | -331.60 | -266.21 | -186.17 | -95.345 | 2.9667 | 207.68 | 413.56 |
| 0.25424E-7 | -153.78 | -88.786 | -9.1342 | 81.082 | 177.85 | 377.17 | 567.63 |
| 0.48023E-7 | -50.300 | 14.084 | 92.426 | 181.10 | 275.94 | 465.62 | 629.09 |
| 0.84747E-7 | -0.99362 | 62.389 | 138.88 | 225.31 | 316.61 | 491.64 | 625.04 |
| 0.15537E-6 | 26.799 | 88.254 | 161.66 | 243.78 | 327.82 | 478.18 | 578.43 |
| 0.28249E-6 | 39.727 | 98.330 | 166.18 | 241.36 | 314.23 | 428.35 | 502.37 |
| 0.56498E-6 | 43.835 | 95.883 | 154.87 | 215.40 | 269.37 | 341.85 | 388.89 |
| 0.84747E-6 | 42.400 | 89.051 | 140.79 | 189.44 | 232.47 | 282.59 | 312.66 |
| 0.19774E-5 | 30.758 | 60.984 | 91.673 | 117.50 | 137.70 | 159.06 | 170.63 |
| 0.42373E-5 | 14.682 | 28.214 | 40.706 | 50.730 | 58.248 | 65.766 | 69.236 |
| 0.84747E-5 | 3.3063 | 6.6605 | 9.6292 | 11.788 | 13.715 | 15.026 | 15.836 |
| | | | | $30 \times 10^{-5}\,M$ | | | |
| 0.81548E-8 | -625.92 | -560.53 | -480.50 | -389.66 | -291.35 | -86.632 | 119.24 |
| 0.14678E-7 | -316.61 | -251.60 | -171.95 | -81.739 | 15.031 | 214.35 | 404.81 |
| 0.27726E-7 | -135.77 | -71.390 | 6.9516 | 95.625 | 190.46 | 380.15 | 543.62 |
| 0.48928E-7 | -48.770 | 14.612 | 91.103 | 177.54 | 268.83 | 443.87 | 577.26 |
| 0.89703E-7 | 1.4132 | 62.868 | 136.27 | 218.39 | 302.44 | 452.80 | 553.04 |
| 0.16309E-6 | 26.403 | 85.005 | 152.86 | 228.04 | 300.90 | 415.02 | 489.05 |
| 0.32619E-6 | 37.819 | 89.867 | 148.85 | 209.38 | 263.36 | 335.84 | 382.87 |
| 0.48928E-6 | 38.769 | 85.419 | 137.15 | 185.81 | 228.84 | 278.96 | 309.03 |
| 0.11416E-5 | 29.689 | 59.915 | 90.604 | 116.43 | 136.63 | 157.99 | 169.56 |
| 0.24464E-5 | 14.425 | 27.958 | 40.449 | 50.473 | 57.991 | 65.509 | 68.979 |
| 0.48928E-5 | 3.2603 | 6.6145 | 9.5831 | 11.742 | 13.669 | 14.980 | 15.790 |
| | | | | $100 \times 10^{-5}\,M$ | | | |
| 0.44665E-8 | -1202.2 | -1136.8 | -1056.8 | -966.02 | -867.71 | -662.99 | -457.11 |
| 0.80398E-8 | -636.05 | -571.04 | -491.39 | -401.18 | -304.41 | -105.08 | 85.370 |
| 0.15186E-7 | -304.09 | -239.70 | -161.36 | -72.689 | 22.153 | 211.83 | 375.30 |
| 0.26799E-7 | -143.41 | -80.034 | -3.5434 | 82.894 | 174.19 | 349.22 | 482.62 |
| 0.49132E-7 | -49.455 | 11.999 | 85.406 | 167.52 | 251.57 | 401.93 | 502.17 |
| 0.89331E-7 | -0.84461 | 57.757 | 125.61 | 200.79 | 273.65 | 387.77 | 461.80 |
| 0.17866E-6 | 24.964 | 77.012 | 136.00 | 196.53 | 250.50 | 322.98 | 370.02 |
| 0.26799E-6 | 30.677 | 77.327 | 129.06 | 177.72 | 220.74 | 270.86 | 300.94 |
| 0.62532E-6 | 26.909 | 57.135 | 87.824 | 113.65 | 133.85 | 155.21 | 166.78 |
| 0.13399E-5 | 13.564 | 27.096 | 39.588 | 49.612 | 57.130 | 64.648 | 68.118 |
| 0.26799E-5 | 3.0408 | 6.3950 | 9.3636 | 11.522 | 13.450 | 14.761 | 15.570 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.22332E-7 | -227.49 | -211.14 | -191.13 | -168.42 | -143.84 | -92.667 | -41.198 |
| 0.40199E-7 | -115.57 | -99.328 | -79.415 | -56.861 | -32.668 | 17.162 | 64.776 |
| 0.75931E-7 | -50.628 | -34.532 | -14.947 | 7.2215 | 30.932 | 78.353 | 119.22 |
| 0.13399E-6 | -19.774 | -3.9290 | 15.193 | 36.803 | 59.627 | 103.38 | 136.73 |
| 0.24566E-6 | -2.3353 | 13.028 | 31.380 | 51.910 | 72.922 | 110.51 | 135.57 |
| 0.44665E-6 | 6.0757 | 20.726 | 37.690 | 56.485 | 74.701 | 103.23 | 121.73 |
| 0.89331E-6 | 9.7616 | 22.773 | 37.520 | 52.652 | 66.146 | 84.267 | 96.026 |
| 0.13399E-5 | 10.075 | 21.737 | 34.672 | 46.836 | 57.592 | 70.122 | 77.640 |
| 0.31266E-5 | 7.6382 | 15.194 | 22.867 | 29.324 | 34.375 | 39.715 | 42.606 |
| 0.66998E-5 | 3.6708 | 7.0539 | 10.176 | 12.682 | 14.562 | 16.441 | 17.309 |
| 0.13399E-4 | 0.82728 | 1.6658 | 2.4080 | 2.9477 | 3.4296 | 3.7573 | 3.9597 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.12893E-7 | -413.06 | -396.71 | -376.70 | -354.00 | -329.42 | -278.24 | -226.77 |
| 0.23209E-7 | -217.98 | -201.73 | -181.82 | -159.27 | -135.07 | -85.247 | -37.633 |
| 0.43839E-7 | -104.12 | -88.031 | -68.445 | -46.277 | -22.566 | 24.854 | 65.721 |
| 0.77363E-7 | -49.443 | -33.598 | -14.475 | 7.1342 | 29.958 | 73.716 | 107.06 |
| 0.14183E-6 | -17.865 | -2.5020 | 15.849 | 36.379 | 57.391 | 94.981 | 120.04 |
| 0.25787E-6 | -1.8641 | 12.786 | 29.750 | 48.545 | 66.761 | 95.291 | 113.79 |
| 0.51575E-6 | 6.3711 | 19.383 | 34.130 | 49.262 | 62.756 | 80.876 | 92.635 |
| 0.77363E-6 | 8.1333 | 19.795 | 32.730 | 44.894 | 55.651 | 68.181 | 75.699 |
| 0.18051E-5 | 7.1620 | 14.718 | 22.390 | 28.848 | 33.899 | 39.238 | 42.130 |
| 0.38681E-5 | 3.5838 | 6.9669 | 10.089 | 12.595 | 14.475 | 16.354 | 17.222 |
| 0.77363E-5 | 0.81613 | 1.6546 | 2.3968 | 2.9366 | 3.4185 | 3.7462 | 3.9486 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.70622E-8 | -776.96 | -760.61 | -740.60 | -717.89 | -693.31 | -642.13 | -590.66 |
| 0.12712E-7 | -419.39 | -403.14 | -383.23 | -360.67 | -336.48 | -286.65 | -239.03 |
| 0.24011E-7 | -209.95 | -193.86 | -174.27 | -152.10 | -128.39 | -80.975 | -40.108 |
| 0.42373E-7 | -108.69 | -92.844 | -73.721 | -52.112 | -29.288 | 14.470 | 47.819 |
| 0.77685E-7 | -49.438 | -34.075 | -15.723 | 4.8065 | 25.818 | 63.408 | 88.468 |
| 0.14124E-6 | -18.523 | -3.8724 | 13.091 | 31.886 | 50.103 | 78.633 | 97.138 |
| 0.28249E-6 | -1.2356 | 11.776 | 26.523 | 41.655 | 55.149 | 73.269 | 85.028 |
| 0.42373E-6 | 3.4926 | 15.155 | 28.090 | 40.253 | 51.010 | 63.540 | 71.058 |
| 0.98872E-6 | 5.7415 | 13.298 | 20.970 | 27.428 | 32.478 | 37.818 | 40.709 |
| 0.21186E-5 | 3.2202 | 6.6033 | 9.7262 | 12.232 | 14.111 | 15.991 | 16.858 |
| 0.42373E-5 | 0.74517 | 1.5837 | 2.3258 | 2.8656 | 3.3475 | 3.6752 | 3.8776 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.40774E-8 | -1367.1 | -1350.8 | -1330.8 | -1308.1 | -1283.5 | -1232.3 | -1180.8 |
| 0.73393E-8 | -746.59 | -730.34 | -710.42 | -687.87 | -663.68 | -613.85 | -566.23 |
| 0.13863E-7 | -382.44 | -366.35 | -346.76 | -324.59 | -300.88 | -253.46 | -212.59 |
| 0.24464E-7 | -205.76 | -189.92 | -170.79 | -149.18 | -126.36 | -82.604 | -49.255 |
| 0.44851E-7 | -101.69 | -86.332 | -67.980 | -47.450 | -26.438 | 11.151 | 36.211 |
| 0.81548E-7 | -46.594 | -31.943 | -14.979 | 3.8152 | 22.032 | 50.562 | 69.067 |
| 0.16309E-6 | -14.560 | -1.5484 | 13.198 | 28.330 | 41.824 | 59.945 | 71.704 |
| 0.24464E-6 | -4.9462 | 6.7163 | 19.651 | 31.814 | 42.571 | 55.101 | 62.619 |
| 0.57083E-6 | 2.7774 | 10.334 | 18.006 | 24.464 | 29.514 | 34.854 | 37.745 |
| 0.12232E-5 | 2.2661 | 5.6492 | 8.7720 | 11.278 | 13.157 | 15.037 | 15.904 |
| 0.24464E-5 | 0.48834 | 1.3268 | 2.0690 | 2.6088 | 3.0907 | 3.4184 | 3.6208 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.22332E-8 | -2521.5 | -2505.2 | -2485.2 | -2462.5 | -2437.9 | -2386.7 | -2335.2 |
| 0.40199E-8 | -1387.1 | -1370.9 | -1351.0 | -1328.4 | -1304.2 | -1254.4 | -1206.8 |
| 0.75931E-8 | -720.78 | -704.68 | -685.09 | -662.93 | -639.22 | -591.79 | -550.93 |
| 0.13399E-7 | -396.74 | -380.90 | -361.78 | -340.17 | -317.34 | -273.58 | -240.23 |
| 0.24566E-7 | -205.10 | -189.73 | -171.38 | -150.85 | -129.84 | -92.252 | -67.192 |
| 0.44665E-7 | -102.71 | -88.064 | -71.100 | -52.305 | -34.088 | -5.5589 | 12.946 |
| 0.89331E-7 | -41.808 | -28.796 | -14.049 | 1.0830 | 14.576 | 32.697 | 44.456 |
| 0.13399E-6 | -22.589 | -10.926 | 2.0082 | 14.172 | 24.928 | 37.458 | 44.976 |
| 0.31266E-6 | -3.9652 | 3.5913 | 11.263 | 17.721 | 22.771 | 28.111 | 31.003 |
| 0.66998E-6 | -0.25974 | 3.1233 | 6.2462 | 8.7522 | 10.631 | 12.511 | 13.378 |
| 0.13399E-5 | -0.37313 | 0.46541 | 1.2075 | 1.7473 | 2.2292 | 2.5569 | 2.7593 |

150°C 800 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}\ M$ | | | |
| 0.44665E-7 | -126.82 | 3.9486 | 164.02 | 345.69 | 542.31 | 951.76 | 1363.5 |
| 0.80398E-7 | -15.184 | 114.81 | 274.12 | 454.55 | 648.09 | 1046.7 | 1427.6 |
| 0.15186E-6 | 49.091 | 177.86 | 334.54 | 511.89 | 701.57 | 1080.9 | 1407.8 |
| 0.26799E-6 | 78.865 | 205.63 | 358.61 | 531.48 | 714.08 | 1064.1 | 1330.9 |
| 0.49132E-6 | 94.280 | 217.19 | 364.00 | 528.24 | 696.34 | 997.06 | 1197.5 |
| 0.89331E-6 | 99.183 | 216.38 | 352.09 | 502.45 | 648.19 | 876.43 | 1024.4 |
| 0.17866E-5 | 95.447 | 199.54 | 317.51 | 438.57 | 546.52 | 691.49 | 785.56 |
| 0.26799E-5 | 89.014 | 182.31 | 285.79 | 383.10 | 469.15 | 569.39 | 629.54 |
| 0.62532E-5 | 62.423 | 122.87 | 184.25 | 235.91 | 276.32 | 319.03 | 342.17 |
| 0.13399E-4 | 29.511 | 56.576 | 81.559 | 101.60 | 116.64 | 131.67 | 138.61 |
| 0.26799E-4 | 6.6296 | 13.338 | 19.275 | 23.593 | 27.448 | 30.070 | 31.689 |
| | | | | $3 \times 10^{-5}\ M$ | | | |
| 0.25787E-7 | -312.40 | -181.62 | -21.549 | 160.11 | 356.74 | 766.18 | 1177.9 |
| 0.46418E-7 | -117.59 | 12.409 | 171.71 | 352.14 | 545.68 | 944.33 | 1325.2 |
| 0.87678E-7 | -4.4077 | 124.36 | 281.04 | 458.39 | 648.08 | 1027.4 | 1354.3 |
| 0.15472E-6 | 49.196 | 175.96 | 328.94 | 501.82 | 684.41 | 1034.4 | 1301.2 |
| 0.28366E-6 | 78.750 | 201.66 | 348.47 | 512.71 | 680.80 | 981.53 | 1182.0 |
| 0.51575E-6 | 91.243 | 208.44 | 344.15 | 494.51 | 640.25 | 868.49 | 1016.5 |
| 0.10315E-5 | 92.057 | 196.15 | 314.12 | 435.18 | 543.13 | 688.10 | 782.17 |
| 0.15472E-5 | 87.072 | 180.37 | 283.85 | 381.16 | 467.21 | 567.45 | 627.59 |
| 0.36102E-5 | 61.947 | 122.39 | 183.77 | 235.44 | 275.84 | 318.56 | 341.69 |
| 0.77363E-5 | 29.424 | 56.489 | 81.472 | 101.52 | 116.55 | 131.59 | 138.53 |
| 0.15472E-4 | 6.6185 | 13.326 | 19.264 | 23.582 | 27.437 | 30.059 | 31.678 |
| | | | | $10 \times 10^{-5}\ M$ | | | |
| 0.14124E-7 | -676.29 | -545.52 | -385.44 | -203.77 | -7.1523 | 402.29 | 814.04 |
| 0.25424E-7 | -319.00 | -188.99 | -29.691 | 150.74 | 344.28 | 742.93 | 1123.8 |
| 0.48023E-7 | -110.23 | 18.531 | 175.21 | 352.56 | 542.24 | 921.62 | 1248.5 |
| 0.84747E-7 | -10.049 | 116.71 | 269.69 | 442.57 | 625.16 | 975.23 | 1242.0 |
| 0.15537E-6 | 47.177 | 170.08 | 316.90 | 481.14 | 649.23 | 949.95 | 1150.4 |
| 0.28249E-6 | 74.584 | 191.78 | 327.49 | 477.85 | 623.59 | 851.83 | 999.88 |
| 0.56498E-6 | 84.450 | 188.54 | 306.52 | 427.58 | 535.53 | 680.49 | 774.56 |
| 0.84747E-6 | 82.431 | 175.73 | 279.21 | 376.52 | 462.57 | 562.81 | 622.95 |
| 0.19774E-5 | 60.526 | 120.97 | 182.35 | 234.01 | 274.42 | 317.14 | 340.27 |
| 0.42373E-5 | 29.061 | 56.125 | 81.108 | 101.15 | 116.19 | 131.22 | 138.16 |
| 0.84747E-5 | 6.5475 | 13.255 | 19.193 | 23.511 | 27.366 | 29.988 | 31.607 |
| | | | | $30 \times 10^{-5}\ M$ | | | |
| 0.81548E-8 | -1266.5 | -1135.7 | -975.64 | -793.98 | -597.35 | -187.91 | 223.84 |
| 0.14678E-7 | -646.19 | -516.19 | -356.88 | -176.45 | 17.084 | 415.73 | 796.64 |
| 0.27726E-7 | -282.72 | -153.95 | 2.7249 | 180.07 | 369.75 | 749.13 | 1076.0 |
| 0.48928E-7 | -107.12 | 19.640 | 172.62 | 345.49 | 528.09 | 878.16 | 1144.9 |
| 0.89703E-7 | -5.0799 | 117.83 | 264.64 | 428.88 | 596.97 | 897.70 | 1098.1 |
| 0.16309E-6 | 46.513 | 163.71 | 299.42 | 449.78 | 595.52 | 823.76 | 971.80 |
| 0.32619E-6 | 71.125 | 175.22 | 293.19 | 414.25 | 522.20 | 667.17 | 761.24 |
| 0.48928E-6 | 73.993 | 167.29 | 270.77 | 368.08 | 454.13 | 554.37 | 614.52 |
| 0.11416E-5 | 57.562 | 118.01 | 179.39 | 231.05 | 271.46 | 314.17 | 337.31 |
| 0.24464E-5 | 28.106 | 55.171 | 80.154 | 100.20 | 115.23 | 130.27 | 137.21 |
| 0.48928E-5 | 6.2907 | 12.999 | 18.936 | 23.254 | 27.109 | 29.731 | 31.350 |
| | | | | $100 \times 10^{-5}\ M$ | | | |
| 0.44665E-8 | -2420.9 | -2290.1 | -2130.0 | -1948.4 | -1751.7 | -1342.3 | -930.58 |
| 0.80398E-8 | -1286.7 | -1156.7 | -997.48 | -817.04 | -623.50 | -224.85 | 156.05 |
| 0.15186E-7 | -621.06 | -492.29 | -335.60 | -158.25 | 31.426 | 410.79 | 737.73 |
| 0.26799E-7 | -298.10 | -171.34 | -18.361 | 154.51 | 337.10 | 687.17 | 953.97 |
| 0.49132E-7 | -108.48 | 14.426 | 161.23 | 325.47 | 493.57 | 794.29 | 994.77 |
| 0.89331E-7 | -9.6071 | 107.59 | 243.30 | 393.66 | 539.40 | 767.64 | 915.68 |
| 0.17866E-6 | 43.878 | 147.97 | 265.94 | 387.00 | 494.95 | 639.92 | 733.99 |
| 0.26799E-6 | 56.350 | 149.65 | 253.12 | 350.44 | 436.49 | 536.73 | 596.87 |
| 0.62532E-6 | 50.820 | 111.27 | 172.65 | 224.31 | 264.71 | 307.43 | 330.56 |
| 0.13399E-5 | 25.581 | 52.645 | 77.628 | 97.677 | 112.71 | 127.74 | 134.68 |
| 0.26799E-5 | 5.4292 | 12.137 | 18.074 | 22.393 | 26.248 | 28.870 | 30.489 |

| $H_0$ | V/kT Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.22332E-7 | -466.77 | -434.07 | -394.05 | -348.64 | -299.48 | -197.12 | -94.185 |
| 0.40199E-7 | -241.29 | -208.79 | -168.96 | -123.85 | -75.471 | 24.190 | 119.41 |
| 0.75931E-7 | -109.62 | -77.429 | -38.258 | 6.0783 | 53.499 | 148.34 | 230.07 |
| 0.13399E-6 | -46.366 | -14.675 | 23.570 | 66.789 | 112.43 | 199.95 | 266.65 |
| 0.24566E-6 | -9.8957 | 20.831 | 57.535 | 98.595 | 140.61 | 215.79 | 265.91 |
| 0.44665E-6 | 8.3943 | 37.695 | 71.622 | 109.21 | 145.64 | 202.70 | 239.71 |
| 0.89331E-6 | 17.256 | 43.280 | 72.774 | 103.03 | 130.02 | 166.26 | 189.78 |
| 0.13399E-5 | 18.602 | 41.927 | 67.797 | 92.125 | 113.63 | 138.69 | 153.73 |
| 0.31266E-5 | 14.762 | 29.875 | 45.219 | 58.135 | 68.236 | 78.915 | 84.698 |
| 0.66998E-5 | 7.2252 | 13.991 | 20.237 | 25.249 | 29.008 | 32.767 | 34.502 |
| 0.13399E-4 | 1.6370 | 3.3141 | 4.7985 | 5.8780 | 6.8418 | 7.4972 | 7.9021 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.12893E-7 | -839.47 | -806.78 | -766.76 | -721.34 | -672.18 | -569.82 | -466.88 |
| 0.23209E-7 | -447.65 | -415.15 | -375.33 | -330.22 | -281.83 | -182.17 | -86.946 |
| 0.43839E-7 | -218.14 | -185.95 | -146.78 | -102.44 | -55.024 | 39.817 | 121.55 |
| 0.77363E-7 | -107.20 | -75.509 | -37.263 | 5.9551 | 51.603 | 139.12 | 205.81 |
| 0.14183E-6 | -42.396 | -11.668 | 25.034 | 66.094 | 108.11 | 183.29 | 233.41 |
| 0.25787E-6 | -8.8297 | 20.471 | 54.398 | 91.988 | 128.42 | 185.48 | 222.49 |
| 0.51575E-6 | 9.3164 | 35.340 | 64.834 | 95.099 | 122.08 | 158.32 | 181.84 |
| 0.77363E-6 | 13.714 | 37.039 | 62.909 | 87.237 | 108.75 | 133.81 | 148.84 |
| 0.18051E-5 | 13.216 | 28.329 | 43.674 | 56.589 | 66.690 | 77.370 | 83.153 |
| 0.38681E-5 | 6.8087 | 13.574 | 19.820 | 24.832 | 28.591 | 32.350 | 34.085 |
| 0.77363E-5 | 1.5500 | 3.2271 | 4.7115 | 5.7910 | 6.7548 | 7.4102 | 7.8151 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.70622E-8 | -1568.9 | -1536.2 | -1496.2 | -1450.8 | -1401.6 | -1299.3 | -1196.3 |
| 0.12712E-7 | -852.17 | -819.67 | -779.84 | -734.73 | -686.35 | -586.69 | -491.46 |
| 0.24011E-7 | -431.50 | -399.30 | -360.13 | -315.80 | -268.37 | -173.53 | -91.801 |
| 0.42373E-7 | -227.36 | -195.67 | -157.43 | -114.21 | -68.563 | 18.954 | 85.652 |
| 0.77685E-7 | -107.17 | -76.452 | -39.748 | 1.3112 | 43.335 | 118.51 | 168.63 |
| 0.14124E-6 | -43.721 | -14.420 | 19.506 | 57.096 | 93.530 | 150.59 | 187.60 |
| 0.28249E-6 | -7.3423 | 18.681 | 48.175 | 78.440 | 105.42 | 141.66 | 165.18 |
| 0.42373E-6 | 3.1043 | 26.429 | 52.299 | 76.626 | 98.139 | 123.20 | 138.23 |
| 0.98872E-6 | 9.4084 | 24.521 | 39.866 | 52.781 | 62.882 | 73.562 | 79.345 |
| 0.21186E-5 | 5.5351 | 12.301 | 18.547 | 23.559 | 27.318 | 31.077 | 32.812 |
| 0.42373E-5 | 1.1865 | 2.8636 | 4.3479 | 5.4274 | 6.3913 | 7.0467 | 7.4515 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.40774E-8 | -2750.9 | -2718.2 | -2678.2 | -2632.8 | -2583.6 | -2481.2 | -2378.3 |
| 0.73393E-8 | -1508.1 | -1475.6 | -1435.8 | -1390.6 | -1342.3 | -1242.6 | -1147.4 |
| 0.13863E-7 | -778.03 | -745.84 | -706.67 | -662.33 | -614.91 | -520.07 | -438.33 |
| 0.24464E-7 | -423.06 | -391.37 | -353.12 | -309.90 | -264.25 | -176.74 | -110.04 |
| 0.44851E-7 | -213.22 | -182.49 | -145.78 | -104.72 | -62.705 | 12.474 | 62.595 |
| 0.81548E-7 | -101.35 | -72.055 | -38.127 | -0.53767 | 35.895 | 92.955 | 129.96 |
| 0.16309E-6 | -35.413 | -9.3894 | 20.104 | 50.369 | 77.357 | 113.59 | 137.11 |
| 0.24464E-6 | -15.128 | 8.1969 | 34.066 | 58.394 | 79.907 | 104.96 | 120.00 |
| 0.57083E-6 | 2.3566 | 17.469 | 32.814 | 45.729 | 55.830 | 66.510 | 72.293 |
| 0.12232E-5 | 2.8348 | 9.6010 | 15.846 | 20.858 | 24.617 | 28.376 | 30.111 |
| 0.24464E-5 | 0.23237 | 1.9094 | 3.3938 | 4.4733 | 5.4371 | 6.0925 | 6.4974 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.22332E-8 | -5061.5 | -5028.8 | -4988.8 | -4943.3 | -4894.2 | -4791.8 | -4688.9 |
| 0.40199E-8 | -2791.0 | -2758.5 | -2718.7 | -2673.5 | -2625.2 | -2525.5 | -2430.3 |
| 0.75931E-8 | -1456.4 | -1424.2 | -1385.0 | -1340.7 | -1293.2 | -1198.4 | -1116.7 |
| 0.13399E-7 | -806.73 | -775.04 | -736.79 | -693.57 | -647.92 | -560.41 | -493.71 |
| 0.24566E-7 | -421.72 | -390.99 | -354.28 | -313.22 | -271.20 | -196.02 | -145.90 |
| 0.44665E-7 | -215.26 | -185.96 | -152.04 | -114.45 | -78.017 | -20.957 | 16.054 |
| 0.89331E-7 | -91.534 | -65.510 | -36.016 | -5.7517 | 21.236 | 57.476 | 80.994 |
| 0.13399E-6 | -51.995 | -28.670 | -2.8004 | 21.527 | 43.040 | 68.100 | 83.136 |
| 0.31266E-6 | -12.548 | 2.5650 | 17.909 | 30.825 | 40.926 | 51.605 | 57.388 |
| 0.66998E-6 | -3.3702 | 3.3959 | 9.6417 | 14.653 | 18.412 | 22.171 | 23.906 |
| 0.13399E-5 | -2.2934 | -0.61636 | 0.86795 | 1.9474 | 2.9113 | 3.5667 | 3.9715 |

150°C 1600 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.44665E-7 | -265.44 | -3.8919 | 316.26 | 679.59 | 1072.8 | 1891.7 | 2715.2 |
| 0.80398E-7 | -40.502 | 219.50 | 538.11 | 898.98 | 1286.0 | 2083.3 | 2845.1 |
| 0.15186E-6 | 89.817 | 347.35 | 660.72 | 1015.4 | 1394.7 | 2153.5 | 2807.4 |
| 0.26799E-6 | 150.91 | 404.44 | 710.40 | 1056.1 | 1421.3 | 2121.4 | 2655.0 |
| 0.49132E-6 | 183.33 | 429.15 | 722.78 | 1051.2 | 1387.4 | 1988.8 | 2389.8 |
| 0.89331E-6 | 194.61 | 429.01 | 700.43 | 1001.1 | 1292.6 | 1749.1 | 2045.2 |
| 0.17866E-5 | 188.62 | 396.82 | 632.77 | 874.89 | 1090.7 | 1380.7 | 1568.8 |
| 0.26799E-5 | 176.48 | 363.08 | 570.04 | 764.66 | 936.76 | 1137.2 | 1257.5 |
| 0.62532E-5 | 124.33 | 245.23 | 367.99 | 471.31 | 552.12 | 637.56 | 683.82 |
| 0.13399E-4 | 58.906 | 113.03 | 163.00 | 203.09 | 233.17 | 263.24 | 277.12 |
| 0.26799E-4 | 13.241 | 26.658 | 38.533 | 47.169 | 54.880 | 60.123 | 63.362 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.25787E-7 | -638.14 | -376.59 | -56.442 | 306.89 | 700.14 | 1519.0 | 2342.5 |
| 0.46418E-7 | -246.86 | 13.139 | 331.75 | 692.61 | 1079.6 | 1876.9 | 2638.8 |
| 0.87678E-7 | -18.707 | 238.83 | 552.20 | 906.89 | 1286.2 | 2045.0 | 2698.8 |
| 0.15472E-6 | 90.080 | 343.61 | 649.57 | 995.32 | 1360.5 | 2060.6 | 2594.2 |
| 0.28366E-6 | 150.83 | 396.65 | 690.28 | 1018.7 | 1354.9 | 1956.3 | 2357.3 |
| 0.51575E-6 | 177.38 | 411.79 | 683.21 | 983.93 | 1275.4 | 1731.8 | 2027.9 |
| 0.10315E-5 | 180.68 | 388.88 | 624.83 | 866.95 | 1082.8 | 1372.7 | 1560.9 |
| 0.15472E-5 | 171.59 | 358.19 | 565.15 | 759.77 | 931.87 | 1132.3 | 1252.6 |
| 0.36102E-5 | 122.78 | 243.69 | 366.44 | 469.77 | 550.58 | 636.01 | 682.28 |
| 0.77363E-5 | 58.490 | 112.62 | 162.58 | 202.68 | 232.75 | 262.82 | 276.70 |
| 0.15472E-4 | 13.154 | 26.571 | 38.446 | 47.082 | 54.793 | 60.036 | 63.275 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.14124E-7 | -1367.6 | -1106.0 | -785.94 | -422.60 | -29.357 | 789.52 | 1613.0 |
| 0.25424E-7 | -651.38 | -391.37 | -72.766 | 288.09 | 675.18 | 1472.4 | 2234.3 |
| 0.48023E-7 | -232.06 | 25.479 | 338.84 | 693.54 | 1072.9 | 1831.6 | 2485.5 |
| 0.84747E-7 | -30.086 | 223.44 | 529.40 | 875.16 | 1240.3 | 1940.4 | 2474.0 |
| 0.15537E-6 | 86.052 | 331.87 | 625.50 | 953.98 | 1290.1 | 1891.6 | 2292.5 |
| 0.28249E-6 | 142.49 | 376.90 | 648.32 | 949.04 | 1240.5 | 1696.9 | 1993.0 |
| 0.56498E-6 | 164.03 | 372.22 | 608.17 | 850.29 | 1066.1 | 1356.1 | 1544.2 |
| 0.84747E-6 | 160.98 | 347.58 | 554.54 | 749.16 | 921.26 | 1121.7 | 1242.0 |
| 0.19774E-5 | 118.97 | 239.88 | 362.64 | 465.96 | 546.77 | 632.20 | 678.47 |
| 0.42373E-5 | 57.216 | 111.34 | 161.31 | 201.40 | 231.48 | 261.55 | 275.43 |
| 0.84747E-5 | 12.791 | 26.208 | 38.082 | 46.718 | 54.429 | 59.672 | 62.911 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.81548E-8 | -2549.6 | -2288.0 | -1967.9 | -1604.5 | -1211.3 | -392.43 | 431.07 |
| 0.14678E-7 | -1307.3 | -1047.3 | -728.72 | -367.85 | 19.225 | 816.52 | 1578.3 |
| 0.27726E-7 | -578.59 | -321.05 | -7.6887 | 347.00 | 726.37 | 1485.1 | 2138.9 |
| 0.48928E-7 | -225.78 | 27.748 | 333.71 | 679.46 | 1044.6 | 1744.7 | 2278.3 |
| 0.89703E-7 | -19.987 | 225.83 | 519.45 | 847.94 | 1184.1 | 1785.5 | 2186.5 |
| 0.16309E-6 | 84.859 | 319.26 | 590.68 | 891.40 | 1182.8 | 1639.3 | 1935.4 |
| 0.32619E-6 | 135.95 | 344.15 | 580.10 | 822.22 | 1038.1 | 1328.0 | 1516.1 |
| 0.48928E-6 | 142.75 | 329.35 | 536.30 | 730.93 | 903.03 | 1103.5 | 1223.8 |
| 0.11416E-5 | 111.92 | 232.83 | 355.58 | 458.91 | 539.72 | 625.15 | 671.42 |
| 0.24464E-5 | 54.516 | 108.64 | 158.61 | 198.70 | 228.78 | 258.85 | 272.73 |
| 0.48928E-5 | 11.837 | 25.253 | 37.128 | 45.764 | 53.475 | 58.718 | 61.957 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.44665E-8 | -4860.1 | -4598.6 | -4278.4 | -3915.1 | -3521.9 | -2703.0 | -1879.5 |
| 0.80398E-8 | -2590.2 | -2330.2 | -2011.6 | -1650.7 | -1263.6 | -466.38 | 295.44 |
| 0.15186E-7 | -1256.9 | -999.42 | -686.06 | -331.36 | 48.006 | 806.74 | 1460.6 |
| 0.26799E-7 | -609.45 | -355.92 | -49.956 | 295.79 | 660.97 | 1361.1 | 1894.7 |
| 0.49132E-7 | -228.48 | 17.332 | 310.95 | 639.43 | 975.63 | 1577.0 | 1978.0 |
| 0.89331E-7 | -29.053 | 205.35 | 476.77 | 777.49 | 1068.9 | 1525.4 | 1821.5 |
| 0.17866E-6 | 79.838 | 288.02 | 523.98 | 766.09 | 982.00 | 1271.9 | 1460.0 |
| 0.26799E-6 | 105.88 | 292.48 | 499.44 | 694.06 | 866.16 | 1066.6 | 1186.9 |
| 0.62532E-6 | 97.022 | 217.92 | 340.68 | 444.00 | 524.81 | 610.25 | 656.51 |
| 0.13399E-5 | 48.311 | 102.44 | 152.40 | 192.50 | 222.57 | 252.64 | 266.52 |
| 0.26799E-5 | 9.3112 | 22.728 | 34.602 | 43.238 | 50.949 | 56.192 | 59.431 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ *M* | | | |
| 0.22332E-7 | -947.29 | -881.90 | -801.86 | -711.03 | -612.72 | -408.00 | -202.12 |
| 0.40199E-7 | -494.67 | -429.66 | -350.01 | -259.79 | -163.02 | 36.294 | 226.75 |
| 0.75931E-7 | -229.53 | -165.15 | -86.812 | 1.8621 | 96.704 | 286.39 | 449.85 |
| 0.13399E-6 | -101.44 | -38.060 | 38.430 | 124.86 | 216.16 | 391.19 | 524.59 |
| 0.24566E-6 | -26.842 | 34.612 | 108.01 | 190.13 | 274.18 | 424.54 | 524.78 |
| 0.44665E-6 | 11.318 | 69.920 | 137.77 | 212.95 | 285.82 | 399.94 | 473.96 |
| 0.89331E-6 | 30.755 | 82.803 | 141.79 | 202.32 | 256.29 | 328.77 | 375.81 |
| 0.13399E-5 | 34.354 | 81.005 | 132.74 | 181.39 | 224.42 | 274.54 | 304.61 |
| 0.31266E-5 | 28.214 | 58.440 | 89.129 | 114.96 | 135.16 | 156.52 | 168.08 |
| 0.66998E-5 | 13.990 | 27.523 | 40.014 | 50.038 | 57.556 | 65.074 | 68.544 |
| 0.13399E-4 | 3.1578 | 6.5120 | 9.4807 | 11.639 | 13.567 | 14.878 | 15.687 |
| | | | | $3 \times 10^{-5}$ *M* | | | |
| 0.12893E-7 | -1694.2 | -1628.8 | -1548.8 | -1458.0 | -1359.6 | -1154.9 | -949.09 |
| 0.23209E-7 | -908.95 | -843.95 | -764.30 | -674.08 | -577.31 | -377.99 | -187.53 |
| 0.43839E-7 | -448.13 | -383.75 | -305.40 | -216.73 | -121.89 | 67.794 | 231.26 |
| 0.77363E-7 | -224.64 | -161.26 | -84.769 | 1.6682 | 92.964 | 267.99 | 401.39 |
| 0.14183E-6 | -93.345 | -31.890 | 41.515 | 123.63 | 207.68 | 358.04 | 458.28 |
| 0.25787E-6 | -24.580 | 34.021 | 101.87 | 177.05 | 249.92 | 364.04 | 438.06 |
| 0.51575E-6 | 13.531 | 65.579 | 124.56 | 185.09 | 239.07 | 311.55 | 358.58 |
| 0.77363E-6 | 23.331 | 69.981 | 121.72 | 170.37 | 213.40 | 263.52 | 293.59 |
| 0.18051E-5 | 24.185 | 54.412 | 85.101 | 110.93 | 131.13 | 152.49 | 164.05 |
| 0.38681E-5 | 12.599 | 26.132 | 38.623 | 48.647 | 56.165 | 63.683 | 67.153 |
| 0.77363E-5 | 2.7412 | 6.0954 | 9.0641 | 11.223 | 13.150 | 14.461 | 15.271 |
| | | | | $10 \times 10^{-5}$ *M* | | | |
| 0.70622E-8 | -3154.9 | -3089.5 | -3009.5 | -2918.7 | -2820.3 | -2615.6 | -2409.7 |
| 0.12712E-7 | -1719.7 | -1654.6 | -1575.0 | -1484.8 | -1388.0 | -1188.7 | -998.27 |
| 0.24011E-7 | -876.54 | -812.16 | -733.82 | -645.14 | -550.30 | -360.61 | -197.14 |
| 0.42373E-7 | -466.67 | -403.28 | -326.79 | -240.35 | -149.06 | 25.971 | 159.36 |
| 0.77685E-7 | -224.58 | -163.13 | -89.727 | -7.6078 | 76.439 | 226.80 | 327.04 |
| 0.14124E-6 | -96.008 | -37.406 | 30.448 | 105.62 | 178.49 | 292.61 | 366.63 |
| 0.28249E-6 | -21.360 | 30.687 | 89.675 | 150.20 | 204.18 | 276.66 | 323.69 |
| 0.42373E-6 | 0.60252 | 47.252 | 98.992 | 147.64 | 190.67 | 240.79 | 270.86 |
| 0.98872E-6 | 15.294 | 45.520 | 76.209 | 102.04 | 122.24 | 143.60 | 155.16 |
| 0.21186E-5 | 9.1219 | 22.654 | 35.145 | 45.169 | 52.687 | 60.206 | 63.675 |
| 0.42373E-5 | 1.4677 | 4.8219 | 7.7905 | 9.9495 | 11.877 | 13.188 | 13.997 |
| | | | | $30 \times 10^{-5}$ *M* | | | |
| 0.40774E-8 | -5520.4 | -5455.0 | -5375.0 | -5284.1 | -5185.8 | -4981.1 | -4775.2 |
| 0.73393E-8 | -3033.1 | -2968.1 | -2888.5 | -2798.3 | -2701.5 | -2502.2 | -2311.7 |
| 0.13863E-7 | -1571.1 | -1506.7 | -1428.4 | -1339.7 | -1244.9 | -1055.2 | -891.78 |
| 0.24464E-7 | -859.61 | -796.23 | -719.74 | -633.30 | -542.01 | -366.97 | -233.57 |
| 0.44851E-7 | -438.21 | -376.76 | -303.35 | -221.23 | -137.18 | 13.172 | 113.41 |
| 0.81548E-7 | -212.80 | -154.20 | -86.350 | -11.169 | 61.697 | 175.81 | 249.84 |
| 0.16309E-6 | -78.995 | -26.947 | 32.040 | 92.570 | 146.54 | 219.02 | 266.06 |
| 0.24464E-6 | -37.318 | 9.3313 | 61.070 | 109.72 | 152.75 | 202.87 | 232.94 |
| 0.57083E-6 | -0.13193 | 30.094 | 60.783 | 86.614 | 106.81 | 128.17 | 139.74 |
| 0.12232E-5 | 2.6229 | 16.155 | 28.646 | 38.670 | 46.188 | 53.706 | 57.176 |
| 0.24464E-5 | -1.2325 | 2.1215 | 5.0902 | 7.2492 | 9.1769 | 10.487 | 11.297 |
| | | | | $100 \times 10^{-5}$ *M* | | | |
| 0.22332E-8 | -10143 | -10077 | -9997.9 | -9907.1 | -9808.7 | -9604.0 | -9398.1 |
| 0.40199E-8 | -5600.6 | -5535.6 | -5456.0 | -5365.8 | -5269.0 | -5069.7 | -4879.2 |
| 0.75931E-8 | -2929.6 | -2865.2 | -2786.9 | -2698.2 | -2603.3 | -2413.7 | -2250.2 |
| 0.13399E-7 | -1628.6 | -1565.2 | -1488.7 | -1402.3 | -1311.0 | -1136.0 | -1002.6 |
| 0.24566E-7 | -856.92 | -795.46 | -722.06 | -639.94 | -555.89 | -405.53 | -305.29 |
| 0.44665E-7 | -442.32 | -383.72 | -315.87 | -240.69 | -167.82 | -53.703 | 20.319 |
| 0.89331E-7 | -192.90 | -140.86 | -81.872 | -21.342 | 32.632 | 105.11 | 152.15 |
| 0.13399E-6 | -112.70 | -66.051 | -14.311 | 34.343 | 77.369 | 127.49 | 157.56 |
| 0.31266E-6 | -31.501 | -1.2749 | 29.414 | 55.245 | 75.447 | 96.806 | 108.37 |
| 0.66998E-6 | -11.187 | 2.3445 | 14.836 | 24.860 | 32.378 | 39.896 | 43.366 |
| 0.13399E-5 | -7.4376 | -4.0834 | -1.1148 | 1.0441 | 2.9718 | 4.2827 | 5.0923 |

150°C 3200 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.44665E-7 | -544.63 | -21.535 | 618.76 | 1345.4 | 2131.9 | 3769.7 | 5416.7 |
| 0.80398E-7 | -93.092 | 426.92 | 1064.1 | 1785.8 | 2560.0 | 4154.6 | 5678.2 |
| 0.15186E-6 | 169.34 | 684.42 | 1311.1 | 2020.5 | 2779.2 | 4296.7 | 5604.5 |
| 0.26799E-6 | 293.11 | 800.18 | 1412.1 | 2103.6 | 2833.9 | 4234.2 | 5301.4 |
| 0.49132E-6 | 359.62 | 851.26 | 1438.5 | 2095.4 | 2767.8 | 3970.7 | 4772.6 |
| 0.89331E-6 | 383.75 | 852.56 | 1395.4 | 1996.8 | 2579.7 | 3492.7 | 4084.9 |
| 0.17866E-5 | 373.50 | 789.88 | 1261.7 | 1746.0 | 2177.8 | 2757.6 | 3133.9 |
| 0.26799E-5 | 350.11 | 723.31 | 1137.2 | 1526.4 | 1870.6 | 2271.6 | 2512.2 |
| 0.62532E-5 | 247.35 | 489.16 | 734.67 | 941.32 | 1102.9 | 1273.8 | 1366.3 |
| 0.13399E-4 | 117.35 | 225.61 | 325.54 | 405.73 | 465.88 | 526.02 | 553.78 |
| 0.26799E-4 | 26.367 | 53.200 | 76.950 | 94.222 | 109.64 | 120.13 | 126.60 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.25787E-7 | -1291.6 | -768.50 | -128.19 | 598.46 | 1384.9 | 3022.7 | 4669.7 |
| 0.46418E-7 | -507.37 | 12.637 | 649.85 | 1371.5 | 2145.7 | 3740.3 | 5264.0 |
| 0.87678E-7 | -49.255 | 465.82 | 1092.5 | 1801.9 | 2560.6 | 4078.1 | 5385.9 |
| 0.15472E-6 | 169.91 | 676.98 | 1288.9 | 1980.4 | 2710.7 | 4111.0 | 5178.2 |
| 0.28366E-6 | 293.11 | 784.75 | 1372.0 | 2028.9 | 2701.3 | 3904.2 | 4706.1 |
| 0.51575E-6 | 347.85 | 816.66 | 1359.5 | 1960.9 | 2543.8 | 3456.8 | 4049.0 |
| 0.10315E-5 | 356.27 | 772.65 | 1244.5 | 1728.7 | 2160.6 | 2740.4 | 3116.7 |
| 0.15472E-5 | 339.08 | 712.29 | 1126.2 | 1515.4 | 1859.6 | 2260.6 | 2501.1 |
| 0.36102E-5 | 243.32 | 485.13 | 730.64 | 937.29 | 1098.9 | 1269.7 | 1362.3 |
| 0.77363E-5 | 115.96 | 224.22 | 324.15 | 404.34 | 464.49 | 524.63 | 552.39 |
| 0.15472E-4 | 25.950 | 52.784 | 76.533 | 93.805 | 109.22 | 119.71 | 126.19 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.14124E-7 | -2752.3 | -2229.2 | -1588.9 | -862.24 | -75.740 | 1562.0 | 3209.0 |
| 0.25424E-7 | -1318.1 | -798.10 | -160.88 | 560.84 | 1335.0 | 2929.6 | 4453.2 |
| 0.48023E-7 | -477.66 | 37.413 | 664.14 | 1373.5 | 2132.2 | 3649.7 | 4957.5 |
| 0.84747E-7 | -72.110 | 434.95 | 1046.8 | 1738.3 | 2468.7 | 3869.0 | 4936.2 |
| 0.15537E-6 | 161.87 | 653.51 | 1240.7 | 1897.7 | 2570.1 | 3772.9 | 4574.9 |
| 0.28249E-6 | 276.42 | 745.23 | 1288.0 | 1889.5 | 2472.4 | 3385.4 | 3977.6 |
| 0.56498E-6 | 321.38 | 737.76 | 1209.6 | 1693.9 | 2125.7 | 2705.5 | 3081.8 |
| 0.84747E-6 | 316.35 | 689.56 | 1103.4 | 1492.7 | 1836.9 | 2237.8 | 2478.4 |
| 0.19774E-5 | 234.43 | 476.24 | 721.75 | 928.40 | 1090.0 | 1260.8 | 1353.4 |
| 0.42373E-5 | 112.48 | 220.74 | 320.67 | 400.86 | 461.01 | 521.15 | 548.91 |
| 0.84747E-5 | 24.677 | 51.510 | 75.260 | 92.532 | 107.95 | 118.44 | 124.91 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.81548E-8 | -5117.7 | -4594.6 | -3954.3 | -3227.7 | -2441.2 | -803.43 | 843.59 |
| 0.14678E-7 | -2631.5 | -2111.5 | -1474.3 | -752.62 | 21.538 | 1616.1 | 3139.7 |
| 0.27726E-7 | -1172.2 | -657.21 | -30.483 | 678.90 | 1437.6 | 2955.1 | 4262.8 |
| 0.48928E-7 | -465.05 | 42.005 | 653.93 | 1345.4 | 2075.8 | 3476.0 | 4543.2 |
| 0.89703E-7 | -51.752 | 439.88 | 1027.1 | 1684.1 | 2356.4 | 3559.3 | 4361.2 |
| 0.16309E-6 | 159.62 | 628.44 | 1171.2 | 1772.7 | 2355.6 | 3268.6 | 3860.8 |
| 0.32619E-6 | 263.74 | 680.13 | 1152.0 | 1636.2 | 2068.0 | 2647.9 | 3024.2 |
| 0.48928E-6 | 278.43 | 651.64 | 1065.5 | 1454.7 | 1799.0 | 2199.9 | 2440.5 |
| 0.11416E-5 | 219.00 | 460.81 | 706.33 | 912.98 | 1074.5 | 1245.4 | 1338.0 |
| 0.24464E-5 | 105.98 | 214.24 | 314.17 | 394.37 | 454.51 | 514.65 | 542.41 |
| 0.48928E-5 | 21.976 | 48.810 | 72.559 | 89.831 | 105.25 | 115.74 | 122.21 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.44665E-8 | -9740.7 | -9217.6 | -8577.3 | -7850.6 | -7064.1 | -5426.3 | -3779.3 |
| 0.80398E-8 | -5199.0 | -4679.0 | -4041.8 | -3320.1 | -2545.9 | -951.37 | 572.28 |
| 0.15186E-7 | -2530.7 | -2015.6 | -1388.9 | -679.54 | 79.198 | 1596.6 | 2904.4 |
| 0.26799E-7 | -1234.1 | -727.04 | -115.11 | 576.38 | 1306.7 | 2707.0 | 3774.2 |
| 0.49132E-7 | -470.45 | 21.181 | 608.43 | 1265.3 | 1937.7 | 3140.6 | 3942.5 |
| 0.89331E-7 | -69.896 | 398.92 | 941.76 | 1543.2 | 2126.1 | 3039.0 | 3631.2 |
| 0.17866E-6 | 149.83 | 566.22 | 1038.1 | 1522.3 | 1954.1 | 2534.0 | 2910.3 |
| 0.26799E-6 | 203.05 | 576.25 | 990.17 | 1379.4 | 1723.6 | 2124.5 | 2365.1 |
| 0.62532E-6 | 187.63 | 429.45 | 674.96 | 881.61 | 1043.2 | 1214.1 | 1306.6 |
| 0.13399E-5 | 92.175 | 200.43 | 300.36 | 380.55 | 440.70 | 500.84 | 528.60 |
| 0.26799E-5 | 15.771 | 42.605 | 66.354 | 83.626 | 99.048 | 109.53 | 116.01 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.22332E-7 | -1910.3 | -1779.5 | -1619.4 | -1437.7 | -1241.1 | -831.72 | -419.96 |
| 0.40199E-7 | -1003.3 | -873.39 | -714.08 | -533.65 | -340.11 | 58.536 | 439.45 |
| 0.75931E-7 | -471.32 | -342.55 | -185.87 | -8.5241 | 181.16 | 560.53 | 887.47 |
| 0.13399E-6 | -213.53 | -86.767 | 66.214 | 239.09 | 421.68 | 771.75 | 1038.5 |
| 0.24566E-6 | -62.637 | 60.272 | 207.08 | 371.32 | 539.42 | 840.14 | 1040.6 |
| 0.44665E-6 | 15.328 | 132.53 | 268.24 | 418.60 | 564.33 | 792.57 | 940.62 |
| 0.89331E-6 | 56.041 | 160.13 | 278.11 | 399.17 | 507.12 | 652.08 | 746.15 |
| 0.13399E-5 | 64.262 | 157.56 | 261.04 | 358.35 | 444.40 | 544.64 | 604.78 |
| 0.31266E-5 | 53.897 | 114.35 | 175.72 | 227.39 | 267.79 | 310.51 | 337.64 |
| 0.66998E-5 | 26.771 | 53.836 | 78.819 | 98.867 | 113.90 | 128.93 | 135.87 |
| 0.13399E-4 | 5.8559 | 12.564 | 18.501 | 22.819 | 26.675 | 29.296 | 30.916 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.12893E-7 | -3405.8 | -3275.0 | -3114.9 | -2933.2 | -2736.6 | -2327.2 | -1915.4 |
| 0.23209E-7 | -1833.5 | -1703.5 | -1544.2 | -1363.7 | -1170.2 | -771.59 | -390.68 |
| 0.43839E-7 | -910.07 | -781.30 | -624.62 | -447.27 | -257.58 | 121.78 | 448.72 |
| 0.77363E-7 | -461.48 | -334.71 | -181.73 | -8.8593 | 173.73 | 523.80 | 790.59 |
| 0.14183E-6 | -197.17 | -74.267 | 72.545 | 236.78 | 404.88 | 705.60 | 906.08 |
| 0.25787E-6 | -57.977 | 59.226 | 194.93 | 345.29 | 491.03 | 719.27 | 867.31 |
| 0.51575E-6 | 20.142 | 124.23 | 242.21 | 363.27 | 471.22 | 616.18 | 710.25 |
| 0.77363E-6 | 40.819 | 134.12 | 237.59 | 334.90 | 420.96 | 521.20 | 581.34 |
| 0.18051E-5 | 44.638 | 105.09 | 166.46 | 218.13 | 258.53 | 301.25 | 324.38 |
| 0.38681E-5 | 23.083 | 50.148 | 75.131 | 95.179 | 110.21 | 125.25 | 132.19 |
| 0.77363E-5 | 4.4650 | 11.173 | 17.110 | 21.428 | 25.284 | 27.905 | 29.525 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.70622E-8 | -6328.8 | -6198.1 | -6038.0 | -5856.3 | -5659.7 | -5250.3 | -4838.5 |
| 0.12712E-7 | -3456.7 | -3326.7 | -3167.4 | -2986.9 | -2793.4 | -2394.7 | -2013.8 |
| 0.24011E-7 | -1768.6 | -1639.8 | -1483.1 | -1305.8 | -1116.1 | -736.74 | -409.81 |
| 0.42373E-7 | -947.24 | -820.47 | -667.49 | -494.62 | -312.02 | 38.040 | 304.83 |
| 0.77685E-7 | -461.36 | -338.45 | -191.63 | -27.399 | 140.69 | 441.41 | 641.89 |
| 0.14124E-6 | -202.51 | -85.310 | 50.399 | 200.75 | 346.49 | 574.73 | 722.78 |
| 0.28249E-6 | -51.285 | 52.809 | 170.78 | 291.84 | 399.79 | 544.75 | 638.83 |
| 0.42373E-6 | -6.2473 | 87.053 | 190.53 | 287.84 | 373.89 | 474.13 | 534.27 |
| 0.98872E-6 | 25.379 | 85.832 | 147.21 | 198.87 | 239.27 | 281.99 | 305.12 |
| 0.21186E-5 | 14.878 | 41.943 | 66.926 | 86.974 | 102.01 | 117.04 | 123.98 |
| 0.42373E-5 | 0.98707 | 7.6954 | 13.632 | 17.950 | 21.806 | 24.427 | 26.047 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.40774E-8 | -11061 | -10930 | -10770 | -10588 | -10392 | -9982.8 | -9571.1 |
| 0.73393E-8 | -6085.1 | -5955.1 | -5795.8 | -5615.4 | -5421.8 | -5023.2 | -4642.3 |
| 0.13863E-7 | -3159.4 | -3030.6 | -2873.9 | -2696.6 | -2506.9 | -2127.5 | -1800.6 |
| 0.24464E-7 | -1734.6 | -1607.9 | -1454.9 | -1282.0 | -1099.4 | -749.41 | -482.61 |
| 0.44851E-7 | -890.17 | -767.26 | -620.45 | -456.21 | -288.11 | 12.603 | 213.08 |
| 0.81548E-7 | -437.66 | -320.45 | -184.74 | -34.386 | 111.34 | 339.58 | 487.63 |
| 0.16309E-6 | -168.08 | -63.988 | 53.986 | 175.04 | 282.99 | 427.96 | 522.03 |
| 0.24464E-6 | -83.601 | 9.6994 | 113.17 | 210.48 | 296.54 | 396.78 | 456.92 |
| 0.57083E-6 | -6.9120 | 53.540 | 114.91 | 166.58 | 206.98 | 249.70 | 272.83 |
| 0.12232E-5 | 0.57313 | 27.638 | 52.621 | 72.669 | 87.705 | 102.74 | 109.68 |
| 0.24464E-5 | -5.5119 | 1.1964 | 7.1337 | 11.451 | 15.307 | 17.928 | 19.548 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.22332E-8 | -20308 | -20178 | -20018 | -19836 | -19639 | -19230 | -18818 |
| 0.40199E-8 | -11221 | -11091 | -10932 | -10751 | -10558 | -10159 | -9778.8 |
| 0.75931E-8 | -5878.0 | -5749.3 | -5592.6 | -5415.2 | -5225.6 | -4846.2 | -4519.2 |
| 0.13399E-7 | -3274.5 | -3147.7 | -2994.7 | -2821.9 | -2639.3 | -2289.2 | -2022.4 |
| 0.24566E-7 | -1729.2 | -1606.3 | -1459.5 | -1295.3 | -1127.2 | -826.51 | -626.03 |
| 0.44665E-7 | -898.40 | -781.20 | -645.49 | -495.13 | -349.39 | -121.15 | 26.888 |
| 0.89331E-7 | -397.60 | -293.50 | -175.53 | -54.474 | 53.476 | 198.43 | 292.51 |
| 0.13399E-6 | -236.04 | -142.74 | -39.269 | 58.041 | 144.09 | 244.33 | 304.47 |
| 0.31266E-6 | -71.287 | -10.834 | 50.543 | 102.20 | 142.61 | 185.32 | 208.46 |
| 0.66998E-6 | -28.597 | -1.5328 | 23.450 | 43.498 | 58.534 | 73.570 | 80.510 |
| 0.13399E-5 | -19.322 | -12.614 | -6.6770 | -2.3590 | 1.4963 | 4.1180 | 5.7373 |

200°C 50 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.43171E-7 | -2.8928 | 4.3100 | 13.126 | 23.132 | 33.962 | 56.514 | 79.193 |
| 0.77708E-7 | 2.3521 | 9.5126 | 18.286 | 28.224 | 38.884 | 60.841 | 81.822 |
| 0.14678E-6 | 4.9031 | 11.995 | 20.625 | 30.393 | 40.841 | 61.736 | 79.743 |
| 0.25902E-6 | 5.7666 | 12.748 | 21.174 | 30.696 | 40.753 | 60.034 | 74.729 |
| 0.47488E-6 | 5.9805 | 12.750 | 20.836 | 29.882 | 39.141 | 55.704 | 66.746 |
| 0.86342E-6 | 5.8440 | 12.299 | 19.774 | 28.055 | 36.082 | 48.653 | 56.808 |
| 0.17268E-5 | 5.3924 | 11.125 | 17.623 | 24.291 | 30.237 | 38.221 | 43.403 |
| 0.25902E-5 | 4.9687 | 10.107 | 15.807 | 21.166 | 25.906 | 31.427 | 34.740 |
| 0.60439E-5 | 3.4485 | 6.7782 | 10.158 | 13.004 | 15.229 | 17.582 | 18.856 |
| 0.12951E-4 | 1.6266 | 3.1172 | 4.4933 | 5.5975 | 6.4257 | 7.2538 | 7.6361 |
| 0.25902E-4 | 0.36524 | 0.73473 | 1.0617 | 1.2995 | 1.5119 | 1.6563 | 1.7455 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.24925E-7 | -12.418 | -5.2160 | 3.6007 | 13.606 | 24.436 | 46.988 | 69.667 |
| 0.44865E-7 | -2.4402 | 4.7201 | 13.494 | 23.432 | 34.092 | 56.049 | 77.029 |
| 0.84745E-7 | 2.8081 | 9.9006 | 18.530 | 28.298 | 38.746 | 59.641 | 77.648 |
| 0.14955E-6 | 4.8813 | 11.863 | 20.289 | 29.811 | 39.868 | 59.149 | 73.844 |
| 0.27417E-6 | 5.6913 | 12.461 | 20.547 | 29.593 | 38.851 | 55.415 | 66.457 |
| 0.49850E-6 | 5.7722 | 12.227 | 19.702 | 27.984 | 36.010 | 48.581 | 56.736 |
| 0.99700E-6 | 5.3834 | 11.116 | 17.614 | 24.282 | 30.228 | 38.212 | 43.394 |
| 0.14955E-5 | 4.9667 | 10.105 | 15.805 | 21.164 | 25.904 | 31.425 | 34.738 |
| 0.34895E-5 | 3.4485 | 6.7781 | 10.158 | 13.004 | 15.229 | 17.582 | 18.856 |
| 0.74775E-5 | 1.6265 | 3.1172 | 4.4933 | 5.5975 | 6.4257 | 7.2538 | 7.6361 |
| 0.14955E-4 | 0.36524 | 0.73473 | 1.0617 | 1.2995 | 1.5119 | 1.6563 | 1.7455 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.13651E-7 | -32.092 | -24.889 | -16.073 | -6.0671 | 4.7627 | 27.314 | 49.993 |
| 0.24573E-7 | -12.767 | -5.6074 | 3.1668 | 13.104 | 23.764 | 45.721 | 66.701 |
| 0.46416E-7 | -2.0851 | 5.0073 | 13.637 | 23.405 | 33.852 | 54.748 | 72.755 |
| 0.81911E-7 | 2.5513 | 9.5334 | 17.959 | 27.481 | 37.538 | 56.819 | 71.514 |
| 0.15017E-6 | 4.7639 | 11.533 | 19.619 | 28.666 | 37.924 | 54.487 | 65.530 |
| 0.27303E-6 | 5.4669 | 11.922 | 19.397 | 27.678 | 35.705 | 48.276 | 56.430 |
| 0.54607E-6 | 5.3249 | 11.058 | 17.556 | 24.224 | 30.169 | 38.154 | 43.335 |
| 0.81911E-6 | 4.9490 | 10.087 | 15.787 | 21.147 | 25.886 | 31.407 | 34.720 |
| 0.19112E-5 | 3.4477 | 6.7773 | 10.157 | 13.003 | 15.228 | 17.581 | 18.855 |
| 0.40955E-5 | 1.6265 | 3.1172 | 4.4933 | 5.5975 | 6.4256 | 7.2538 | 7.6360 |
| 0.81911E-5 | 0.36524 | 0.73473 | 1.0617 | 1.2995 | 1.5119 | 1.6563 | 1.7455 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.78819E-8 | -64.947 | -57.744 | -48.927 | -38.921 | -28.091 | -5.5403 | 17.138 |
| 0.14187E-7 | -30.440 | -23.279 | -14.505 | -4.5673 | 6.0926 | 28.049 | 49.029 |
| 0.26798E-7 | -10.862 | -3.7695 | 4.8603 | 14.628 | 25.076 | 45.971 | 63.978 |
| 0.47291E-7 | -1.9413 | 5.0407 | 13.466 | 22.988 | 33.045 | 52.326 | 67.021 |
| 0.86701E-7 | 2.7348 | 9.5045 | 17.590 | 26.636 | 35.895 | 52.458 | 63.500 |
| 0.15763E-6 | 4.6561 | 11.111 | 18.586 | 26.867 | 34.894 | 47.465 | 55.620 |
| 0.31527E-6 | 5.1099 | 10.843 | 17.341 | 24.009 | 29.954 | 37.939 | 43.120 |
| 0.47291E-6 | 4.8666 | 10.005 | 15.705 | 21.064 | 25.804 | 31.325 | 34.638 |
| 0.11034E-5 | 3.4413 | 6.7710 | 10.151 | 12.997 | 15.222 | 17.575 | 18.849 |
| 0.23645E-5 | 1.6262 | 3.1169 | 4.4929 | 5.5972 | 6.4253 | 7.2535 | 7.6357 |
| 0.47291E-5 | 0.36522 | 0.73471 | 1.0617 | 1.2995 | 1.5119 | 1.6563 | 1.7455 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.43171E-8 | -130.29 | -123.08 | -114.27 | -104.26 | -93.437 | -70.885 | -48.206 |
| 0.77708E-8 | -66.086 | -58.926 | -50.152 | -40.214 | -29.554 | -7.5970 | 13.383 |
| 0.14678E-7 | -29.062 | -21.970 | -13.340 | -3.5720 | 6.8756 | 27.770 | 45.778 |
| 0.25902E-7 | -11.672 | -4.6901 | 3.7359 | 13.257 | 23.314 | 42.595 | 57.290 |
| 0.47488E-7 | -2.0223 | 4.7473 | 12.833 | 21.879 | 31.138 | 47.701 | 58.743 |
| 0.86342E-7 | 2.4920 | 8.9475 | 16.422 | 24.703 | 32.730 | 45.301 | 53.456 |
| 0.17268E-6 | 4.3793 | 10.112 | 16.610 | 23.278 | 29.224 | 37.208 | 42.390 |
| 0.25902E-6 | 4.5264 | 9.6653 | 15.364 | 20.724 | 25.464 | 30.985 | 34.297 |
| 0.60439E-6 | 3.3973 | 6.7269 | 10.107 | 12.953 | 15.178 | 17.531 | 18.805 |
| 0.12951E-5 | 1.6226 | 3.1133 | 4.4893 | 5.5935 | 6.4217 | 7.2498 | 7.6321 |
| 0.25902E-5 | 0.36501 | 0.73450 | 1.0615 | 1.2993 | 1.5117 | 1.6561 | 1.7452 |

| $H_0$ | V/kT: Z = 2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.21585E-7 | -20.785 | -18.984 | -16.780 | -14.278 | -11.571 | -5.9333 | -0.26358 |
| 0.38854E-7 | -9.0479 | -7.2578 | -5.0642 | -2.5797 | 0.85247E-1 | 5.5744 | 10.819 |
| 0.73391E-7 | -2.7586 | -0.98556 | 1.1719 | 3.6139 | 6.2258 | 11.449 | 15.951 |
| 0.12951E-6 | -0.16615 | 1.5793 | 3.6858 | 6.0663 | 8.5805 | 13.400 | 17.074 |
| 0.23744E-6 | 0.98666 | 2.6790 | 4.7006 | 6.9621 | 9.2768 | 13.417 | 16.178 |
| 0.43171E-6 | 1.3348 | 2.9487 | 4.8173 | 6.8878 | 8.8945 | 12.037 | 14.075 |
| 0.86342E-6 | 1.3316 | 2.7650 | 4.3894 | 6.0564 | 7.5428 | 9.5389 | 10.834 |
| 0.12951E-5 | 1.2382 | 2.5229 | 3.9478 | 5.2877 | 6.4726 | 7.8529 | 8.6811 |
| 0.30219E-5 | 0.86203 | 1.6944 | 2.5395 | 3.2509 | 3.8073 | 4.3955 | 4.7140 |
| 0.64757E-5 | 0.40664 | 0.77932 | 1.1233 | 1.3993 | 1.6064 | 1.8134 | 1.9090 |
| 0.12951E-4 | 0.91310E-1 | 0.18368 | 0.26543 | 0.32489 | 0.37798 | 0.41408 | 0.43637 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.12462E-7 | -41.081 | -39.280 | -37.076 | -34.575 | -31.867 | -26.229 | -20.559 |
| 0.22432E-7 | -19.766 | -17.976 | -15.782 | -13.298 | -10.633 | -5.1439 | 0.10105 |
| 0.42372E-7 | -7.8956 | -6.1225 | -3.9650 | -1.5230 | 1.0888 | 6.3126 | 10.814 |
| 0.74775E-7 | -2.6549 | -0.90940 | 1.1971 | 3.5775 | 6.0917 | 10.912 | 14.585 |
| 0.13708E-6 | -0.33579E-1 | 1.6588 | 3.6804 | 5.9419 | 8.2565 | 12.397 | 15.157 |
| 0.24925E-6 | 0.98412 | 2.5979 | 4.4666 | 6.5370 | 8.5437 | 11.686 | 13.725 |
| 0.49850E-6 | 1.2597 | 2.6931 | 4.3176 | 5.9845 | 7.4710 | 9.4671 | 10.762 |
| 0.74775E-6 | 1.2155 | 2.5002 | 3.9250 | 5.2650 | 6.4499 | 7.8302 | 8.6583 |
| 0.17447E-5 | 0.86091 | 1.6933 | 2.5384 | 3.2498 | 3.8062 | 4.3944 | 4.7129 |
| 0.37387E-5 | 0.40661 | 0.77928 | 1.1232 | 1.3993 | 1.6063 | 1.8134 | 1.9089 |
| 0.74775E-5 | 0.91309E-1 | 0.18368 | 0.26543 | 0.32489 | 0.37798 | 0.41408 | 0.43637 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.68259E-8 | -81.865 | -80.064 | -77.860 | -75.358 | -72.651 | -67.013 | -61.343 |
| 0.12286E-7 | -41.782 | -39.992 | -37.799 | -35.314 | -32.649 | -27.160 | -21.915 |
| 0.23208E-7 | -18.908 | -17.134 | -14.977 | -12.535 | -9.9235 | -4.6997 | -0.19795 |
| 0.40955E-7 | -8.3549 | -6.6094 | -4.5029 | -2.1225 | 0.39172 | 5.2120 | 8.8857 |
| 0.75085E-7 | -2.6603 | -0.96791 | 1.0536 | 3.3151 | 5.6298 | 9.7706 | 12.531 |
| 0.13651E-6 | -0.10033 | 1.5135 | 3.3822 | 5.4526 | 7.4593 | 10.602 | 12.640 |
| 0.27303E-6 | 0.95447 | 2.3878 | 4.0123 | 5.6792 | 7.1657 | 9.1618 | 10.457 |
| 0.40955E-6 | 1.0928 | 2.3775 | 3.8024 | 5.1423 | 6.3272 | 7.7075 | 8.5357 |
| 0.95563E-6 | 0.85023 | 1.6826 | 2.5278 | 3.2391 | 3.7955 | 4.3837 | 4.7022 |
| 0.20477E-5 | 0.40602 | 0.77869 | 1.1227 | 1.3987 | 1.6057 | 1.8128 | 1.9083 |
| 0.40955E-5 | 0.91284E-1 | 0.18365 | 0.26541 | 0.32486 | 0.37795 | 0.41405 | 0.43635 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.39409E-8 | -148.92 | -147.12 | -144.91 | -142.41 | -139.71 | -134.07 | -128.40 |
| 0.70937E-8 | -78.436 | -76.646 | -74.452 | -71.968 | -69.303 | -63.814 | -58.569 |
| 0.13399E-7 | -37.695 | -35.922 | -33.764 | -31.322 | -28.710 | -23.486 | -18.985 |
| 0.23645E-7 | -18.461 | -16.715 | -14.609 | -12.228 | -9.7146 | -4.8942 | -1.2206 |
| 0.43350E-7 | -7.6572 | -5.9648 | -3.9432 | -1.6817 | 0.63287 | 4.7737 | 7.5342 |
| 0.78819E-7 | -2.4166 | -0.80274 | 1.0659 | 3.1363 | 5.1430 | 8.2858 | 10.324 |
| 0.15763E-6 | 0.14367 | 1.5770 | 3.2015 | 4.8684 | 6.3549 | 8.3510 | 9.6463 |
| 0.23645E-6 | 0.70376 | 1.9884 | 3.4133 | 4.7532 | 5.9381 | 7.3184 | 8.1466 |
| 0.55173E-6 | 0.79542 | 1.6278 | 2.4729 | 3.1843 | 3.7407 | 4.3289 | 4.6474 |
| 0.11822E-5 | 0.40106 | 0.77373 | 1.1177 | 1.3938 | 1.6008 | 1.8078 | 1.9034 |
| 0.23645E-5 | 0.90973E-1 | 0.18334 | 0.26510 | 0.32455 | 0.37764 | 0.41374 | 0.43604 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.21585E-8 | -281.11 | -279.31 | -277.11 | -274.61 | -271.90 | -266.26 | -260.59 |
| 0.38854E-8 | -151.20 | -149.41 | -147.22 | -144.74 | -142.07 | -136.58 | -131.34 |
| 0.73391E-8 | -75.524 | -73.751 | -71.594 | -69.152 | -66.540 | -61.316 | -56.814 |
| 0.12951E-7 | -39.275 | -37.529 | -35.423 | -33.043 | -30.528 | -25.708 | -22.034 |
| 0.23744E-7 | -18.391 | -16.698 | -14.677 | -12.415 | -10.101 | -5.9604 | -3.1999 |
| 0.43171E-7 | -7.7641 | -6.1502 | -4.2815 | -2.2111 | -0.20446 | 2.9383 | 4.9768 |
| 0.86342E-7 | -2.0203 | -0.58698 | 1.0374 | 2.7044 | 4.1908 | 6.1869 | 7.4823 |
| 0.12951E-6 | -0.47618 | 0.80852 | 2.2333 | 3.5733 | 4.7582 | 6.1385 | 6.9666 |
| 0.30219E-6 | 0.54910 | 1.3815 | 2.2266 | 2.9380 | 3.4944 | 4.0826 | 4.4011 |
| 0.64757E-6 | 0.36493 | 0.73761 | 1.0816 | 1.3576 | 1.5647 | 1.7717 | 1.8673 |
| 0.12951E-5 | 0.87332E-1 | 0.17970 | 0.26145 | 0.32091 | 0.37400 | 0.41010 | 0.43240 |

200°C 100 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.43171E-7 | -9.6961 | 4.7096 | 22.343 | 42.355 | 64.014 | 109.11 | 154.47 |
| 0.77708E-7 | 2.0112 | 16.332 | 33.880 | 53.756 | 75.076 | 118.99 | 160.95 |
| 0.14678E-6 | 8.2261 | 22.411 | 39.670 | 59.207 | 80.102 | 121.89 | 157.90 |
| 0.25902E-6 | 10.699 | 24.663 | 41.516 | 60.559 | 80.673 | 119.23 | 148.62 |
| 0.47488E-6 | 11.629 | 25.169 | 41.341 | 59.433 | 77.950 | 111.07 | 133.16 |
| 0.86342E-6 | 11.591 | 24.502 | 39.451 | 56.014 | 72.068 | 97.210 | 113.51 |
| 0.17268E-5 | 10.770 | 22.237 | 35.233 | 48.568 | 60.460 | 76.429 | 86.791 |
| 0.25902E-5 | 9.9340 | 20.211 | 31.610 | 42.330 | 51.809 | 62.851 | 69.476 |
| 0.60439E-5 | 6.8970 | 13.556 | 20.317 | 26.008 | 30.459 | 35.165 | 37.713 |
| 0.12951E-4 | 3.2531 | 6.2345 | 8.9866 | 11.195 | 12.851 | 14.507 | 15.272 |
| 0.25902E-4 | 0.73048 | 1.4694 | 2.1234 | 2.5991 | 3.0238 | 3.3126 | 3.4910 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.24925E-7 | -29.992 | -15.586 | 2.0467 | 22.058 | 43.718 | 88.821 | 134.17 |
| 0.44865E-7 | -8.7072 | 5.6136 | 23.162 | 43.038 | 64.358 | 108.27 | 150.23 |
| 0.84745E-7 | 3.0891 | 17.274 | 34.533 | 54.070 | 74.965 | 116.75 | 152.77 |
| 0.14955E-6 | 8.2110 | 22.175 | 39.027 | 58.070 | 78.184 | 116.74 | 146.13 |
| 0.27417E-6 | 10.609 | 24.148 | 40.321 | 58.413 | 76.930 | 110.05 | 132.14 |
| 0.49850E-6 | 11.240 | 24.151 | 39.100 | 55.664 | 71.717 | 96.860 | 113.16 |
| 0.99700E-6 | 10.698 | 22.165 | 35.161 | 48.497 | 60.388 | 76.357 | 86.720 |
| 0.14955E-5 | 9.9112 | 20.188 | 31.587 | 42.307 | 51.786 | 62.828 | 69.454 |
| 0.34895E-5 | 6.8958 | 13.555 | 20.316 | 26.007 | 30.458 | 35.163 | 37.712 |
| 0.74775E-5 | 3.2531 | 6.2345 | 8.9866 | 11.195 | 12.851 | 14.507 | 15.272 |
| 0.14955E-4 | 0.73048 | 1.4694 | 2.1234 | 2.5991 | 3.0238 | 3.3126 | 3.4910 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.13651E-7 | -70.776 | -56.370 | -38.736 | -18.724 | 2.9347 | 48.037 | 93.395 |
| 0.24573E-7 | -30.723 | -16.402 | 1.1457 | 21.021 | 42.341 | 86.255 | 128.21 |
| 0.46416E-7 | -7.9232 | 6.2617 | 23.521 | 43.057 | 63.952 | 105.74 | 141.75 |
| 0.81911E-7 | 2.5109 | 16.475 | 33.327 | 52.370 | 72.484 | 111.04 | 140.43 |
| 0.15017E-6 | 7.9826 | 21.522 | 37.694 | 55.786 | 74.303 | 107.43 | 129.51 |
| 0.27303E-6 | 10.156 | 23.067 | 38.016 | 54.579 | 70.633 | 95.775 | 112.08 |
| 0.54607E-6 | 10.393 | 21.860 | 34.856 | 48.191 | 60.083 | 76.052 | 86.414 |
| 0.81911E-6 | 9.7885 | 20.066 | 31.465 | 42.184 | 51.663 | 62.706 | 69.331 |
| 0.19112E-5 | 6.8852 | 13.544 | 20.305 | 25.996 | 30.447 | 35.153 | 37.701 |
| 0.40955E-5 | 3.2525 | 6.2339 | 8.9860 | 11.194 | 12.850 | 14.507 | 15.271 |
| 0.81911E-5 | 0.73045 | 1.4694 | 2.1234 | 2.5991 | 3.0238 | 3.3126 | 3.4910 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.78819E-8 | -137.83 | -123.42 | -105.79 | -85.783 | -64.124 | -19.021 | 26.336 |
| 0.14187E-7 | -67.377 | -53.056 | -35.507 | -15.631 | 5.6880 | 49.602 | 91.562 |
| 0.26798E-7 | -26.710 | -12.525 | 4.7344 | 24.270 | 45.165 | 86.956 | 122.97 |
| 0.47291E-7 | -7.5953 | 6.3687 | 23.220 | 42.264 | 62.378 | 100.94 | 130.33 |
| 0.86701E-7 | 2.9857 | 16.525 | 32.697 | 50.789 | 69.306 | 102.43 | 124.51 |
| 0.15763E-6 | 7.8398 | 20.750 | 35.700 | 52.263 | 68.317 | 93.459 | 109.76 |
| 0.31527E-6 | 9.5826 | 21.049 | 34.045 | 47.380 | 59.272 | 75.241 | 85.603 |
| 0.47291E-6 | 9.3994 | 19.677 | 31.076 | 41.795 | 51.274 | 62.317 | 68.942 |
| 0.11034E-5 | 6.8304 | 13.489 | 20.250 | 25.941 | 30.392 | 35.098 | 37.646 |
| 0.23645E-5 | 3.2476 | 6.2290 | 8.9810 | 11.189 | 12.845 | 14.502 | 15.266 |
| 0.47291E-5 | 0.73014 | 1.4691 | 2.1231 | 2.5988 | 3.0235 | 3.3123 | 3.4906 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.43171E-8 | -270.02 | -255.62 | -237.98 | -217.97 | -196.31 | -151.21 | -105.85 |
| 0.77708E-8 | -140.14 | -125.82 | -108.27 | -88.403 | -67.083 | -23.169 | 18.790 |
| 0.14678E-7 | -64.539 | -50.354 | -33.095 | -13.558 | 7.3362 | 49.126 | 85.141 |
| 0.25902E-7 | -28.409 | -14.445 | 2.4067 | 21.450 | 41.564 | 80.126 | 109.51 |
| 0.47488E-7 | -7.7484 | 5.7909 | 21.963 | 40.055 | 58.572 | 91.699 | 113.78 |
| 0.86342E-7 | 2.4923 | 15.403 | 30.352 | 46.915 | 62.969 | 88.111 | 104.42 |
| 0.17268E-6 | 7.4186 | 18.885 | 31.881 | 45.216 | 57.108 | 73.077 | 83.439 |
| 0.25902E-6 | 8.2195 | 18.497 | 29.896 | 40.615 | 50.094 | 61.137 | 67.762 |
| 0.60439E-6 | 6.5840 | 13.243 | 20.004 | 25.695 | 30.146 | 34.852 | 37.400 |
| 0.12951E-5 | 3.2114 | 6.1928 | 8.9449 | 11.153 | 12.809 | 14.466 | 15.230 |
| 0.25902E-5 | 0.72650 | 1.4654 | 2.1195 | 2.5951 | 3.0198 | 3.3086 | 3.4870 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.21585E-7 | -47.062 | -43.461 | -39.052 | -34.049 | -28.634 | -17.358 | -6.0194 |
| 0.38854E-7 | -22.238 | -18.658 | -14.271 | -9.3021 | -3.9721 | 7.0063 | 17.496 |
| 0.73391E-7 | -8.3220 | -4.7758 | -0.46088 | 4.4231 | 9.6469 | 20.094 | 29.098 |
| 0.12951E-6 | -2.1106 | 1.3803 | 5.5933 | 10.354 | 15.382 | 25.023 | 32.370 |
| 0.23744E-6 | 1.0426 | 4.4275 | 8.4706 | 12.993 | 17.622 | 25.904 | 31.425 |
| 0.43171E-6 | 2.2790 | 5.5067 | 9.2440 | 13.384 | 17.398 | 23.683 | 27.761 |
| 0.86342E-6 | 2.5664 | 5.4332 | 8.6821 | 12.016 | 14.988 | 18.981 | 21.571 |
| 0.12951E-5 | 2.4427 | 5.0122 | 7.8619 | 10.541 | 12.911 | 15.672 | 17.328 |
| 0.30219E-5 | 1.7220 | 3.3869 | 5.0772 | 6.4999 | 7.6126 | 8.7890 | 9.4261 |
| 0.64757E-5 | 0.81322 | 1.5585 | 2.2465 | 2.7986 | 3.2127 | 3.6268 | 3.8179 |
| 0.12951E-4 | 0.18261 | 0.36736 | 0.53087 | 0.64978 | 0.75596 | 0.82816 | 0.87275 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.12462E-7 | -88.975 | -85.374 | -80.965 | -75.962 | -70.547 | -59.272 | -47.932 |
| 0.22432E-7 | -44.934 | -41.354 | -36.967 | -31.998 | -26.668 | -15.689 | -5.1995 |
| 0.42372E-7 | -19.742 | -16.196 | -11.881 | -6.9975 | -1.7737 | 8.6738 | 17.677 |
| 0.74775E-7 | -8.0778 | -4.5868 | -0.37383 | 4.3870 | 9.4154 | 19.056 | 26.403 |
| 0.13708E-6 | -1.7541 | 1.6307 | 5.6738 | 10.196 | 14.826 | 23.107 | 28.628 |
| 0.24925E-6 | 1.0926 | 4.3203 | 8.0576 | 12.198 | 16.211 | 22.497 | 26.574 |
| 0.49850E-6 | 2.2157 | 5.0824 | 8.3314 | 11.665 | 14.638 | 18.630 | 21.221 |
| 0.74775E-6 | 2.2964 | 4.8658 | 7.7155 | 10.395 | 12.765 | 15.525 | 17.182 |
| 0.17447E-5 | 1.7080 | 3.3729 | 5.0632 | 6.4859 | 7.5986 | 8.7750 | 9.4121 |
| 0.37387E-5 | 0.81237 | 1.5577 | 2.2457 | 2.7978 | 3.2119 | 3.6260 | 3.8171 |
| 0.74775E-5 | 0.18258 | 0.36732 | 0.53083 | 0.64975 | 0.75592 | 0.82812 | 0.87271 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.68259E-8 | -172.02 | -168.42 | -164.01 | -159.01 | -153.60 | -142.32 | -130.98 |
| 0.12286E-7 | -90.413 | -86.832 | -82.445 | -77.476 | -72.146 | -61.168 | -50.678 |
| 0.23208E-7 | -43.137 | -39.591 | -35.276 | -30.392 | -25.168 | -14.721 | -5.7175 |
| 0.40955E-7 | -20.736 | -17.245 | -13.032 | -8.2711 | -3.2427 | 6.3979 | 13.745 |
| 0.75085E-7 | -8.0806 | -4.6957 | -0.65260 | 3.8704 | 8.4996 | 16.781 | 22.302 |
| 0.13651E-6 | -1.8942 | 1.3334 | 5.0708 | 9.2116 | 13.225 | 19.510 | 23.587 |
| 0.27303E-6 | 1.1312 | 3.9980 | 7.2469 | 10.580 | 13.553 | 17.545 | 20.136 |
| 0.40955E-6 | 1.7591 | 4.3286 | 7.1783 | 9.8582 | 12.228 | 14.988 | 16.644 |
| 0.95563E-6 | 1.6247 | 3.2895 | 4.9799 | 6.4026 | 7.5153 | 8.6917 | 9.3288 |
| 0.20477E-5 | 0.80393 | 1.5492 | 2.2372 | 2.7894 | 3.2034 | 3.6175 | 3.8086 |
| 0.40955E-5 | 0.18199 | 0.36673 | 0.53024 | 0.64916 | 0.75533 | 0.82753 | 0.87212 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.39409E-8 | -307.52 | -303.92 | -299.51 | -294.50 | -289.09 | -277.81 | -266.47 |
| 0.70937E-8 | -165.07 | -161.49 | -157.10 | -152.13 | -146.80 | -135.83 | -125.34 |
| 0.13399E-7 | -82.026 | -78.480 | -74.165 | -69.281 | -64.057 | -53.609 | -44.606 |
| 0.23645E-7 | -42.200 | -38.709 | -34.496 | -29.735 | -24.707 | -15.066 | -7.7191 |
| 0.43350E-7 | -19.215 | -15.831 | -11.787 | -7.2649 | -2.6357 | 5.6459 | 11.167 |
| 0.78819E-7 | -7.4988 | -4.2711 | -0.53374 | 3.6070 | 7.6204 | 13.906 | 17.983 |
| 0.15763E-6 | -1.1849 | 1.6817 | 4.9307 | 8.2645 | 11.237 | 15.229 | 17.820 |
| 0.23645E-6 | 0.47205 | 3.0414 | 5.8912 | 8.5710 | 10.940 | 13.701 | 15.357 |
| 0.55173E-6 | 1.3392 | 3.0041 | 4.6944 | 6.1171 | 7.2298 | 8.4062 | 9.0433 |
| 0.11822E-5 | 0.75863 | 1.5039 | 2.1919 | 2.7441 | 3.1581 | 3.5722 | 3.7633 |
| 0.23645E-5 | 0.17703 | 0.36177 | 0.52528 | 0.64420 | 0.75037 | 0.82257 | 0.86717 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.21585E-8 | -573.42 | -569.82 | -565.41 | -560.41 | -555.00 | -543.72 | -532.38 |
| 0.38854E-8 | -312.12 | -308.54 | -304.15 | -299.18 | -293.85 | -282.88 | -272.39 |
| 0.73391E-8 | -159.16 | -155.62 | -151.30 | -146.42 | -141.19 | -130.75 | -121.74 |
| 0.12951E-7 | -85.269 | -81.778 | -77.565 | -72.804 | -67.776 | -58.135 | -50.788 |
| 0.23744E-7 | -42.051 | -38.666 | -34.623 | -30.099 | -25.470 | -17.189 | -11.667 |
| 0.43171E-7 | -19.438 | -16.211 | -12.473 | -8.3328 | -4.3194 | 1.9660 | 6.0432 |
| 0.86342E-7 | -6.5324 | -3.6657 | -0.41681 | 2.9170 | 5.8899 | 9.8821 | 12.472 |
| 0.12951E-6 | -2.7307 | -0.16128 | 2.6884 | 5.3683 | 7.7381 | 10.498 | 12.155 |
| 0.30219E-6 | 0.42134 | 2.0861 | 3.7764 | 5.1992 | 6.3119 | 7.4883 | 8.1254 |
| 0.64757E-6 | 0.54682 | 1.2921 | 1.9801 | 2.5322 | 2.9463 | 3.3604 | 3.5515 |
| 0.12951E-5 | 0.14090 | 0.32565 | 0.48916 | 0.60807 | 0.71425 | 0.78645 | 0.83104 |

200°C 200 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.43171E-7 | -24.884 | 3.9269 | 39.194 | 79.217 | 122.53 | 212.74 | 303.45 |
| 0.77708E-7 | -0.12012 | 28.521 | 63.618 | 103.37 | 146.01 | 233.83 | 317.75 |
| 0.14678E-6 | 13.647 | 42.017 | 76.537 | 115.60 | 157.40 | 240.98 | 313.01 |
| 0.25902E-6 | 19.621 | 47.549 | 81.253 | 119.34 | 159.56 | 236.69 | 295.47 |
| 0.47488E-6 | 22.328 | 49.407 | 81.752 | 117.93 | 154.97 | 221.22 | 265.39 |
| 0.86342E-6 | 22.792 | 48.613 | 78.512 | 111.63 | 143.74 | 194.03 | 226.64 |
| 0.17268E-5 | 21.444 | 44.378 | 70.369 | 97.041 | 120.82 | 152.76 | 173.48 |
| 0.25902E-5 | 19.834 | 40.389 | 63.187 | 84.626 | 103.58 | 125.66 | 138.92 |
| 0.60439E-5 | 13.792 | 27.110 | 40.633 | 52.015 | 60.916 | 70.328 | 75.424 |
| 0.12951E-4 | 6.5063 | 12.469 | 17.973 | 22.390 | 25.702 | 29.015 | 30.544 |
| 0.25902E-4 | 1.4609 | 2.9389 | 4.2469 | 5.1983 | 6.0477 | 6.6253 | 6.9820 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.24925E-7 | -66.797 | -37.986 | -2.7190 | 37.304 | 80.624 | 170.83 | 261.54 |
| 0.44865E-7 | -22.816 | 5.8257 | 40.922 | 80.674 | 123.31 | 211.14 | 295.06 |
| 0.84745E-7 | 2.2269 | 30.596 | 65.116 | 104.18 | 145.97 | 229.56 | 301.58 |
| 0.14955E-6 | 13.654 | 41.582 | 75.286 | 113.37 | 153.60 | 230.72 | 289.50 |
| 0.27417E-6 | 19.531 | 46.610 | 78.955 | 115.14 | 152.17 | 218.42 | 262.59 |
| 0.49850E-6 | 21.605 | 47.427 | 77.326 | 110.45 | 142.56 | 192.84 | 225.46 |
| 0.99700E-6 | 21.093 | 44.027 | 70.019 | 96.690 | 120.47 | 152.41 | 173.13 |
| 0.14955E-5 | 19.687 | 40.243 | 63.041 | 84.480 | 103.43 | 125.52 | 138.77 |
| 0.34895E-5 | 13.778 | 27.096 | 40.619 | 52.001 | 60.902 | 70.314 | 75.410 |
| 0.74775E-5 | 6.5054 | 12.468 | 17.972 | 22.389 | 25.701 | 29.014 | 30.543 |
| 0.14955E-4 | 1.4609 | 2.9388 | 4.2469 | 5.1982 | 6.0476 | 6.6252 | 6.9820 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.13651E-7 | -149.85 | -121.03 | -85.771 | -45.747 | -2.4282 | 87.778 | 178.49 |
| 0.24573E-7 | -68.294 | -39.652 | -4.5557 | 35.196 | 77.836 | 165.66 | 249.58 |
| 0.46416E-7 | -21.168 | 7.2017 | 41.721 | 80.793 | 122.58 | 206.16 | 278.19 |
| 0.81911E-7 | 0.99580 | 28.924 | 62.628 | 100.71 | 140.94 | 218.06 | 276.84 |
| 0.15017E-6 | 13.205 | 40.284 | 72.629 | 108.81 | 145.84 | 212.10 | 256.26 |
| 0.27303E-6 | 18.618 | 44.440 | 74.339 | 107.46 | 139.57 | 189.85 | 222.47 |
| 0.54607E-6 | 20.009 | 42.943 | 68.934 | 95.605 | 119.38 | 151.32 | 172.05 |
| 0.81911E-6 | 19.150 | 39.706 | 62.504 | 83.942 | 102.90 | 124.98 | 138.23 |
| 0.19112E-5 | 13.694 | 27.013 | 40.535 | 51.917 | 60.819 | 70.230 | 75.327 |
| 0.40955E-5 | 6.4970 | 12.459 | 17.963 | 22.380 | 25.693 | 29.006 | 30.535 |
| 0.81911E-5 | 1.4603 | 2.9382 | 4.2463 | 5.1976 | 6.0470 | 6.6246 | 6.9814 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.78819E-8 | -285.34 | -256.53 | -221.26 | -181.24 | -137.92 | -47.715 | 43.000 |
| 0.14187E-7 | -142.95 | -114.31 | -79.217 | -39.465 | 3.1740 | 91.002 | 174.92 |
| 0.26798E-7 | -60.056 | -31.686 | 2.8328 | 41.905 | 83.695 | 167.27 | 239.30 |
| 0.47291E-7 | -20.468 | 7.4596 | 41.163 | 79.250 | 119.47 | 196.60 | 255.38 |
| 0.86701E-7 | 2.0699 | 29.148 | 61.493 | 97.678 | 134.71 | 200.96 | 245.13 |
| 0.15763E-6 | 13.014 | 38.835 | 68.734 | 101.86 | 133.96 | 184.25 | 216.87 |
| 0.31527E-6 | 17.692 | 40.626 | 66.618 | 93.289 | 117.07 | 149.01 | 169.73 |
| 0.47291E-6 | 17.863 | 38.419 | 61.216 | 82.655 | 101.61 | 123.69 | 136.94 |
| 0.11034E-5 | 13.409 | 26.727 | 40.250 | 51.632 | 60.533 | 69.945 | 75.041 |
| 0.23645E-5 | 6.4517 | 12.414 | 17.918 | 22.335 | 25.648 | 28.960 | 30.489 |
| 0.47291E-5 | 1.4553 | 2.9333 | 4.2414 | 5.1927 | 6.0421 | 6.6197 | 6.9764 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.43171E-8 | -551.25 | -522.44 | -487.17 | -447.14 | -403.82 | -313.62 | -222.90 |
| 0.77708E-8 | -290.00 | -261.36 | -226.26 | -186.51 | -143.87 | -56.048 | 27.872 |
| 0.14678E-7 | -137.19 | -108.82 | -74.307 | -35.235 | 6.5551 | 90.136 | 162.16 |
| 0.25902E-7 | -63.537 | -35.609 | -1.9053 | 36.181 | 76.409 | 153.53 | 212.31 |
| 0.47488E-7 | -20.765 | 6.3138 | 38.658 | 74.843 | 111.87 | 178.13 | 222.29 |
| 0.86342E-7 | 1.0742 | 26.895 | 56.794 | 89.921 | 122.02 | 172.31 | 204.93 |
| 0.17268E-6 | 12.345 | 35.279 | 61.270 | 87.942 | 111.72 | 143.66 | 164.38 |
| 0.25902E-6 | 14.660 | 35.216 | 58.014 | 79.452 | 98.411 | 120.49 | 133.74 |
| 0.60439E-6 | 12.491 | 25.809 | 39.332 | 50.714 | 59.616 | 69.027 | 74.123 |
| 0.12951E-5 | 6.2399 | 12.202 | 17.706 | 22.123 | 25.436 | 28.749 | 30.277 |
| 0.25902E-5 | 1.4192 | 2.8972 | 4.2052 | 5.1566 | 6.0060 | 6.5836 | 6.9403 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.21585E-7 | -101.28 | -94.086 | -85.269 | -75.263 | -64.434 | -41.882 | -19.203 |
| 0.38854E-7 | -50.219 | -43.058 | -34.284 | -24.346 | -13.686 | 8.2706 | 29.250 |
| 0.73391E-7 | -20.914 | -13.821 | -5.1917 | 4.5763 | 15.023 | 35.919 | 53.926 |
| 0.12951E-6 | -7.2760 | -0.29398 | 8.1320 | 17.653 | 27.710 | 46.992 | 61.686 |
| 0.23744E-6 | 0.16272 | 6.9324 | 15.018 | 24.064 | 33.323 | 49.886 | 60.928 |
| 0.43171E-6 | 3.5135 | 9.9689 | 17.443 | 25.725 | 33.752 | 46.323 | 54.477 |
| 0.86342E-6 | 4.7422 | 10.475 | 16.973 | 23.641 | 29.587 | 37.571 | 42.752 |
| 0.12951E-5 | 4.7025 | 9.8413 | 15.540 | 20.900 | 25.640 | 31.161 | 34.473 |
| 0.30219E-5 | 3.4226 | 6.7523 | 10.132 | 12.978 | 15.203 | 17.556 | 18.830 |
| 0.64757E-5 | 1.6249 | 3.1156 | 4.4916 | 5.5958 | 6.4240 | 7.2522 | 7.6344 |
| 0.12951E-4 | 0.36516 | 0.73465 | 1.0616 | 1.2995 | 1.5118 | 1.6562 | 1.7454 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.12462E-7 | -186.47 | -179.27 | -170.45 | -160.45 | -149.62 | -127.06 | -104.39 |
| 0.22432E-7 | -96.939 | -89.778 | -81.004 | -71.066 | -60.406 | -38.449 | -17.469 |
| 0.42372E-7 | -45.022 | -37.929 | -29.299 | -19.531 | -9.0839 | 11.811 | 29.818 |
| 0.74775E-7 | -20.384 | -13.402 | -4.9759 | 4.5458 | 14.602 | 33.884 | 48.578 |
| 0.13708E-6 | -6.4485 | 0.32115 | 8.4074 | 17.453 | 26.712 | 43.275 | 54.317 |
| 0.24925E-6 | 0.34371 | 6.7991 | 14.273 | 22.555 | 30.582 | 43.153 | 51.307 |
| 0.49850E-6 | 3.5558 | 9.2893 | 15.787 | 22.455 | 28.400 | 36.385 | 41.566 |
| 0.74775E-6 | 4.0992 | 9.2381 | 14.937 | 20.297 | 25.036 | 30.558 | 33.870 |
| 0.17447E-5 | 3.3216 | 6.6513 | 10.031 | 12.877 | 15.102 | 17.455 | 18.729 |
| 0.37387E-5 | 1.6137 | 3.1044 | 4.4804 | 5.5847 | 6.4128 | 7.2410 | 7.6232 |
| 0.74775E-5 | 0.36431 | 0.73380 | 1.0608 | 1.2986 | 1.5110 | 1.6554 | 1.7445 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.68259E-8 | -354.09 | -346.88 | -338.07 | -328.06 | -317.23 | -294.68 | -272.00 |
| 0.12286E-7 | -189.38 | -182.22 | -173.45 | -163.51 | -152.85 | -130.89 | -109.91 |
| 0.23208E-7 | -93.262 | -86.170 | -77.540 | -67.772 | -57.324 | -36.429 | -18.422 |
| 0.40955E-7 | -47.089 | -40.107 | -31.680 | -22.159 | -12.102 | 7.1790 | 21.873 |
| 0.75085E-7 | -20.380 | -13.610 | -5.5242 | 3.5218 | 12.780 | 29.343 | 40.385 |
| 0.13651E-6 | -6.7370 | -0.28162 | 7.1930 | 15.474 | 23.501 | 36.072 | 44.226 |
| 0.27303E-6 | 0.56902 | 6.3024 | 12.800 | 19.468 | 25.413 | 33.398 | 38.579 |
| 0.40955E-6 | 2.4077 | 7.5465 | 13.246 | 18.605 | 23.345 | 28.866 | 32.179 |
| 0.95563E-6 | 2.9217 | 6.2513 | 9.6320 | 12.477 | 14.702 | 17.055 | 18.329 |
| 0.20477E-5 | 1.5442 | 3.0349 | 4.4109 | 5.5151 | 6.3433 | 7.1715 | 7.5537 |
| 0.40955E-5 | 0.35587 | 0.72536 | 1.0523 | 1.2902 | 1.5025 | 1.6469 | 1.7361 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.39409E-8 | -626.46 | -619.26 | -610.44 | -600.44 | -589.61 | -567.06 | -544.38 |
| 0.70937E-8 | -340.08 | -332.92 | -324.15 | -314.21 | -303.55 | -281.59 | -260.61 |
| 0.13399E-7 | -172.39 | -165.30 | -156.67 | -146.90 | -136.45 | -115.56 | -97.556 |
| 0.23645E-7 | -91.342 | -84.360 | -75.934 | -66.412 | -56.355 | -37.074 | -22.379 |
| 0.43350E-7 | -43.914 | -37.144 | -29.058 | -20.012 | -10.753 | 5.8093 | 16.851 |
| 0.78819E-7 | -19.108 | -12.653 | -5.1786 | 3.1029 | 11.129 | 23.700 | 31.855 |
| 0.15763E-6 | -5.0355 | 0.69788 | 7.1957 | 13.863 | 19.809 | 27.793 | 32.975 |
| 0.23645E-6 | -0.98547 | 4.1533 | 9.8528 | 15.212 | 19.952 | 25.473 | 28.785 |
| 0.55173E-6 | 1.9115 | 5.2412 | 8.6218 | 11.467 | 13.692 | 16.045 | 17.319 |
| 0.11822E-5 | 1.2972 | 2.7879 | 4.1639 | 5.2681 | 6.0963 | 6.9244 | 7.3067 |
| 0.23645E-5 | 0.31057 | 0.68006 | 1.0070 | 1.2449 | 1.4572 | 1.6016 | 1.6908 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.21585E-8 | -1159.8 | -1152.6 | -1143.7 | -1133.7 | -1122.9 | -1100.4 | -1077.7 |
| 0.38854E-8 | -635.71 | -628.55 | -619.77 | -609.83 | -599.17 | -577.22 | -556.24 |
| 0.73391E-8 | -328.18 | -321.09 | -312.46 | -302.69 | -292.24 | -271.35 | -253.34 |
| 0.12951E-7 | -178.96 | -171.98 | -163.56 | -154.03 | -143.98 | -124.70 | -110.00 |
| 0.23744E-7 | -91.033 | -84.263 | -76.177 | -67.131 | -57.872 | -41.309 | -30.267 |
| 0.43171E-7 | -44.369 | -37.914 | -30.439 | -22.158 | -14.131 | -1.5601 | 6.5941 |
| 0.86342E-7 | -16.975 | -11.242 | -4.7441 | 1.9236 | 7.8694 | 15.853 | 21.035 |
| 0.12951E-6 | -8.5161 | -3.3773 | 2.3221 | 7.6818 | 12.421 | 17.942 | 21.255 |
| 0.30219E-6 | -0.69321 | 2.6364 | 6.0170 | 8.8625 | 11.087 | 13.440 | 14.714 |
| 0.64757E-6 | 0.48032 | 1.9710 | 3.3470 | 4.4512 | 5.2794 | 6.1075 | 6.4898 |
| 0.12951E-5 | 0.98761E-1 | 0.46825 | 0.79526 | 1.0331 | 1.2454 | 1.3898 | 1.4790 |

200°C 400 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.43171E-7 | -56.933 | 0.68941 | 71.223 | 151.27 | 237.90 | 418.32 | 599.75 |
| 0.77708E-7 | -5.9822 | 51.301 | 121.49 | 200.99 | 286.27 | 461.93 | 629.77 |
| 0.14678E-6 | 23.025 | 79.765 | 148.80 | 226.94 | 310.53 | 477.69 | 621.75 |
| 0.25902E-6 | 36.187 | 92.044 | 159.45 | 235.62 | 316.08 | 470.33 | 587.89 |
| 0.47488E-6 | 42.734 | 96.892 | 161.58 | 233.95 | 308.01 | 440.52 | 528.86 |
| 0.86342E-6 | 44.539 | 96.183 | 155.98 | 222.23 | 286.44 | 387.01 | 452.25 |
| 0.17268E-5 | 42.498 | 88.365 | 140.34 | 193.69 | 241.25 | 305.13 | 346.58 |
| 0.25902E-5 | 39.485 | 80.596 | 126.19 | 169.06 | 206.98 | 251.15 | 277.65 |
| 0.60439E-5 | 27.562 | 54.199 | 81.244 | 104.00 | 121.81 | 140.63 | 150.82 |
| 0.12951E-4 | 13.011 | 24.936 | 35.944 | 44.778 | 51.404 | 58.029 | 61.087 |
| 0.25902E-4 | 2.9218 | 5.8777 | 8.4939 | 10.396 | 12.095 | 13.250 | 13.964 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.24925E-7 | -142.12 | -84.497 | -13.963 | 66.084 | 152.72 | 333.13 | 514.56 |
| 0.44865E-7 | -52.702 | 4.5811 | 74.775 | 154.27 | 239.55 | 415.21 | 583.05 |
| 0.84745E-7 | -1.0825 | 55.657 | 124.69 | 202.84 | 286.42 | 453.58 | 597.64 |
| 0.14955E-6 | 23.079 | 78.936 | 146.34 | 222.51 | 302.97 | 457.22 | 574.78 |
| 0.27417E-6 | 36.123 | 90.281 | 154.97 | 227.34 | 301.40 | 433.91 | 522.25 |
| 0.49850E-6 | 41.369 | 93.013 | 152.81 | 219.06 | 283.27 | 383.84 | 449.08 |
| 0.99700E-6 | 41.311 | 87.179 | 139.16 | 192.50 | 240.07 | 303.94 | 345.39 |
| 0.14955E-5 | 38.882 | 79.993 | 125.58 | 168.46 | 206.38 | 250.55 | 277.05 |
| 0.34895E-5 | 27.461 | 54.098 | 81.143 | 103.90 | 121.71 | 140.53 | 150.72 |
| 0.74775E-5 | 12.999 | 24.925 | 35.933 | 44.767 | 51.392 | 58.018 | 61.076 |
| 0.14955E-4 | 2.9210 | 5.8769 | 8.4930 | 10.395 | 12.094 | 13.249 | 13.963 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.13651E-7 | -309.73 | -252.11 | -181.57 | -101.53 | -14.892 | 165.52 | 346.95 |
| 0.24573E-7 | -145.14 | -87.866 | -17.671 | 61.831 | 147.11 | 322.76 | 490.60 |
| 0.46416E-7 | -49.323 | 7.4165 | 76.455 | 154.60 | 238.18 | 405.34 | 549.40 |
| 0.81911E-7 | -3.6253 | 52.231 | 119.63 | 195.81 | 276.26 | 430.52 | 548.07 |
| 0.15017E-6 | 22.191 | 76.349 | 141.03 | 213.40 | 287.47 | 419.98 | 508.32 |
| 0.27303E-6 | 34.288 | 85.932 | 145.73 | 211.98 | 276.19 | 376.76 | 442.00 |
| 0.54607E-6 | 38.324 | 84.192 | 136.17 | 189.51 | 237.08 | 300.95 | 342.41 |
| 0.81911E-6 | 37.190 | 78.301 | 123.89 | 166.77 | 204.69 | 248.86 | 275.36 |
| 0.19112E-5 | 27.061 | 53.698 | 80.743 | 103.50 | 121.31 | 140.13 | 150.32 |
| 0.40955E-5 | 12.930 | 24.856 | 35.864 | 44.698 | 51.323 | 57.948 | 61.006 |
| 0.81911E-5 | 2.9125 | 5.8684 | 8.4846 | 10.387 | 12.086 | 13.241 | 13.954 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.78819E-8 | -582.11 | -524.48 | -453.95 | -373.90 | -287.26 | -106.85 | 74.576 |
| 0.14187E-7 | -295.85 | -238.56 | -168.37 | -88.870 | -3.5906 | 172.06 | 339.90 |
| 0.26798E-7 | -128.45 | -71.717 | -2.6786 | 75.466 | 159.04 | 326.20 | 470.26 |
| 0.47291E-7 | -47.878 | 7.9780 | 75.386 | 151.56 | 232.01 | 386.26 | 503.82 |
| 0.86701E-7 | -1.3425 | 52.815 | 117.50 | 189.87 | 263.94 | 396.44 | 484.78 |
| 0.15763E-6 | 21.917 | 73.560 | 133.35 | 199.61 | 263.82 | 364.39 | 429.62 |
| 0.31527E-6 | 32.720 | 78.587 | 130.57 | 183.91 | 231.47 | 295.35 | 336.80 |
| 0.47291E-6 | 33.797 | 74.908 | 120.50 | 163.38 | 201.29 | 245.46 | 271.96 |
| 0.11034E-5 | 26.051 | 52.688 | 79.733 | 102.49 | 120.30 | 139.12 | 149.31 |
| 0.23645E-5 | 12.683 | 24.609 | 35.617 | 44.450 | 51.076 | 57.701 | 60.759 |
| 0.47291E-5 | 2.8672 | 5.8231 | 8.4393 | 10.341 | 12.040 | 13.195 | 13.909 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.43171E-8 | -1115.4 | -1057.8 | -987.29 | -907.24 | -820.61 | -640.19 | -458.76 |
| 0.77708E-8 | -591.47 | -534.19 | -463.99 | -384.49 | -299.21 | -123.55 | 44.283 |
| 0.14678E-7 | -284.24 | -227.50 | -158.46 | -80.323 | 3.2570 | 170.41 | 314.47 |
| 0.25902E-7 | -135.50 | -79.648 | -12.239 | 63.934 | 144.38 | 298.64 | 416.19 |
| 0.47488E-7 | -48.461 | 5.6965 | 70.386 | 142.75 | 216.82 | 349.32 | 437.66 |
| 0.86342E-7 | -3.3438 | 48.299 | 108.09 | 174.35 | 238.56 | 339.13 | 404.36 |
| 0.17268E-6 | 20.780 | 66.647 | 118.63 | 171.97 | 219.53 | 283.41 | 324.86 |
| 0.25902E-6 | 26.266 | 67.377 | 112.97 | 155.85 | 193.76 | 237.93 | 264.43 |
| 0.60439E-6 | 23.446 | 50.083 | 77.128 | 99.892 | 117.69 | 136.51 | 146.71 |
| 0.12951E-5 | 11.866 | 23.792 | 34.800 | 43.634 | 50.259 | 56.884 | 59.942 |
| 0.25902E-5 | 2.6554 | 5.6113 | 8.2275 | 10.130 | 11.828 | 12.984 | 13.697 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.21585E-7 | -211.46 | -197.05 | -179.42 | -159.41 | -137.75 | -92.649 | -47.291 |
| 0.38854E-7 | -107.86 | -93.540 | -75.992 | -56.116 | -34.796 | 9.1176 | 51.077 |
| 0.73391E-7 | -47.706 | -33.521 | -16.261 | 3.2743 | 24.169 | 65.960 | 101.97 |
| 0.12951E-6 | -19.104 | -5.1401 | 11.711 | 30.755 | 50.869 | 89.432 | 118.82 |
| 0.23744E-6 | -2.9073 | 10.632 | 26.804 | 44.896 | 63.413 | 96.540 | 118.62 |
| 0.43171E-6 | 4.9406 | 17.851 | 32.801 | 49.364 | 65.417 | 90.560 | 106.86 |
| 0.86342E-6 | 8.4400 | 19.906 | 32.902 | 46.238 | 58.129 | 74.098 | 84.461 |
| 0.12951E-5 | 8.7917 | 19.069 | 30.468 | 41.187 | 50.667 | 61.709 | 68.334 |
| 0.30219E-5 | 6.7138 | 13.373 | 20.134 | 25.825 | 30.276 | 34.981 | 37.530 |
| 0.64757E-5 | 3.2324 | 6.2138 | 8.9659 | 11.174 | 12.830 | 14.487 | 15.251 |
| 0.12951E-4 | 0.72881 | 1.4677 | 2.1218 | 2.5974 | 3.0221 | 3.3109 | 3.4893 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.12462E-7 | -383.21 | -368.81 | -351.17 | -331.16 | -309.50 | -264.40 | -219.04 |
| 0.22432E-7 | -202.66 | -188.34 | -170.79 | -150.92 | -129.60 | -85.687 | -43.726 |
| 0.42372E-7 | -97.254 | -83.069 | -65.809 | -46.273 | -25.378 | 16.412 | 52.426 |
| 0.74775E-7 | -46.601 | -32.637 | -15.785 | 3.2579 | 23.371 | 61.934 | 91.323 |
| 0.13708E-6 | -17.320 | -3.7812 | 12.391 | 30.483 | 49.000 | 82.127 | 104.21 |
| 0.24925E-6 | -2.4456 | 10.465 | 25.414 | 41.977 | 58.031 | 83.173 | 99.482 |
| 0.49850E-6 | 5.2702 | 16.737 | 29.732 | 43.068 | 54.960 | 70.928 | 81.291 |
| 0.74775E-6 | 6.9679 | 17.245 | 28.644 | 39.364 | 48.843 | 59.885 | 66.510 |
| 0.17447E-5 | 6.2594 | 12.918 | 19.679 | 25.370 | 29.821 | 34.527 | 37.075 |
| 0.37387E-5 | 3.1475 | 6.1289 | 8.8810 | 11.089 | 12.745 | 14.402 | 15.166 |
| 0.74775E-5 | 0.71764 | 1.4566 | 2.1106 | 2.5863 | 3.0110 | 3.2998 | 3.4781 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.68259E-8 | -719.97 | -705.56 | -687.93 | -667.92 | -646.26 | -601.15 | -555.80 |
| 0.12286E-7 | -389.07 | -374.75 | -357.20 | -337.32 | -316.00 | -272.09 | -230.13 |
| 0.23208E-7 | -195.22 | -181.04 | -163.78 | -144.24 | -123.35 | -81.562 | -45.547 |
| 0.40955E-7 | -101.47 | -87.508 | -70.656 | -51.612 | -31.498 | 7.0640 | 36.453 |
| 0.75085E-7 | -46.584 | -33.044 | -16.872 | 1.2199 | 19.736 | 52.863 | 74.947 |
| 0.13651E-6 | -17.907 | -4.9961 | 9.9532 | 26.516 | 42.570 | 67.712 | 84.020 |
| 0.27303E-6 | -1.8105 | 9.6563 | 22.652 | 35.987 | 47.879 | 63.848 | 74.210 |
| 0.40955E-6 | 2.6360 | 12.913 | 24.312 | 35.032 | 44.511 | 55.553 | 62.179 |
| 0.95563E-6 | 4.9199 | 11.579 | 18.340 | 24.031 | 28.482 | 33.187 | 35.736 |
| 0.20477E-5 | 2.7990 | 5.7804 | 8.5325 | 10.740 | 12.397 | 14.053 | 14.818 |
| 0.40955E-5 | 0.64813 | 1.3871 | 2.0411 | 2.5168 | 2.9415 | 3.2303 | 3.4086 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.39409E-8 | -1266.1 | -1251.7 | -1234.0 | -1214.0 | -1192.4 | -1147.3 | -1101.9 |
| 0.70937E-8 | -691.87 | -677.54 | -660.00 | -640.12 | -618.80 | -574.89 | -532.93 |
| 0.13399E-7 | -354.87 | -340.69 | -323.43 | -303.89 | -283.00 | -241.21 | -205.19 |
| 0.23645E-7 | -191.34 | -177.37 | -160.52 | -141.48 | -121.36 | -82.804 | -53.415 |
| 0.43350E-7 | -94.983 | -81.444 | -65.271 | -47.179 | -28.662 | 4.4643 | 26.548 |
| 0.78819E-7 | -43.925 | -31.015 | -16.065 | 0.49773 | 16.551 | 41.693 | 58.002 |
| 0.15763E-6 | -14.182 | -2.7153 | 10.280 | 23.616 | 35.507 | 51.476 | 61.839 |
| 0.23645E-6 | -5.2123 | 5.0654 | 16.464 | 27.183 | 36.663 | 47.705 | 54.330 |
| 0.55173E-6 | 2.1459 | 8.8052 | 15.566 | 21.257 | 25.708 | 30.413 | 32.962 |
| 0.11822E-5 | 1.8962 | 4.8776 | 7.6297 | 9.8381 | 11.494 | 13.150 | 13.915 |
| 0.23645E-5 | 0.40110 | 1.1400 | 1.7941 | 2.2697 | 2.6944 | 2.9832 | 3.1616 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.21585E-8 | -2334.3 | -2319.9 | -2302.2 | -2282.2 | -2260.6 | -2215.5 | -2170.1 |
| 0.38854E-8 | -1284.6 | -1270.3 | -1252.7 | -1232.8 | -1211.5 | -1167.6 | -1125.7 |
| 0.73391E-8 | -667.97 | -653.79 | -636.53 | -616.99 | -596.10 | -554.31 | -518.29 |
| 0.12951E-7 | -368.10 | -354.14 | -337.28 | -318.24 | -298.13 | -259.56 | -230.18 |
| 0.23744E-7 | -190.71 | -177.17 | -161.00 | -142.90 | -124.39 | -91.264 | -69.180 |
| 0.43171E-7 | -95.904 | -82.993 | -68.044 | -51.480 | -35.427 | -10.284 | 6.0236 |
| 0.86342E-7 | -39.443 | -27.976 | -14.980 | -1.6450 | 10.246 | 26.215 | 36.577 |
| 0.12951E-6 | -21.584 | -11.306 | 0.92159E-1 | 10.811 | 20.290 | 31.333 | 37.958 |
| 0.30219E-6 | -4.1343 | 2.5249 | 9.2862 | 14.977 | 19.428 | 24.133 | 26.681 |
| 0.64757E-6 | -0.47242 | 2.5089 | 5.2610 | 7.4694 | 9.1257 | 10.782 | 11.546 |
| 0.12951E-5 | -0.41579 | 0.32318 | 0.97722 | 1.4528 | 1.8775 | 2.1663 | 2.3447 |

200°C 800 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.43171E-7 | -122.75 | -7.5057 | 133.56 | 293.65 | 466.93 | 827.76 | 1190.6 |
| 0.77708E-7 | -19.388 | 95.178 | 235.56 | 394.57 | 565.13 | 916.44 | 1252.1 |
| 0.14678E-6 | 40.172 | 153.65 | 291.73 | 448.02 | 615.18 | 949.50 | 1237.6 |
| 0.25902E-6 | 67.823 | 179.53 | 314.35 | 466.70 | 627.61 | 936.11 | 1171.2 |
| 0.47488E-6 | 82.236 | 190.55 | 319.93 | 464.67 | 612.80 | 877.81 | 1054.4 |
| 0.86342E-6 | 86.992 | 190.27 | 309.87 | 442.38 | 570.81 | 771.94 | 902.41 |
| 0.17268E-5 | 83.951 | 175.68 | 279.65 | 386.33 | 481.47 | 609.22 | 692.12 |
| 0.25902E-5 | 78.357 | 160.57 | 251.77 | 337.52 | 413.36 | 501.69 | 554.70 |
| 0.60439E-5 | 54.993 | 108.26 | 162.35 | 207.88 | 243.49 | 281.13 | 301.52 |
| 0.12951E-4 | 26.004 | 49.856 | 71.872 | 89.540 | 102.79 | 116.04 | 122.15 |
| 0.25902E-4 | 5.8422 | 11.754 | 16.986 | 20.791 | 24.189 | 26.499 | 27.926 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.24925E-7 | -294.50 | -179.26 | -38.191 | 121.90 | 295.18 | 656.00 | 1018.8 |
| 0.44865E-7 | -114.19 | 0.37403 | 140.76 | 299.77 | 470.33 | 821.64 | 1157.3 |
| 0.84745E-7 | -9.3756 | 104.10 | 242.18 | 398.47 | 565.63 | 899.95 | 1188.0 |
| 0.14955E-6 | 40.325 | 152.03 | 286.85 | 439.20 | 600.11 | 908.61 | 1143.7 |
| 0.27417E-6 | 67.823 | 176.13 | 305.51 | 450.25 | 598.39 | 863.40 | 1040.0 |
| 0.49850E-6 | 79.606 | 182.89 | 302.48 | 434.99 | 563.42 | 764.56 | 895.03 |
| 0.99700E-6 | 80.781 | 172.51 | 276.48 | 383.16 | 478.30 | 606.05 | 688.95 |
| 0.14955E-5 | 76.533 | 158.75 | 249.94 | 335.70 | 411.53 | 499.87 | 552.87 |
| 0.34895E-5 | 54.539 | 107.81 | 161.90 | 207.43 | 243.03 | 280.68 | 301.06 |
| 0.74775E-5 | 25.919 | 49.771 | 71.787 | 89.455 | 102.70 | 115.95 | 122.07 |
| 0.14955E-4 | 5.8310 | 11.742 | 16.975 | 20.780 | 24.178 | 26.488 | 27.915 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.13651E-7 | -631.26 | -516.01 | -374.94 | -214.85 | -41.573 | 319.25 | 682.11 |
| 0.24573E-7 | -300.60 | -186.03 | -45.645 | 113.36 | 283.92 | 635.23 | 970.91 |
| 0.46416E-7 | -107.34 | 6.1299 | 144.20 | 300.49 | 467.65 | 801.98 | 1090.1 |
| 0.81911E-7 | -14.544 | 97.168 | 231.98 | 384.33 | 545.24 | 853.74 | 1088.8 |
| 0.15017E-6 | 38.559 | 146.87 | 276.25 | 420.99 | 569.12 | 834.14 | 1010.8 |
| 0.27303E-6 | 64.145 | 167.43 | 287.02 | 419.53 | 547.96 | 749.10 | 879.56 |
| 0.54607E-6 | 73.701 | 165.43 | 269.40 | 376.08 | 471.22 | 598.97 | 681.87 |
| 0.81911E-6 | 72.201 | 154.42 | 245.61 | 331.37 | 407.20 | 495.54 | 548.54 |
| 0.19112E-5 | 53.199 | 106.47 | 160.56 | 206.09 | 241.69 | 279.34 | 299.72 |
| 0.40955E-5 | 25.571 | 49.422 | 71.439 | 89.106 | 102.35 | 115.60 | 121.72 |
| 0.81911E-5 | 5.7615 | 11.673 | 16.905 | 20.710 | 24.108 | 26.418 | 27.845 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.78819E-8 | -1177.4 | -1062.1 | -921.09 | -760.99 | -587.72 | -226.89 | 135.96 |
| 0.14187E-7 | -603.39 | -488.82 | -348.44 | -189.43 | -18.873 | 332.43 | 668.12 |
| 0.26798E-7 | -266.99 | -153.51 | -15.440 | 140.84 | 308.01 | 642.33 | 930.45 |
| 0.47291E-7 | -104.41 | 7.2994 | 142.11 | 294.46 | 455.37 | 763.87 | 998.99 |
| 0.86701E-7 | -9.8395 | 98.475 | 227.85 | 372.59 | 520.72 | 785.74 | 962.41 |
| 0.15763E-6 | 38.126 | 141.41 | 261.00 | 393.51 | 521.94 | 723.08 | 853.55 |
| 0.31527E-6 | 61.329 | 153.06 | 257.03 | 363.71 | 458.84 | 586.59 | 669.49 |
| 0.47291E-6 | 64.353 | 146.57 | 237.76 | 323.52 | 399.35 | 487.69 | 540.69 |
| 0.11034E-5 | 50.425 | 103.70 | 157.78 | 203.31 | 238.92 | 276.57 | 296.95 |
| 0.23645E-5 | 24.668 | 48.519 | 70.536 | 88.203 | 101.45 | 114.70 | 120.82 |
| 0.47291E-5 | 5.5144 | 11.426 | 16.658 | 20.463 | 23.861 | 26.171 | 27.598 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.43171E-8 | -2245.6 | -2130.3 | -1989.3 | -1829.2 | -1655.9 | -1295.1 | -932.24 |
| 0.77708E-8 | -1196.1 | -1081.6 | -941.21 | -782.20 | -611.64 | -260.33 | 75.346 |
| 0.14678E-7 | -580.10 | -466.62 | -328.54 | -172.25 | -5.0903 | 329.23 | 617.34 |
| 0.25902E-7 | -281.17 | -169.46 | -34.648 | 117.70 | 278.61 | 587.11 | 822.22 |
| 0.47488E-7 | -105.56 | 2.7468 | 132.12 | 276.86 | 425.00 | 690.01 | 866.68 |
| 0.86342E-7 | -13.852 | 89.434 | 209.03 | 341.53 | 469.96 | 671.10 | 801.57 |
| 0.17268E-6 | 36.068 | 127.80 | 231.77 | 338.45 | 433.58 | 561.33 | 644.23 |
| 0.25902E-6 | 47.981 | 130.20 | 221.39 | 307.15 | 382.98 | 471.32 | 524.32 |
| 0.60439E-6 | 44.145 | 97.419 | 151.50 | 197.03 | 232.64 | 270.28 | 290.67 |
| 0.12951E-5 | 22.299 | 46.151 | 68.167 | 85.835 | 99.085 | 112.33 | 118.45 |
| 0.25902E-5 | 4.6975 | 10.609 | 15.841 | 19.647 | 23.044 | 25.355 | 26.781 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.21585E-7 | -433.55 | -404.74 | -369.47 | -329.45 | -286.13 | -195.92 | -105.21 |
| 0.38854E-7 | -224.87 | -196.23 | -161.13 | -121.38 | -78.741 | 9.0866 | 93.007 |
| 0.73391E-7 | -102.97 | -74.608 | -40.088 | -1.0159 | 40.774 | 124.35 | 196.38 |
| 0.12951E-6 | -44.386 | -16.458 | 17.245 | 55.332 | 95.560 | 172.68 | 231.46 |
| 0.23744E-6 | -10.565 | 16.513 | 48.858 | 85.042 | 122.07 | 188.33 | 232.49 |
| 0.43171E-6 | 6.4498 | 32.271 | 62.170 | 95.297 | 127.40 | 177.68 | 210.30 |
| 0.86342E-6 | 14.793 | 37.727 | 63.719 | 90.390 | 114.17 | 146.11 | 166.83 |
| 0.12951E-5 | 16.150 | 36.705 | 59.503 | 80.942 | 99.901 | 121.98 | 135.23 |
| 0.30219E-5 | 12.941 | 26.260 | 39.782 | 51.164 | 60.066 | 69.478 | 74.574 |
| 0.64757E-5 | 6.3523 | 12.315 | 17.819 | 22.236 | 25.548 | 28.861 | 30.390 |
| 0.12951E-4 | 1.4402 | 2.9181 | 4.2262 | 5.1775 | 6.0269 | 6.6045 | 6.9613 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.12462E-7 | -778.45 | -749.64 | -714.37 | -674.35 | -631.03 | -540.82 | -450.11 |
| 0.22432E-7 | -415.86 | -387.22 | -352.12 | -312.37 | -269.73 | -181.90 | -97.984 |
| 0.42372E-7 | -203.44 | -175.07 | -140.55 | -101.47 | -59.688 | 23.892 | 95.922 |
| 0.74775E-7 | -100.72 | -72.794 | -39.089 | -1.0027 | 39.224 | 116.35 | 175.12 |
| 0.13708E-6 | -40.683 | -13.604 | 18.740 | 54.925 | 91.959 | 158.21 | 202.38 |
| 0.24925E-6 | -9.5310 | 16.290 | 46.189 | 79.316 | 111.42 | 161.70 | 194.32 |
| 0.49850E-6 | 7.4074 | 30.341 | 56.332 | 83.004 | 106.78 | 138.72 | 159.45 |
| 0.74775E-6 | 11.591 | 32.147 | 54.944 | 76.383 | 95.342 | 117.42 | 130.67 |
| 0.17447E-5 | 11.486 | 24.805 | 38.328 | 49.709 | 58.611 | 68.023 | 73.119 |
| 0.37387E-5 | 5.9542 | 11.917 | 17.421 | 21.838 | 25.150 | 28.463 | 29.992 |
| 0.74775E-5 | 1.3553 | 2.8332 | 4.1413 | 5.0926 | 5.9420 | 6.5196 | 6.8764 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.68259E-8 | -1453.4 | -1424.6 | -1389.4 | -1349.3 | -1306.0 | -1215.8 | -1125.1 |
| 0.12286E-7 | -790.20 | -761.56 | -726.46 | -686.71 | -644.07 | -556.24 | -472.32 |
| 0.23208E-7 | -400.90 | -372.53 | -338.01 | -298.94 | -257.15 | -173.57 | -101.54 |
| 0.40955E-7 | -211.96 | -184.03 | -150.32 | -112.24 | -72.013 | 5.1116 | 63.890 |
| 0.75085E-7 | -100.67 | -73.598 | -41.252 | -5.0685 | 31.965 | 98.218 | 142.38 |
| 0.13651E-6 | -41.865 | -16.044 | 13.854 | 46.981 | 79.088 | 129.37 | 161.99 |
| 0.27303E-6 | -8.0539 | 14.879 | 40.871 | 67.542 | 91.325 | 123.26 | 143.98 |
| 0.40955E-6 | 1.7292 | 22.284 | 45.082 | 66.521 | 85.480 | 107.56 | 120.81 |
| 0.95563E-6 | 7.9276 | 21.246 | 34.768 | 46.150 | 55.052 | 64.463 | 69.560 |
| 0.20477E-5 | 4.7518 | 10.714 | 16.218 | 20.635 | 23.948 | 27.260 | 28.789 |
| 0.40955E-5 | 1.0068 | 2.4848 | 3.7928 | 4.7442 | 5.5936 | 6.1712 | 6.5279 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.39409E-8 | -2547.1 | -2518.3 | -2483.1 | -2443.0 | -2399.7 | -2309.5 | -2218.8 |
| 0.70937E-8 | -1397.1 | -1368.5 | -1333.4 | -1293.7 | -1251.0 | -1163.2 | -1079.3 |
| 0.13399E-7 | -721.59 | -693.22 | -658.70 | -619.62 | -577.83 | -494.25 | -422.22 |
| 0.23645E-7 | -393.08 | -365.15 | -331.44 | -293.36 | -253.13 | -176.00 | -117.23 |
| 0.43350E-7 | -198.84 | -171.76 | -139.41 | -103.23 | -66.198 | 0.54519E-1 | 44.223 |
| 0.78819E-7 | -95.240 | -69.418 | -39.519 | -6.3932 | 25.714 | 75.998 | 108.61 |
| 0.15763E-6 | -34.072 | -11.139 | 14.852 | 41.523 | 65.306 | 97.244 | 117.96 |
| 0.23645E-6 | -15.184 | 5.3705 | 28.168 | 49.607 | 68.565 | 90.650 | 103.90 |
| 0.55173E-6 | 1.3638 | 14.682 | 28.204 | 39.586 | 48.488 | 57.899 | 62.996 |
| 0.11822E-5 | 2.2228 | 8.1856 | 13.689 | 18.106 | 21.419 | 24.731 | 26.260 |
| 0.23645E-5 | 0.10405 | 1.5820 | 2.8900 | 3.8414 | 4.6908 | 5.2684 | 5.6251 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.21585E-8 | -4685.1 | -4656.3 | -4621.0 | -4581.0 | -4537.7 | -4447.5 | -4356.7 |
| 0.38854E-8 | -2584.2 | -2555.6 | -2520.5 | -2480.7 | -2438.1 | -2350.3 | -2266.3 |
| 0.73391E-8 | -1349.3 | -1320.9 | -1286.4 | -1247.3 | -1205.5 | -1121.9 | -1049.9 |
| 0.12951E-7 | -748.13 | -720.20 | -686.50 | -648.41 | -608.18 | -531.06 | -472.28 |
| 0.23744E-7 | -391.81 | -364.73 | -332.38 | -296.20 | -259.17 | -192.91 | -148.74 |
| 0.43171E-7 | -200.69 | -174.87 | -144.97 | -111.84 | -79.738 | -29.454 | 3.1626 |
| 0.86342E-7 | -86.051 | -63.117 | -37.125 | -10.454 | 13.328 | 45.265 | 65.991 |
| 0.12951E-6 | -49.347 | -28.791 | -5.9941 | 15.444 | 34.403 | 56.487 | 69.738 |
| 0.30219E-6 | -12.473 | 0.84465 | 14.367 | 25.749 | 34.650 | 44.062 | 49.158 |
| 0.64757E-6 | -3.5592 | 2.4035 | 7.9076 | 12.324 | 15.637 | 18.949 | 20.478 |
| 0.12951E-5 | -2.2646 | -0.78670 | 0.52137 | 1.4727 | 2.3221 | 2.8996 | 3.2564 |

200°C 1600 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.43171E-7 | -256.13 | -25.640 | 256.49 | 576.68 | 923.24 | 1644.8 | 2370.6 |
| 0.77708E-7 | -47.925 | 181.20 | 461.98 | 780.00 | 1121.1 | 1823.7 | 2495.1 |
| 0.14678E-6 | 72.779 | 299.73 | 575.89 | 888.47 | 1222.7 | 1891.4 | 2467.6 |
| 0.25902E-6 | 129.46 | 352.89 | 622.52 | 927.22 | 1249.0 | 1866.0 | 2336.2 |
| 0.47488E-6 | 159.72 | 376.35 | 635.11 | 924.58 | 1220.8 | 1750.8 | 2104.2 |
| 0.86342E-6 | 170.55 | 377.12 | 616.31 | 881.33 | 1138.1 | 1540.4 | 1801.4 |
| 0.17268E-5 | 165.81 | 349.28 | 557.22 | 770.58 | 960.85 | 1216.3 | 1382.1 |
| 0.25902E-5 | 155.28 | 319.72 | 502.10 | 673.61 | 825.28 | 1001.9 | 1107.9 |
| 0.60439E-5 | 109.50 | 216.05 | 324.23 | 415.28 | 486.49 | 561.79 | 602.56 |
| 0.12951E-4 | 51.897 | 99.599 | 143.63 | 178.96 | 205.46 | 231.97 | 244.20 |
| 0.25902E-4 | 11.667 | 23.490 | 33.955 | 41.565 | 48.361 | 52.981 | 55.835 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.24925E-7 | -601.03 | -370.54 | -88.404 | 231.78 | 578.34 | 1299.9 | 2025.7 |
| 0.44865E-7 | -238.91 | -9.7832 | 270.99 | 589.00 | 930.12 | 1632.7 | 2304.1 |
| 0.84745E-7 | -27.682 | 199.27 | 475.43 | 788.01 | 1122.3 | 1790.9 | 2367.2 |
| 0.14955E-6 | 73.132 | 296.55 | 566.19 | 870.88 | 1192.7 | 1809.7 | 2279.9 |
| 0.27417E-6 | 129.60 | 346.23 | 604.99 | 894.47 | 1190.7 | 1720.7 | 2074.1 |
| 0.49850E-6 | 154.57 | 361.14 | 600.33 | 865.35 | 1122.2 | 1524.4 | 1785.4 |
| 0.99700E-6 | 158.43 | 341.90 | 549.83 | 763.20 | 953.46 | 1208.9 | 1374.7 |
| 0.14955E-5 | 150.72 | 315.16 | 497.55 | 669.06 | 820.73 | 997.40 | 1103.4 |
| 0.34895E-5 | 108.04 | 214.59 | 322.77 | 413.83 | 485.04 | 560.33 | 601.10 |
| 0.74775E-5 | 51.499 | 99.201 | 143.23 | 178.56 | 205.07 | 231.57 | 243.80 |
| 0.14955E-4 | 11.582 | 23.405 | 33.870 | 41.480 | 48.276 | 52.896 | 55.750 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.13651E-7 | -1276.0 | -1045.5 | -763.44 | -443.25 | -96.699 | 624.95 | 1350.6 |
| 0.24573E-7 | -613.25 | -384.12 | -103.34 | 214.66 | 555.78 | 1258.4 | 1929.7 |
| 0.46416E-7 | -225.14 | 1.8139 | 277.97 | 590.55 | 924.87 | 1593.5 | 2169.7 |
| 0.81911E-7 | -38.105 | 185.32 | 454.95 | 759.65 | 1081.4 | 1698.4 | 2168.7 |
| 0.15017E-6 | 69.610 | 286.24 | 545.00 | 834.47 | 1130.7 | 1660.7 | 2014.1 |
| 0.27303E-6 | 122.23 | 328.81 | 568.00 | 833.01 | 1089.8 | 1492.1 | 1753.0 |
| 0.54607E-6 | 142.96 | 326.43 | 534.37 | 747.74 | 938.00 | 1193.5 | 1359.3 |
| 0.81911E-6 | 140.86 | 305.30 | 487.68 | 659.19 | 810.86 | 987.54 | 1093.5 |
| 0.19112E-5 | 104.48 | 211.03 | 319.21 | 410.27 | 481.48 | 556.77 | 597.54 |
| 0.40955E-5 | 50.296 | 97.999 | 142.03 | 177.36 | 203.86 | 230.36 | 242.60 |
| 0.81911E-5 | 11.233 | 23.057 | 33.521 | 41.132 | 47.927 | 52.548 | 55.402 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.78819E-8 | -2369.7 | -2139.2 | -1857.1 | -1536.9 | -1190.3 | -468.73 | 256.98 |
| 0.14187E-7 | -1220.2 | -991.11 | -710.33 | -392.31 | -51.199 | 651.42 | 1322.7 |
| 0.26798E-7 | -545.83 | -318.87 | -42.717 | 269.86 | 604.18 | 1272.8 | 1849.0 |
| 0.47291E-7 | -219.22 | 4.2000 | 273.83 | 578.53 | 900.35 | 1517.3 | 1987.5 |
| 0.86701E-7 | -28.553 | 188.07 | 446.83 | 736.31 | 1032.5 | 1562.6 | 1915.9 |
| 0.15763E-6 | 68.863 | 275.43 | 514.62 | 779.64 | 1036.5 | 1438.7 | 1699.7 |
| 0.31527E-6 | 116.95 | 300.42 | 508.35 | 721.72 | 911.98 | 1167.4 | 1333.2 |
| 0.47291E-6 | 123.94 | 288.39 | 470.77 | 642.28 | 793.95 | 970.62 | 1076.6 |
| 0.11034E-5 | 97.923 | 204.47 | 312.65 | 403.70 | 474.92 | 550.21 | 590.98 |
| 0.23645E-5 | 47.767 | 95.470 | 139.50 | 174.83 | 201.33 | 227.84 | 240.07 |
| 0.47291E-5 | 10.330 | 22.154 | 32.619 | 40.229 | 47.024 | 51.645 | 54.499 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.43171E-8 | -4507.7 | -4277.2 | -3995.0 | -3674.9 | -3328.3 | -2606.6 | -1880.9 |
| 0.77708E-8 | -2407.3 | -2178.1 | -1897.4 | -1579.3 | -1238.2 | -535.65 | 135.70 |
| 0.14678E-7 | -1173.5 | -946.60 | -670.44 | -357.87 | -23.546 | 645.10 | 1221.3 |
| 0.25902E-7 | -574.27 | -350.85 | -81.219 | 223.47 | 545.29 | 1162.3 | 1632.5 |
| 0.47488E-7 | -221.52 | -4.8945 | 253.86 | 543.34 | 839.61 | 1369.6 | 1722.9 |
| 0.86342E-7 | -36.589 | 169.98 | 409.17 | 674.18 | 931.04 | 1333.3 | 1594.2 |
| 0.17268E-6 | 64.972 | 248.44 | 456.37 | 669.74 | 860.01 | 1115.5 | 1281.3 |
| 0.25902E-6 | 89.784 | 254.22 | 436.61 | 608.12 | 759.79 | 936.46 | 1042.4 |
| 0.60439E-6 | 84.085 | 190.63 | 298.81 | 389.86 | 461.08 | 536.37 | 577.14 |
| 0.12951E-5 | 41.985 | 89.687 | 133.72 | 169.05 | 195.55 | 222.05 | 234.28 |
| 0.25902E-5 | 7.9621 | 19.785 | 30.250 | 37.860 | 44.656 | 49.276 | 52.130 |

| $H_0$ | V/kT Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.21585E-7 | -879.49 | -821.87 | -751.34 | -671.29 | -584.65 | -404.24 | -222.81 |
| 0.38854E-7 | -460.63 | -403.35 | -333.16 | -253.65 | -168.37 | 7.2780 | 175.11 |
| 0.73391E-7 | -215.24 | -158.50 | -89.468 | -11.323 | 72.256 | 239.41 | 383.47 |
| 0.12951E-6 | -96.648 | -40.791 | 26.616 | 102.79 | 183.24 | 337.49 | 455.05 |
| 0.23744E-6 | -27.519 | 26.638 | 91.328 | 163.69 | 237.76 | 370.27 | 458.60 |
| 0.43171E-6 | 7.9292 | 59.572 | 119.37 | 185.62 | 249.83 | 350.40 | 415.64 |
| 0.86342E-6 | 26.155 | 72.023 | 124.00 | 177.34 | 224.91 | 288.79 | 330.24 |
| 0.12951E-5 | 29.686 | 70.797 | 116.39 | 159.27 | 197.18 | 241.35 | 267.85 |
| 0.30219E-5 | 24.667 | 51.304 | 78.349 | 101.11 | 118.91 | 137.73 | 147.93 |
| 0.64757E-5 | 12.269 | 24.195 | 35.203 | 44.037 | 50.662 | 57.288 | 60.345 |
| 0.12951E-4 | 2.7679 | 5.7238 | 8.3399 | 10.242 | 11.941 | 13.096 | 13.810 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.12462E-7 | -1570.6 | -1513.0 | -1442.5 | -1362.4 | -1275.8 | -1095.4 | -914.00 |
| 0.22432E-7 | -844.01 | -786.73 | -716.53 | -637.03 | -551.75 | -376.09 | -208.25 |
| 0.42372E-7 | -417.55 | -360.81 | -291.77 | -213.63 | -130.05 | 37.109 | 181.16 |
| 0.74775E-7 | -210.68 | -154.83 | -87.424 | -11.250 | 69.204 | 223.45 | 341.01 |
| 0.13708E-6 | -89.099 | -34.942 | 29.748 | 102.11 | 176.18 | 308.69 | 397.02 |
| 0.24925E-6 | -25.333 | 26.310 | 86.108 | 152.36 | 216.57 | 317.14 | 382.37 |
| 0.49850E-6 | 10.175 | 56.042 | 108.02 | 161.36 | 208.93 | 272.80 | 314.26 |
| 0.74775E-6 | 19.444 | 60.555 | 106.15 | 149.02 | 186.94 | 231.11 | 257.61 |
| 0.17447E-5 | 20.905 | 47.542 | 74.587 | 97.351 | 115.15 | 133.97 | 144.17 |
| 0.37387E-5 | 10.959 | 22.884 | 33.893 | 42.726 | 49.352 | 55.977 | 59.035 |
| 0.74775E-5 | 2.3697 | 5.3256 | 7.9418 | 9.8444 | 11.543 | 12.698 | 13.411 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.68259E-8 | -2922.3 | -2864.6 | -2794.1 | -2714.1 | -2627.4 | -2447.0 | -2265.6 |
| 0.12286E-7 | -1594.2 | -1536.9 | -1466.7 | -1387.2 | -1301.9 | -1126.3 | -958.47 |
| 0.23208E-7 | -814.00 | -757.26 | -688.22 | -610.08 | -526.50 | -359.34 | -215.28 |
| 0.40955E-7 | -434.68 | -378.82 | -311.41 | -235.24 | -154.79 | -0.53896 | 117.01 |
| 0.75085E-7 | -210.58 | -156.43 | -91.740 | -19.371 | 54.696 | 187.20 | 275.54 |
| 0.13651E-6 | -91.475 | -39.832 | 19.965 | 86.218 | 150.43 | 251.00 | 316.23 |
| 0.27303E-6 | -22.159 | 23.707 | 75.691 | 129.03 | 176.59 | 240.47 | 281.92 |
| 0.40955E-6 | -1.6343 | 39.476 | 85.072 | 127.95 | 165.86 | 210.03 | 236.53 |
| 0.95563E-6 | 12.635 | 39.272 | 66.317 | 89.081 | 106.88 | 125.70 | 135.90 |
| 0.20477E-5 | 7.7060 | 19.631 | 30.639 | 39.473 | 46.098 | 52.724 | 55.782 |
| 0.40955E-5 | 1.1674 | 4.1233 | 6.7394 | 8.6421 | 10.340 | 11.496 | 12.209 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.39409E-8 | -5111.0 | -5053.3 | -4982.8 | -4902.8 | -4816.1 | -4635.7 | -4454.3 |
| 0.70937E-8 | -2809.5 | -2752.3 | -2682.1 | -2602.6 | -2517.3 | -2341.6 | -2173.8 |
| 0.13399E-7 | -1456.7 | -1400.0 | -1331.0 | -1252.8 | -1169.2 | -1002.1 | -858.05 |
| 0.23645E-7 | -798.31 | -742.45 | -675.05 | -598.87 | -518.42 | -364.17 | -246.61 |
| 0.43350E-7 | -408.30 | -354.14 | -289.45 | -217.08 | -143.01 | -10.509 | 77.828 |
| 0.78819E-7 | -199.59 | -147.95 | -88.152 | -21.899 | 42.315 | 142.88 | 208.11 |
| 0.15763E-6 | -75.534 | -29.666 | 22.316 | 75.658 | 123.22 | 187.10 | 228.55 |
| 0.23645E-6 | -36.768 | 4.3427 | 49.938 | 92.816 | 130.73 | 174.90 | 201.40 |
| 0.55173E-6 | -1.6819 | 24.955 | 52.000 | 74.764 | 92.567 | 111.39 | 121.58 |
| 0.11822E-5 | 1.6544 | 13.580 | 24.588 | 33.422 | 40.047 | 46.672 | 49.730 |
| 0.23645E-5 | -1.3615 | 1.5943 | 4.2104 | 6.1131 | 7.8119 | 8.9671 | 9.6806 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.21585E-8 | -9388.4 | -9330.8 | -9260.3 | -9180.2 | -9093.6 | -8913.2 | -8731.7 |
| 0.38854E-8 | -5185.2 | -5128.0 | -5057.8 | -4978.3 | -4893.0 | -4717.3 | -4549.5 |
| 0.73391E-8 | -2713.7 | -2657.0 | -2588.0 | -2509.8 | -2426.2 | -2259.1 | -2115.0 |
| 0.12951E-7 | -1509.9 | -1454.0 | -1386.6 | -1310.5 | -1230.0 | -1075.8 | -958.24 |
| 0.23744E-7 | -795.77 | -741.61 | -676.92 | -604.55 | -530.48 | -397.97 | -309.64 |
| 0.43171E-7 | -412.01 | -360.37 | -300.57 | -234.32 | -170.10 | -69.537 | -4.3036 |
| 0.86342E-7 | -180.98 | -135.11 | -83.136 | -29.794 | 17.772 | 81.647 | 123.09 |
| 0.12951E-6 | -106.56 | -65.458 | -19.862 | 23.015 | 60.932 | 105.10 | 131.60 |
| 0.30219E-6 | -30.756 | -4.1198 | 22.925 | 45.689 | 63.492 | 82.315 | 92.507 |
| 0.64757E-6 | -11.170 | 0.75479 | 11.763 | 20.596 | 27.222 | 33.847 | 36.905 |
| 0.12951E-5 | -7.1437 | -4.1877 | -1.5716 | 0.33100 | 2.0298 | 3.1849 | 3.8984 |

200°C 3200 Å z = 1

| $H_0$ | V/kT Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.43171E-7 | -524.65 | -63.667 | 500.60 | 1140.9 | 1834.0 | 3277.3 | 4728.8 |
| 0.77708E-7 | -106.74 | 351.52 | 913.07 | 1549.1 | 2231.3 | 3636.5 | 4979.3 |
| 0.14678E-6 | 136.26 | 590.18 | 1142.5 | 1767.6 | 2436.3 | 3773.6 | 4926.0 |
| 0.25902E-6 | 251.06 | 697.91 | 1237.1 | 1846.5 | 2490.2 | 3724.2 | 4664.6 |
| 0.47488E-6 | 313.05 | 746.31 | 1263.8 | 1842.7 | 2435.3 | 3495.3 | 4202.0 |
| 0.86342E-6 | 336.13 | 749.28 | 1227.6 | 1757.6 | 2271.4 | 3075.9 | 3597.8 |
| 0.17268E-5 | 328.20 | 695.14 | 1111.0 | 1537.7 | 1918.2 | 2429.2 | 2760.8 |
| 0.25902E-5 | 307.94 | 636.83 | 1001.6 | 1344.6 | 1647.9 | 2001.3 | 2213.3 |
| 0.60439E-5 | 217.78 | 430.88 | 647.24 | 829.35 | 971.78 | 1122.3 | 1203.9 |
| 0.12951E-4 | 103.35 | 198.76 | 286.82 | 357.50 | 410.50 | 463.50 | 487.96 |
| 0.25902E-4 | 23.221 | 46.868 | 67.797 | 83.019 | 96.609 | 105.85 | 111.55 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.24925E-7 | -1215.8 | -754.86 | -190.58 | 449.79 | 1142.9 | 2586.2 | 4037.6 |
| 0.44865E-7 | -490.12 | -31.854 | 529.70 | 1165.7 | 1847.9 | 3253.2 | 4595.9 |
| 0.84745E-7 | -66.041 | 387.87 | 940.19 | 1565.3 | 2233.9 | 3571.2 | 4723.7 |
| 0.14955E-6 | 137.02 | 583.87 | 1123.1 | 1732.5 | 2376.1 | 3610.1 | 4550.6 |
| 0.27417E-6 | 251.47 | 684.73 | 1202.2 | 1781.2 | 2373.7 | 3433.8 | 4140.5 |
| 0.49850E-6 | 302.87 | 716.02 | 1194.4 | 1724.4 | 2238.1 | 3042.6 | 3564.5 |
| 0.99700E-6 | 312.22 | 679.16 | 1095.0 | 1521.7 | 1902.2 | 2413.2 | 2744.9 |
| 0.14955E-5 | 297.70 | 626.59 | 991.36 | 1334.3 | 1637.7 | 1991.0 | 2203.0 |
| 0.34895E-5 | 214.02 | 427.12 | 643.48 | 825.59 | 968.02 | 1118.6 | 1200.1 |
| 0.74775E-5 | 102.04 | 197.45 | 285.51 | 356.18 | 409.19 | 462.19 | 486.65 |
| 0.14955E-4 | 22.823 | 46.470 | 67.399 | 82.621 | 96.211 | 105.45 | 111.16 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.13651E-7 | -2567.4 | -2106.4 | -1542.2 | -901.82 | -208.71 | 1234.5 | 2686.0 |
| 0.24573E-7 | -1240.3 | -782.06 | -220.51 | 415.51 | 1097.7 | 2503.0 | 3845.7 |
| 0.46416E-7 | -462.49 | -8.5739 | 543.73 | 1168.8 | 1837.5 | 3174.8 | 4327.3 |
| 0.81911E-7 | -86.973 | 359.87 | 899.14 | 1508.5 | 2152.1 | 3386.1 | 4326.6 |
| 0.15017E-6 | 129.98 | 563.24 | 1080.7 | 1659.7 | 2252.2 | 3312.3 | 4019.0 |
| 0.27303E-6 | 236.73 | 649.88 | 1128.2 | 1658.2 | 2172.0 | 2976.5 | 3498.4 |
| 0.54607E-6 | 279.88 | 646.82 | 1062.6 | 1489.4 | 1869.9 | 2380.9 | 2712.5 |
| 0.81911E-6 | 276.62 | 605.51 | 970.28 | 1313.3 | 1616.6 | 1969.9 | 2182.0 |
| 0.19112E-5 | 205.75 | 418.85 | 635.21 | 817.32 | 959.75 | 1110.3 | 1191.8 |
| 0.40955E-5 | 98.795 | 194.20 | 282.26 | 352.93 | 405.93 | 458.94 | 483.40 |
| 0.81911E-5 | 21.620 | 45.268 | 66.197 | 81.418 | 95.009 | 104.25 | 109.95 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.78819E-8 | -4756.1 | -4295.1 | -3730.9 | -3090.5 | -2397.4 | -954.12 | 497.32 |
| 0.14187E-7 | -2455.7 | -1997.4 | -1435.8 | -799.84 | -117.61 | 1287.6 | 2630.3 |
| 0.26798E-7 | -1105.2 | -651.34 | -99.030 | 526.12 | 1194.7 | 2532.0 | 3684.5 |
| 0.47291E-7 | -450.60 | -3.7531 | 535.51 | 1144.9 | 1788.5 | 3022.5 | 3963.0 |
| 0.86701E-7 | -67.725 | 365.53 | 883.05 | 1462.0 | 2054.5 | 3114.6 | 3821.3 |
| 0.15763E-6 | 128.61 | 541.76 | 1020.1 | 1550.1 | 2063.8 | 2868.4 | 3390.3 |
| 0.31527E-6 | 226.51 | 593.45 | 1009.3 | 1436.0 | 1816.5 | 2327.5 | 2659.1 |
| 0.47291E-6 | 241.49 | 570.38 | 935.14 | 1278.1 | 1581.5 | 1934.8 | 2146.8 |
| 0.11034E-5 | 191.43 | 404.53 | 620.89 | 803.00 | 945.43 | 1096.0 | 1177.5 |
| 0.23645E-5 | 92.744 | 188.14 | 276.21 | 346.88 | 399.88 | 452.88 | 477.35 |
| 0.47291E-5 | 19.091 | 42.739 | 63.668 | 78.889 | 92.480 | 101.72 | 107.42 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.43171E-8 | -9033.6 | -8572.6 | -8008.3 | -7367.9 | -6674.8 | -5231.5 | -3780.1 |
| 0.77708E-8 | -4831.3 | -4373.1 | -3811.5 | -3175.5 | -2493.3 | -1088.0 | 254.67 |
| 0 14678E-7 | -2362.2 | -1908.3 | -1356.0 | -730.88 | -62.234 | 1275.0 | 2427.5 |
| 0.25902E-7 | -1162.2 | -715.38 | -176.12 | 433.27 | 1076.9 | 2310.9 | 3251.3 |
| 0.47488E-7 | -455.19 | -21.933 | 495.58 | 1074.5 | 1667.0 | 2727.1 | 3433.8 |
| 0.86342E-7 | -83.807 | 329.34 | 807.72 | 1337.7 | 1851.4 | 2656.0 | 3177.8 |
| 0.17268E-6 | 121.05 | 488.00 | 903.86 | 1330.6 | 1711.1 | 2222.1 | 2553.7 |
| 0.25902E-6 | 171.69 | 500.58 | 865.34 | 1208.3 | 1511.7 | 1865.0 | 2077.0 |
| 0.60439E-6 | 162.36 | 375.46 | 591.81 | 773.93 | 916.35 | 1066.9 | 1148.4 |
| 0.12951E-5 | 79.918 | 175.32 | 263.38 | 334.05 | 387.06 | 440.06 | 464.52 |
| 0.25902E-5 | 13.309 | 36.957 | 57.886 | 73.107 | 86.698 | 95.939 | 101.64 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.21585E-7 | -1773.1 | -1657.8 | -1516.8 | -1356.7 | -1183.4 | -822.62 | -459.76 |
| 0.38854E-7 | -933.93 | -819.36 | -678.97 | -519.96 | -349.40 | 1.9046 | 337.58 |
| 0.73391E-7 | -441.53 | -328.05 | -189.97 | -33.688 | 133.47 | 467.79 | 755.91 |
| 0.12951E-6 | -202.90 | -91.189 | 43.626 | 195.97 | 356.88 | 665.38 | 900.50 |
| 0.23744E-6 | -63.128 | 45.186 | 174.56 | 319.30 | 467.44 | 732.45 | 909.12 |
| 0.43171E-6 | 9.2390 | 112.52 | 232.12 | 364.62 | 493.05 | 694.19 | 824.66 |
| 0.86342E-6 | 47.341 | 139.07 | 243.04 | 349.72 | 444.86 | 572.61 | 655.51 |
| 0.12951E-5 | 55.320 | 137.54 | 228.73 | 314.48 | 390.32 | 478.66 | 531.66 |
| 0.30219E-5 | 47.009 | 100.28 | 154.37 | 199.90 | 235.50 | 273.15 | 293.53 |
| 0.64757E-5 | 23.414 | 47.265 | 69.281 | 86.949 | 100.19 | 113.45 | 119.56 |
| 0.12951E-4 | 5.1010 | 11.012 | 16.245 | 20.050 | 23.448 | 25.758 | 27.185 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.12462E-7 | -3156.9 | -3041.6 | -2900.6 | -2740.5 | -2567.2 | -2206.4 | -1843.5 |
| 0.22432E-7 | -1702.0 | -1587.5 | -1447.1 | -1288.1 | -1117.5 | -766.25 | -430.57 |
| 0.42372E-7 | -847.54 | -734.06 | -595.98 | -439.69 | -272.53 | 61.788 | 349.90 |
| 0.74775E-7 | -432.37 | -320.65 | -185.84 | -33.494 | 127.41 | 435.91 | 671.03 |
| 0.13708E-6 | -187.66 | -79.347 | 50.032 | 194.77 | 342.90 | 607.91 | 784.59 |
| 0.24925E-6 | -58.636 | 44.650 | 164.24 | 296.75 | 425.18 | 626.32 | 756.78 |
| 0.49850E-6 | 14.078 | 105.81 | 209.78 | 316.46 | 411.59 | 539.34 | 622.24 |
| 0.74775E-6 | 33.584 | 115.80 | 206.99 | 292.75 | 368.58 | 456.92 | 509.92 |
| 0.17447E-5 | 38.401 | 91.675 | 145.76 | 191.29 | 226.90 | 264.54 | 284.93 |
| 0.37387E-5 | 19.968 | 43.819 | 65.836 | 83.503 | 96.754 | 110.00 | 116.12 |
| 0.74775E-5 | 3.7902 | 9.7020 | 14.934 | 18.739 | 22.137 | 24.447 | 25.874 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.68259E-8 | -5861.6 | -5746.4 | -5605.3 | -5445.2 | -5271.9 | -4911.1 | -4548.2 |
| 0.12286E-7 | -3204.0 | -3089.4 | -2949.0 | -2790.0 | -2619.4 | -2268.1 | -1932.5 |
| 0.23208E-7 | -1641.9 | -1528.4 | -1390.4 | -1234.1 | -1066.9 | -732.64 | -444.52 |
| 0.40955E-7 | -881.88 | -770.17 | -635.35 | -483.01 | -322.10 | -13.598 | 221.51 |
| 0.75085E-7 | -432.15 | -323.84 | -194.46 | -49.725 | 98.409 | 363.42 | 540.09 |
| 0.13651E-6 | -192.42 | -89.138 | 30.457 | 162.96 | 291.39 | 492.53 | 622.99 |
| 0.27303E-6 | -52.063 | 39.671 | 143.63 | 250.32 | 345.45 | 473.20 | 556.10 |
| 0.40955E-6 | -10.016 | 72.205 | 163.39 | 249.15 | 324.98 | 413.32 | 466.32 |
| 0.95563E-6 | 20.533 | 73.808 | 127.89 | 173.42 | 209.03 | 246.67 | 267.06 |
| 0.20477E-5 | 12.333 | 36.184 | 58.200 | 75.868 | 89.119 | 102.36 | 108.48 |
| 0.40955E-5 | 0.53714 | 6.4489 | 11.681 | 15.486 | 18.884 | 21.194 | 22.621 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.39409E-8 | -10240 | -10125 | -9984.3 | -9824.2 | -9650.9 | -9290.1 | -8927.2 |
| 0.70937E-8 | -5636.1 | -5521.5 | -5381.1 | -5222.1 | -5051.6 | -4700.2 | -4364.6 |
| 0.13399E-7 | -2928.9 | -2815.4 | -2677.3 | -2521.0 | -2353.9 | -2019.5 | -1731.4 |
| 0.23645E-7 | -1610.5 | -1498.8 | -1364.0 | -1211.6 | -1050.7 | -742.25 | -507.14 |
| 0.43350E-7 | -828.97 | -720.66 | -591.28 | -446.54 | -298.40 | -33.394 | 143.28 |
| 0.78819E-7 | -410.04 | -306.76 | -187.16 | -54.658 | 73.770 | 274.90 | 405.37 |
| 0.15763E-6 | -160.18 | -68.446 | 35.519 | 142.20 | 237.33 | 365.08 | 447.98 |
| 0.23645E-6 | -81.637 | 0.58491 | 91.776 | 177.53 | 253.36 | 341.70 | 394.70 |
| 0.55173E-6 | -9.3909 | 43.883 | 97.973 | 143.50 | 179.10 | 216.75 | 237.13 |
| 0.11822E-5 | -0.94588 | 22.905 | 44.921 | 62.589 | 75.839 | 89.090 | 95.206 |
| 0.23645E-5 | -5.5144 | 0.39733 | 5.6296 | 9.4349 | 12.832 | 15.142 | 16.569 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.21585E-8 | -18796 | -18681 | -18540 | -18380 | -18207 | -17846 | -17483 |
| 0.38854E-8 | -10388 | -10274 | -10133 | -9974.8 | -9804.2 | -9452.9 | -9117.2 |
| 0.73391E-8 | -5444.3 | -5330.9 | -5192.8 | -5036.5 | -4869.3 | -4535.0 | -4246.9 |
| 0.12951E-7 | -3035.3 | -2923.6 | -2788.8 | -2636.4 | -2475.5 | -2167.0 | -1931.9 |
| 0.23744E-7 | -1605.4 | -1497.1 | -1367.7 | -1223.0 | -1074.8 | -809.86 | -633.18 |
| 0.43171E-7 | -836.41 | -733.13 | -613.53 | -481.02 | -352.59 | -151.46 | -20.993 |
| 0.86342E-7 | -372.60 | -280.86 | -176.90 | -70.217 | 24.915 | 152.66 | 235.56 |
| 0.12951E-6 | -222.74 | -140.52 | -49.331 | 36.423 | 112.25 | 200.59 | 253.59 |
| 0.30219E-6 | -69.007 | -15.732 | 38.357 | 83.884 | 119.49 | 157.13 | 177.52 |
| 0.64757E-6 | -27.986 | -4.1354 | 17.880 | 35.548 | 48.799 | 62.049 | 68.165 |
| 0.12951E-5 | -18.339 | -12.427 | -7.1955 | -3.3902 | 0.73224E-2 | 2.3176 | 3.7446 |

250°C 50 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.41528E-7 | -3.3767 | 2.7822 | 10.321 | 18.877 | 28.137 | 47.420 | 66.812 |
| 0.74751E-7 | 1.5968 | 7.7195 | 15.222 | 23.719 | 32.834 | 51.609 | 69.549 |
| 0.14119E-6 | 4.0343 | 10.098 | 17.478 | 25.830 | 34.764 | 52.631 | 68.028 |
| 0.24917E-6 | 4.8738 | 10.844 | 18.048 | 26.190 | 34.790 | 51.277 | 63.842 |
| 0.45681E-6 | 5.0987 | 10.887 | 17.801 | 25.536 | 33.453 | 47.616 | 57.058 |
| 0.83057E-6 | 4.9942 | 10.514 | 16.905 | 23.986 | 30.850 | 41.599 | 48.572 |
| 0.16611E-5 | 4.6106 | 9.5131 | 15.069 | 20.770 | 25.854 | 32.682 | 37.112 |
| 0.24917E-5 | 4.2486 | 8.6427 | 13.516 | 18.099 | 22.151 | 26.872 | 29.705 |
| 0.58140E-5 | 2.9487 | 5.7958 | 8.6865 | 11.119 | 13.022 | 15.034 | 16.123 |
| 0.12458E-4 | 1.3908 | 2.6655 | 3.8421 | 4.7863 | 5.4944 | 6.2026 | 6.5294 |
| 0.24917E-4 | 0.31230 | 0.62824 | 0.90787 | 1.1112 | 1.2928 | 1.4162 | 1.4925 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.23976E-7 | -12.376 | -6.2169 | 1.3220 | 9.8778 | 19.138 | 38.421 | 57.813 |
| 0.43157E-7 | -2.9469 | 3.1757 | 10.678 | 19.176 | 28.291 | 47.066 | 65.005 |
| 0.81520E-7 | 2.0345 | 8.0991 | 15.478 | 23.830 | 32.764 | 50.631 | 66.028 |
| 0.14385E-6 | 4.0204 | 9.9906 | 17.195 | 25.337 | 33.936 | 50.423 | 62.988 |
| 0.26374E-6 | 4.8156 | 10.604 | 17.518 | 25.253 | 33.170 | 47.333 | 56.775 |
| 0.47953E-6 | 4.9223 | 10.442 | 16.833 | 23.915 | 30.778 | 41.527 | 48.500 |
| 0.95906E-6 | 4.6013 | 9.5038 | 15.060 | 20.761 | 25.845 | 32.672 | 37.103 |
| 0.14385E-5 | 4.2464 | 8.6405 | 13.514 | 18.096 | 22.149 | 26.870 | 29.703 |
| 0.33567E-5 | 2.9487 | 5.7958 | 8.6864 | 11.119 | 13.022 | 15.034 | 16.123 |
| 0.71929E-5 | 1.3908 | 2.6655 | 3.8421 | 4.7863 | 5.4944 | 6.2026 | 6.5294 |
| 0.14385E-4 | 0.31230 | 0.62824 | 0.90787 | 1.1112 | 1.2928 | 1.4162 | 1.4925 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.13132E-7 | -30.923 | -24.764 | -17.225 | -8.6696 | 0.59071 | 19.873 | 39.266 |
| 0.23638E-7 | -12.703 | -6.5811 | 0.92153 | 9.4192 | 18.534 | 37.309 | 55.248 |
| 0.44650E-7 | -2.6069 | 3.4576 | 10.836 | 19.189 | 28.122 | 45.989 | 61.387 |
| 0.78795E-7 | 1.7967 | 7.7669 | 14.971 | 23.113 | 31.713 | 48.200 | 60.765 |
| 0.14445E-6 | 3.9211 | 9.7097 | 16.624 | 24.359 | 32.275 | 46.438 | 55.880 |
| 0.26265E-6 | 4.6232 | 10.143 | 16.534 | 23.616 | 30.479 | 41.228 | 48.201 |
| 0.52530E-6 | 4.5426 | 9.4452 | 15.001 | 20.702 | 25.786 | 32.614 | 37.044 |
| 0.78795E-6 | 4.2283 | 8.6225 | 13.495 | 18.078 | 22.131 | 26.852 | 29.685 |
| 0.18385E-5 | 2.9478 | 5.7949 | 8.6856 | 11.118 | 13.021 | 15.033 | 16.122 |
| 0.39397E-5 | 1.3908 | 2.6654 | 3.8420 | 4.7862 | 5.4944 | 6.2025 | 6.5294 |
| 0.78795E-5 | 0.31230 | 0.62824 | 0.90787 | 1.1112 | 1.2928 | 1.4162 | 1.4925 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.75820E-8 | -61.860 | -55.701 | -48.162 | -39.606 | -30.346 | -11.063 | 8.3289 |
| 0.13647E-7 | -29.364 | -23.242 | -15.739 | -7.2417 | 1.8733 | 20.648 | 38.587 |
| 0.25779E-7 | -10.901 | -4.8367 | 2.5424 | 10.894 | 19.828 | 37.695 | 53.092 |
| 0.45492E-7 | -2.4646 | 3.5055 | 10.710 | 18.852 | 27.451 | 43.938 | 56.503 |
| 0.83402E-7 | 1.9837 | 7.7723 | 14.686 | 22.421 | 30.338 | 44.501 | 53.943 |
| 0.15164E-6 | 3.8408 | 9.3606 | 15.752 | 22.833 | 29.697 | 40.446 | 47.418 |
| 0.30328E-6 | 4.3312 | 9.2337 | 14.789 | 20.491 | 25.575 | 32.402 | 36.833 |
| 0.45492E-6 | 4.1461 | 8.5402 | 13.413 | 17.996 | 22.049 | 26.770 | 29.602 |
| 0.10614E-5 | 2.9413 | 5.7884 | 8.6790 | 11.112 | 13.015 | 15.026 | 16.116 |
| 0.22746E-5 | 1.3905 | 2.6651 | 3.8417 | 4.7859 | 5.4940 | 6.2022 | 6.5290 |
| 0.45492E-5 | 0.31229 | 0.62823 | 0.90786 | 1.1112 | 1.2928 | 1.4162 | 1.4925 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.41528E-8 | -123.35 | -117.19 | -109.65 | -101.09 | -91.836 | -72.553 | -53.161 |
| 0.74751E-8 | -62.931 | -56.809 | -49.306 | -40.808 | -31.693 | -12.918 | 5.0208 |
| 0.14119E-7 | -28.063 | -21.998 | -14.619 | -6.2669 | 2.6665 | 20.533 | 35.931 |
| 0.24917E-7 | -11.659 | -5.6898 | 1.5150 | 9.6569 | 18.256 | 34.743 | 47.308 |
| 0.45681E-7 | -2.5296 | 3.2589 | 10.173 | 17.908 | 25.825 | 39.987 | 49.429 |
| 0.83057E-7 | 1.7739 | 7.2938 | 13.685 | 20.766 | 27.630 | 38.379 | 45.351 |
| 0.16611E-6 | 3.6243 | 8.5269 | 14.083 | 19.784 | 24.868 | 31.695 | 36.126 |
| 0.24917E-6 | 3.8134 | 8.2075 | 13.081 | 17.663 | 21.716 | 26.437 | 29.270 |
| 0.58140E-6 | 2.8968 | 5.7439 | 8.6346 | 11.067 | 12.970 | 14.982 | 16.071 |
| 0.12458E-5 | 1.3867 | 2.6613 | 3.8379 | 4.7821 | 5.4902 | 6.1984 | 6.5252 |
| 0.24917E-5 | 0.31206 | 0.62800 | 0.90763 | 1.1109 | 1.2925 | 1.4160 | 1.4923 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.20764E-7 | -19.849 | -18.309 | -16.424 | -14.285 | -11.970 | -7.1496 | -2.3016 |
| 0.37375E-7 | -8.7668 | -7.2361 | -5.3604 | -3.2360 | -0.95727 | 3.7364 | 8.2213 |
| 0.70598E-7 | -2.8077 | -1.2915 | 0.55323 | 2.6413 | 4.8747 | 9.3414 | 13.190 |
| 0.12458E-6 | -0.33574 | 1.1568 | 2.9580 | 4.9934 | 7.1433 | 11.265 | 14.406 |
| 0.22840E-6 | 0.77616 | 2.2233 | 3.9519 | 5.8856 | 7.8648 | 11.405 | 13.766 |
| 0.41528E-6 | 1.1224 | 2.5024 | 4.1003 | 5.8706 | 7.5865 | 10.273 | 12.016 |
| 0.83057E-6 | 1.1357 | 2.3613 | 3.7504 | 5.1758 | 6.4468 | 8.1536 | 9.2612 |
| 0.12458E-5 | 1.0580 | 2.1565 | 3.3749 | 4.5206 | 5.5338 | 6.7141 | 7.4222 |
| 0.29070E-5 | 0.73707 | 1.4488 | 2.1715 | 2.7797 | 3.2555 | 3.7584 | 4.0308 |
| 0.62293E-5 | 0.34771 | 0.66637 | 0.96052 | 1.1965 | 1.3736 | 1.5506 | 1.6323 |
| 0.12458E-4 | 0.78077E-1 | 0.15706 | 0.22696 | 0.27780 | 0.32320 | 0.35407 | 0.37313 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.11988E-7 | -38.977 | -37.438 | -35.553 | -33.414 | -31.099 | -26.278 | -21.430 |
| 0.21578E-7 | -18.887 | -17.357 | -15.481 | -13.357 | -11.078 | -6.3845 | -1.8996 |
| 0.40760E-7 | -7.6760 | -6.1599 | -4.3150 | -2.2269 | 0.63863E-2 | 4.4731 | 8.3225 |
| 0.71929E-7 | -2.7075 | -1.2149 | 0.58626 | 2.6217 | 4.7715 | 8.8933 | 12.034 |
| 0.13187E-6 | -0.20554 | 1.2416 | 2.9702 | 4.9039 | 6.8831 | 10.423 | 12.784 |
| 0.23976E-6 | 0.78002 | 2.1599 | 3.7578 | 5.5282 | 7.2440 | 9.9314 | 11.674 |
| 0.47953E-6 | 1.0638 | 2.2895 | 3.6785 | 5.1039 | 6.3749 | 8.0817 | 9.1893 |
| 0.71929E-6 | 1.0348 | 2.1334 | 3.3517 | 4.4975 | 5.5107 | 6.6909 | 7.3990 |
| 0.16783E-5 | 0.73589 | 1.4476 | 2.1703 | 2.7786 | 3.2543 | 3.7572 | 4.0296 |
| 0.35964E-5 | 0.34767 | 0.66633 | 0.96048 | 1.1965 | 1.3735 | 1.5506 | 1.6323 |
| 0.71929E-5 | 0.78075E-1 | 0.15706 | 0.22696 | 0.27780 | 0.32320 | 0.35406 | 0.37313 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.65662E-8 | -77.374 | -75.834 | -73.950 | -71.811 | -69.496 | -64.675 | -59.827 |
| 0.11819E-7 | -39.638 | -38.107 | -36.231 | -34.107 | -31.828 | -27.134 | -22.650 |
| 0.22325E-7 | -18.077 | -16.560 | -14.716 | -12.628 | -10.394 | -5.9279 | -2.0785 |
| 0.39397E-7 | -8.1089 | -6.6164 | -4.8151 | -2.7797 | -0.62989 | 3.4918 | 6.6331 |
| 0.72229E-7 | -2.7096 | -1.2624 | 0.46612 | 2.3999 | 4.3790 | 7.9197 | 10.280 |
| 0.13132E-6 | -0.26380 | 1.1161 | 2.7140 | 4.4843 | 6.2002 | 8.8875 | 10.630 |
| 0.26265E-6 | 0.76479 | 1.9904 | 3.3794 | 4.8048 | 6.0758 | 7.7826 | 8.8902 |
| 0.39397E-6 | 0.91304 | 2.0115 | 3.2299 | 4.3756 | 5.3888 | 6.5691 | 7.2772 |
| 0.91927E-6 | 0.72490 | 1.4366 | 2.1593 | 2.7676 | 3.2433 | 3.7463 | 4.0186 |
| 0.19698E-5 | 0.34704 | 0.66570 | 0.95986 | 1.1959 | 1.3729 | 1.5499 | 1.6316 |
| 0.39397E-5 | 0.78049E-1 | 0.15703 | 0.22694 | 0.27778 | 0.32317 | 0.35404 | 0.37310 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.37910E-8 | -140.47 | -138.93 | -137.04 | -134.90 | -132.59 | -127.77 | -122.92 |
| 0.68238E-8 | -74.147 | -72.616 | -70.741 | -68.616 | -66.337 | -61.644 | -57.159 |
| 0.12889E-7 | -35.786 | -34.270 | -32.425 | -30.337 | -28.104 | -23.637 | -19.788 |
| 0.22746E-7 | -17.654 | -16.161 | -14.360 | -12.324 | -10.175 | -6.0532 | -2.9120 |
| 0.41701E-7 | -7.4460 | -5.9988 | -4.2702 | -2.3365 | -0.35733 | 3.1833 | 5.5438 |
| 0.75820E-7 | -2.4726 | -1.0926 | 0.50517 | 2.2755 | 3.9914 | 6.6787 | 8.4218 |
| 0.15164E-6 | -0.17665E-1 | 1.2079 | 2.5970 | 4.0223 | 5.2934 | 7.0002 | 8.1078 |
| 0.22746E-6 | 0.53372 | 1.6322 | 2.8506 | 3.9963 | 5.0095 | 6.1897 | 6.8979 |
| 0.53074E-6 | 0.66985 | 1.3816 | 2.1042 | 2.7125 | 3.1882 | 3.6912 | 3.9636 |
| 0.11373E-5 | 0.34189 | 0.66055 | 0.95471 | 1.1907 | 1.3677 | 1.5448 | 1.6265 |
| 0.22746E-5 | 0.77716E-1 | 0.15670 | 0.22660 | 0.27744 | 0.32284 | 0.35371 | 0.37277 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.20764E-8 | -264.81 | -263.27 | -261.38 | -259.24 | -256.93 | -252.11 | -247.26 |
| 0.37375E-8 | -142.62 | -141.08 | -139.21 | -137.08 | -134.81 | -130.11 | -125.63 |
| 0.70598E-8 | -71.405 | -69.889 | -68.045 | -65.956 | -63.723 | -59.256 | -55.407 |
| 0.12458E-7 | -37.273 | -35.781 | -33.980 | -31.944 | -29.794 | -25.673 | -22.531 |
| 0.22840E-7 | -17.585 | -16.138 | -14.409 | -12.475 | -10.496 | -6.9559 | -4.5954 |
| 0.41528E-7 | -7.5421 | -6.1621 | -4.5642 | -2.7939 | -1.0780 | 1.6092 | 3.3523 |
| 0.83057E-7 | -2.0844 | -0.85884 | 0.53020 | 1.9555 | 3.2265 | 4.9334 | 6.0410 |
| 0.12458E-6 | -0.60084 | 0.49768 | 1.7160 | 2.8617 | 3.8749 | 5.0552 | 5.7633 |
| 0.29070E-6 | 0.42777 | 1.1395 | 1.8622 | 2.4704 | 2.9462 | 3.4491 | 3.7215 |
| 0.62293E-6 | 0.30534 | 0.62400 | 0.91815 | 1.1542 | 1.3312 | 1.5082 | 1.5899 |
| 0.12458E-5 | 0.73915E-1 | 0.15290 | 0.22280 | 0.27364 | 0.31904 | 0.34990 | 0.36897 |

250°C 100 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.41528E-7 | -10.367 | 1.9508 | 17.028 | 34.140 | 52.661 | 91.227 | 130.01 |
| 0.74751E-7 | 0.68961 | 12.935 | 27.940 | 44.935 | 63.165 | 100.71 | 136.59 |
| 0.14119E-6 | 6.5851 | 18.714 | 33.472 | 50.177 | 68.044 | 103.77 | 134.57 |
| 0.24917E-6 | 8.9554 | 20.895 | 35.305 | 51.589 | 68.788 | 101.76 | 126.89 |
| 0.45681E-6 | 9.8767 | 21.453 | 35.282 | 50.752 | 66.586 | 94.911 | 113.79 |
| 0.83057E-6 | 9.8925 | 20.932 | 33.715 | 47.878 | 61.605 | 83.103 | 97.048 |
| 0.16611E-5 | 9.2067 | 19.011 | 30.124 | 41.527 | 51.695 | 65.349 | 74.210 |
| 0.24917E-5 | 8.4935 | 17.281 | 27.028 | 36.194 | 44.300 | 53.742 | 59.407 |
| 0.58140E-5 | 5.8974 | 11.591 | 17.372 | 22.239 | 26.044 | 30.068 | 32.247 |
| 0.12458E-4 | 2.7817 | 5.3310 | 7.6842 | 9.5726 | 10.988 | 12.405 | 13.058 |
| 0.24917E-4 | 0.62461 | 1.2564 | 1.8157 | 2.2224 | 2.5856 | 2.8325 | 2.9850 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.23976E-7 | -29.496 | -17.177 | -2.1000 | 15.011 | 33.532 | 72.098 | 110.88 |
| 0.43157E-7 | -9.4313 | 2.8140 | 17.819 | 34.814 | 53.044 | 90.594 | 126.47 |
| 0.81520E-7 | 1.7168 | 13.846 | 28.604 | 45.309 | 63.176 | 98.910 | 129.70 |
| 0.14385E-6 | 6.5836 | 18.524 | 32.933 | 49.217 | 66.416 | 99.390 | 124.52 |
| 0.26374E-6 | 8.8949 | 20.472 | 34.300 | 49.771 | 65.604 | 93.930 | 112.81 |
| 0.47953E-6 | 9.5500 | 20.589 | 33.372 | 47.535 | 61.262 | 82.761 | 96.706 |
| 0.95906E-6 | 9.1348 | 18.939 | 30.052 | 41.455 | 51.623 | 65.277 | 74.138 |
| 0.14385E-5 | 8.4703 | 17.258 | 27.005 | 36.171 | 44.276 | 53.718 | 59.384 |
| 0.33567E-5 | 5.8962 | 11.590 | 17.371 | 22.238 | 26.043 | 30.067 | 32.246 |
| 0.71929E-5 | 2.7816 | 5.3309 | 7.6842 | 9.5725 | 10.988 | 12.405 | 13.058 |
| 0.14385E-4 | 0.62461 | 1.2564 | 1.8157 | 2.2224 | 2.5856 | 2.8325 | 2.9850 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.13132E-7 | -67.892 | -55.574 | -40.496 | -23.385 | -4.8645 | 33.701 | 72.486 |
| 0.23638E-7 | -30.181 | -17.936 | -2.9309 | 14.064 | 32.294 | 69.844 | 105.72 |
| 0.44650E-7 | -8.6842 | 3.4449 | 18.203 | 34.908 | 52.775 | 88.509 | 119.30 |
| 0.78795E-7 | 1.1822 | 13.122 | 27.532 | 43.816 | 61.014 | 93.988 | 119.11 |
| 0.14445E-6 | 6.3909 | 17.968 | 31.796 | 47.267 | 63.100 | 91.426 | 110.30 |
| 0.26265E-6 | 8.5062 | 19.546 | 32.328 | 46.491 | 60.218 | 81.717 | 95.662 |
| 0.52530E-6 | 8.8357 | 18.640 | 29.753 | 41.156 | 51.324 | 64.978 | 73.839 |
| 0.78795E-6 | 8.3485 | 17.136 | 26.883 | 36.049 | 44.155 | 53.597 | 59.262 |
| 0.18385E-5 | 5.8852 | 11.579 | 17.360 | 22.227 | 26.032 | 30.056 | 32.235 |
| 0.39397E-5 | 2.7810 | 5.3303 | 7.6835 | 9.5719 | 10.988 | 12.404 | 13.058 |
| 0.78795E-5 | 0.62458 | 1.2564 | 1.8157 | 2.2224 | 2.5855 | 2.8325 | 2.9850 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.75820E-8 | -130.98 | -118.67 | -103.59 | -86.482 | -67.961 | -29.394 | 9.3894 |
| 0.13647E-7 | -64.691 | -52.445 | -37.440 | -20.444 | -2.2146 | 35.335 | 71.214 |
| 0.25779E-7 | -26.393 | -14.264 | 0.49384 | 17.198 | 35.065 | 70.799 | 101.59 |
| 0.45492E-7 | -8.3628 | 3.5774 | 17.987 | 34.270 | 51.469 | 84.443 | 109.57 |
| 0.83402E-7 | 1.6545 | 13.231 | 27.060 | 42.530 | 58.364 | 86.689 | 105.57 |
| 0.15164E-6 | 6.2974 | 17.337 | 30.120 | 44.282 | 58.009 | 79.508 | 93.453 |
| 0.30328E-6 | 8.0533 | 17.858 | 28.970 | 40.373 | 50.541 | 64.196 | 73.057 |
| 0.45492E-6 | 7.9692 | 16.757 | 26.504 | 35.670 | 43.775 | 53.217 | 58.882 |
| 0.10614E-5 | 5.8302 | 11.524 | 17.305 | 22.171 | 25.977 | 30.001 | 32.180 |
| 0.22746E-5 | 2.7759 | 5.3252 | 7.6784 | 9.5668 | 10.983 | 12.399 | 13.053 |
| 0.45492E-5 | 0.62425 | 1.2561 | 1.8153 | 2.2221 | 2.5852 | 2.8322 | 2.9847 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.41528E-8 | -255.33 | -243.01 | -227.93 | -210.82 | -192.30 | -153.73 | -114.95 |
| 0.74751E-8 | -133.16 | -120.91 | -105.91 | -88.917 | -70.687 | -33.137 | 2.7414 |
| 0.14119E-7 | -62.013 | -49.883 | -35.125 | -18.420 | -0.55360 | 35.180 | 65.975 |
| 0.24917E-7 | -27.982 | -16.042 | -1.6325 | 14.651 | 31.849 | 64.823 | 89.953 |
| 0.45681E-7 | -8.4847 | 3.0924 | 16.921 | 32.391 | 48.224 | 76.550 | 95.434 |
| 0.83057E-7 | 1.2279 | 12.267 | 25.050 | 39.213 | 52.940 | 74.439 | 88.383 |
| 0.16611E-6 | 5.9865 | 15.791 | 26.903 | 38.306 | 48.475 | 62.129 | 70.990 |
| 0.24917E-6 | 6.8346 | 15.622 | 25.369 | 34.535 | 42.641 | 52.083 | 57.748 |
| 0.58140E-6 | 5.5881 | 11.282 | 17.063 | 21.929 | 25.735 | 29.759 | 31.938 |
| 0.12458E-5 | 2.7393 | 5.2886 | 7.6418 | 9.5302 | 10.946 | 12.362 | 13.016 |
| 0.24917E-5 | 0.62045 | 1.2523 | 1.8115 | 2.2183 | 2.5814 | 2.8284 | 2.9809 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.20764E-7 | -44.748 | -41.668 | -37.899 | -33.621 | -28.991 | -19.349 | -9.6535 |
| 0.37375E-7 | -21.358 | -18.297 | -14.545 | -10.296 | -5.7392 | 3.6481 | 12.617 |
| 0.70598E-7 | -8.2214 | -5.1891 | -1.4995 | 2.6767 | 7.1434 | 16.076 | 23.775 |
| 0.12458E-6 | -2.3374 | 0.64766 | 4.2501 | 8.3210 | 12.620 | 20.864 | 27.146 |
| 0.22840E-6 | 0.66954 | 3.5638 | 7.0210 | 10.888 | 14.846 | 21.928 | 26.649 |
| 0.41528E-6 | 1.8679 | 4.6279 | 7.8236 | 11.364 | 14.796 | 20.170 | 23.656 |
| 0.83057E-6 | 2.1756 | 4.6268 | 7.4049 | 10.255 | 12.797 | 16.211 | 18.426 |
| 0.12458E-5 | 2.0820 | 4.2791 | 6.7158 | 9.0073 | 11.033 | 13.394 | 14.810 |
| 0.29070E-5 | 1.4720 | 2.8956 | 4.3409 | 5.5575 | 6.5089 | 7.5148 | 8.0596 |
| 0.62293E-5 | 0.69534 | 1.3326 | 1.9209 | 2.3930 | 2.7471 | 3.1012 | 3.2646 |
| 0.12458E-4 | 0.15615 | 0.31412 | 0.45393 | 0.55561 | 0.64640 | 0.70813 | 0.74627 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.11988E-7 | -84.202 | -81.123 | -77.353 | -73.075 | -68.445 | -58.804 | -49.108 |
| 0.21578E-7 | -42.743 | -39.682 | -35.930 | -31.682 | -27.124 | -17.737 | -8.7672 |
| 0.40760E-7 | -19.002 | -15.970 | -12.281 | -8.1048 | -3.6380 | 5.2954 | 12.994 |
| 0.71929E-7 | -7.9875 | -5.0024 | -1.3999 | 2.6709 | 6.9706 | 15.214 | 21.496 |
| 0.13187E-6 | -1.9929 | 0.90131 | 4.3584 | 8.2260 | 12.184 | 19.265 | 23.986 |
| 0.23976E-6 | 0.72845 | 3.4883 | 6.6841 | 10.224 | 13.656 | 19.031 | 22.517 |
| 0.47953E-6 | 1.8331 | 4.2844 | 7.0625 | 9.9132 | 12.455 | 15.868 | 18.084 |
| 0.71929E-6 | 1.9372 | 4.1342 | 6.5710 | 8.8625 | 10.888 | 13.249 | 14.665 |
| 0.16783E-5 | 1.4577 | 2.8812 | 4.3266 | 5.5431 | 6.4946 | 7.5005 | 8.0452 |
| 0.35964E-5 | 0.69444 | 1.3317 | 1.9200 | 2.3921 | 2.7462 | 3.1003 | 3.2637 |
| 0.71929E-5 | 0.15611 | 0.31408 | 0.45389 | 0.55557 | 0.64636 | 0.70809 | 0.74622 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.65662E-8 | -162.34 | -159.26 | -155.49 | -151.21 | -146.58 | -136.94 | -127.24 |
| 0.11819E-7 | -85.554 | -82.493 | -78.742 | -74.493 | -69.935 | -60.548 | -51.578 |
| 0.22325E-7 | -41.049 | -38.017 | -34.327 | -30.151 | -25.684 | -16.751 | -9.0526 |
| 0.39397E-7 | -19.936 | -16.951 | -13.349 | -9.2783 | -4.9786 | 3.2648 | 9.5473 |
| 0.72229E-7 | -7.9843 | -5.0900 | -1.6328 | 2.2347 | 6.1930 | 13.274 | 17.995 |
| 0.13132E-6 | -2.1155 | 0.64434 | 3.8400 | 7.3807 | 10.812 | 16.187 | 19.673 |
| 0.26265E-6 | 0.78932 | 3.2405 | 6.0186 | 8.8694 | 11.411 | 14.825 | 17.040 |
| 0.39397E-6 | 1.4152 | 3.6123 | 6.0490 | 8.3405 | 10.366 | 12.727 | 14.143 |
| 0.91927E-6 | 1.3744 | 2.7980 | 4.2433 | 5.4599 | 6.4113 | 7.4173 | 7.9620 |
| 0.19698E-5 | 0.68573 | 1.3230 | 1.9113 | 2.3834 | 2.7375 | 3.0916 | 3.2550 |
| 0.39397E-5 | 0.15548 | 0.31345 | 0.45326 | 0.55494 | 0.64573 | 0.70747 | 0.74560 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.37910E-8 | -289.78 | -286.70 | -282.93 | -278.65 | -274.02 | -264.38 | -254.68 |
| 0.68238E-8 | -155.80 | -152.73 | -148.98 | -144.73 | -140.18 | -130.79 | -121.82 |
| 0.12889E-7 | -77.660 | -74.628 | -70.938 | -66.762 | -62.295 | -53.362 | -45.663 |
| 0.22746E-7 | -40.163 | -37.178 | -33.576 | -29.505 | -25.205 | -16.962 | -10.679 |
| 0.41701E-7 | -18.497 | -15.603 | -12.145 | -8.2784 | -4.3200 | 2.7613 | 7.4822 |
| 0.75820E-7 | -7.4242 | -4.6642 | -1.4685 | 2.0721 | 5.5039 | 10.878 | 14.364 |
| 0.15164E-6 | -1.4195 | 1.0317 | 3.8098 | 6.6605 | 9.2026 | 12.616 | 14.831 |
| 0.22746E-6 | 0.18020 | 2.3772 | 4.8140 | 7.1054 | 9.1318 | 11.492 | 12.908 |
| 0.53074E-6 | 1.0948 | 2.5184 | 3.9637 | 5.1803 | 6.1317 | 7.1377 | 7.6824 |
| 0.11373E-5 | 0.64009 | 1.2774 | 1.8657 | 2.3378 | 2.6918 | 3.0459 | 3.2093 |
| 0.22746E-5 | 0.15033 | 0.30830 | 0.44811 | 0.54979 | 0.64058 | 0.70232 | 0.74045 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.20764E-8 | -539.83 | -536.75 | -532.98 | -528.71 | -524.08 | -514.43 | -504.74 |
| 0.37375E-8 | -294.10 | -291.04 | -287.29 | -283.04 | -278.49 | -269.10 | -260.13 |
| 0.70598E-8 | -150.24 | -147.20 | -143.51 | -139.34 | -134.87 | -125.94 | -118.24 |
| 0.12458E-7 | -80.709 | -77.724 | -74.122 | -70.051 | -65.751 | -57.508 | -51.225 |
| 0.22840E-7 | -40.017 | -37.123 | -33.666 | -29.798 | -25.840 | -18.758 | -14.037 |
| 0.41528E-7 | -18.697 | -15.937 | -12.742 | -9.2014 | -5.7697 | -0.39510 | 3.0911 |
| 0.83057E-7 | -6.4889 | -4.0377 | -1.2596 | 1.5911 | 4.1331 | 7.5467 | 9.7619 |
| 0.12458E-6 | -2.8676 | -0.67056 | 1.7661 | 4.0576 | 6.0840 | 8.4444 | 9.8607 |
| 0.29070E-6 | 0.20947 | 1.6330 | 3.0783 | 4.2949 | 5.2463 | 6.2522 | 6.7970 |
| 0.62293E-6 | 0.43146 | 1.0687 | 1.6570 | 2.1291 | 2.4832 | 2.8373 | 3.0007 |
| 0.12458E-5 | 0.11378 | 0.27175 | 0.41156 | 0.51324 | 0.60403 | 0.66576 | 0.70390 |

250°C 200 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.41528E-7 | -25.784 | -1.1486 | 29.007 | 63.230 | 100.27 | 177.40 | 254.97 |
| 0.74751E-7 | -2.4455 | 22.045 | 52.056 | 86.046 | 122.50 | 197.60 | 269.36 |
| 0.14119E-6 | 10.564 | 34.822 | 64.339 | 97.749 | 133.48 | 204.95 | 266.54 |
| 0.24917E-6 | 16.244 | 40.125 | 68.945 | 101.51 | 135.91 | 201.85 | 252.11 |
| 0.45681E-6 | 18.870 | 42.025 | 69.682 | 100.62 | 132.28 | 188.94 | 226.70 |
| 0.83057E-6 | 19.408 | 41.487 | 67.053 | 95.379 | 122.83 | 165.83 | 193.72 |
| 0.16611E-5 | 18.317 | 37.927 | 60.152 | 82.958 | 103.29 | 130.60 | 148.32 |
| 0.24917E-5 | 16.953 | 34.529 | 54.023 | 72.355 | 88.566 | 107.45 | 118.78 |
| 0.58140E-5 | 11.792 | 23.181 | 34.743 | 44.476 | 52.087 | 60.135 | 64.493 |
| 0.12458E-4 | 5.5633 | 10.661 | 15.368 | 19.145 | 21.977 | 24.810 | 26.117 |
| 0.24917E-4 | 1.2492 | 2.5129 | 3.6314 | 4.4449 | 5.1712 | 5.6651 | 5.9701 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.23976E-7 | -65.239 | -40.603 | -10.447 | 23.776 | 60.817 | 137.95 | 215.51 |
| 0.43157E-7 | -23.830 | 0.66012 | 30.670 | 64.661 | 101.12 | 176.22 | 247.97 |
| 0.81520E-7 | -0.21721 | 24.041 | 53.558 | 86.967 | 122.70 | 194.16 | 255.75 |
| 0.14385E-6 | 10.594 | 34.475 | 63.295 | 95.862 | 130.26 | 196.20 | 246.46 |
| 0.26374E-6 | 16.208 | 39.362 | 67.020 | 97.960 | 129.62 | 186.27 | 224.04 |
| 0.47953E-6 | 18.268 | 40.348 | 65.913 | 94.239 | 121.69 | 164.69 | 192.58 |
| 0.95906E-6 | 17.975 | 37.585 | 59.810 | 82.615 | 102.95 | 130.26 | 147.98 |
| 0.14385E-5 | 16.808 | 34.384 | 53.878 | 72.210 | 88.421 | 107.30 | 118.63 |
| 0.33567E-5 | 11.778 | 23.166 | 34.729 | 44.461 | 52.073 | 60.120 | 64.478 |
| 0.71929E-5 | 5.5624 | 10.661 | 15.367 | 19.144 | 21.976 | 24.809 | 26.116 |
| 0.14385E-4 | 1.2491 | 2.5129 | 3.6314 | 4.4449 | 5.1712 | 5.6650 | 5.9701 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.13132E-7 | -143.37 | -118.74 | -88.585 | -54.362 | -17.321 | 59.811 | 137.38 |
| 0.23638E-7 | -66.642 | -42.151 | -12.140 | 21.850 | 58.310 | 133.41 | 205.16 |
| 0.44650E-7 | -22.264 | 1.9944 | 31.511 | 64.921 | 100.65 | 172.12 | 233.71 |
| 0.78795E-7 | -1.3543 | 22.526 | 51.345 | 83.913 | 118.31 | 184.25 | 234.51 |
| 0.14445E-6 | 10.216 | 33.371 | 61.028 | 91.969 | 123.63 | 180.28 | 218.05 |
| 0.26265E-6 | 15.424 | 37.504 | 63.069 | 91.395 | 118.84 | 161.84 | 189.73 |
| 0.52530E-6 | 16.931 | 36.541 | 58.766 | 81.572 | 101.90 | 129.21 | 146.93 |
| 0.78795E-6 | 16.286 | 33.862 | 53.356 | 71.688 | 87.899 | 106.78 | 118.11 |
| 0.18385E-5 | 11.695 | 23.083 | 34.646 | 44.378 | 51.990 | 60.037 | 64.395 |
| 0.39397E-5 | 5.5537 | 10.652 | 15.358 | 19.135 | 21.968 | 24.800 | 26.108 |
| 0.78795E-5 | 1.2485 | 2.5123 | 3.6308 | 4.4442 | 5.1705 | 5.6644 | 5.9695 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.75820E-8 | -270.81 | -246.18 | -216.02 | -181.80 | -144.76 | -67.627 | 9.9415 |
| 0.13647E-7 | -136.88 | -112.39 | -82.385 | -48.395 | -11.934 | 63.164 | 134.92 |
| 0.25779E-7 | -58.874 | -34.616 | -5.0994 | 28.310 | 64.044 | 135.51 | 197.10 |
| 0.45492E-7 | -21.581 | 2.2991 | 31.118 | 63.686 | 98.083 | 164.03 | 214.29 |
| 0.83402E-7 | -0.29638 | 22.858 | 50.515 | 81.455 | 113.12 | 169.77 | 207.54 |
| 0.15164E-6 | 10.115 | 32.195 | 57.761 | 86.086 | 113.54 | 156.53 | 184.42 |
| 0.30328E-6 | 14.722 | 34.332 | 56.557 | 79.363 | 99.699 | 127.00 | 144.73 |
| 045492E-6 | 15.051 | 32.627 | 52.121 | 70.453 | 86.664 | 105.54 | 116.87 |
| 0.10614E-5 | 11.415 | 22.803 | 34.366 | 44.099 | 51.710 | 59.758 | 64.115 |
| 0.22746E-5 | 5.5081 | 10.606 | 15.313 | 19.089 | 21.922 | 24.755 | 26.062 |
| 0.45492E-5 | 1.2434 | 2.5071 | 3.6256 | 4.4391 | 5.1654 | 5.6593 | 5.9643 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.41528E-8 | -520.87 | -496.23 | -466.08 | -431.85 | -394.81 | -317.68 | -240.11 |
| 0.74751E-8 | -275.19 | -250.70 | -220.69 | -186.70 | -150.24 | -75.145 | -3.3865 |
| 0.14119E-7 | -131.45 | -107.19 | -77.679 | -44.270 | -8.5360 | 62.931 | 124.52 |
| 0.24917E-7 | -62.127 | -38.246 | -9.4270 | 23.140 | 57.537 | 123.48 | 173.74 |
| 0.45681E-7 | -21.816 | 1.3379 | 28.995 | 59.935 | 91.602 | 148.25 | 186.02 |
| 0.83057E-7 | -1.1577 | 20.921 | 46.487 | 74.813 | 102.26 | 145.26 | 173.15 |
| 0.16611E-6 | 9.6530 | 29.263 | 51.487 | 74.293 | 94.630 | 121.93 | 139.66 |
| 0.24917E-6 | 12.003 | 29.579 | 49.073 | 67.405 | 83.616 | 102.50 | 113.83 |
| 0.58140E-6 | 10.530 | 21.918 | 33.481 | 43.213 | 50.825 | 58.872 | 63.230 |
| 0.12458E-5 | 5.2994 | 10.398 | 15.104 | 18.881 | 21.713 | 24.546 | 25.853 |
| 0.24917E-5 | 1.2068 | 2.4706 | 3.5891 | 4.4025 | 5.1288 | 5.6227 | 5.9278 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.20764E-7 | -96.062 | -89.903 | -82.364 | -73.808 | -64.548 | -45.265 | -25.873 |
| 0.37375E-7 | -47.993 | -41.870 | -34.368 | -25.870 | -16.755 | 2.0194 | 19.959 |
| 0.70598E-7 | -20.383 | -14.318 | -6.9395 | 1.4128 | 10.346 | 28.213 | 43.610 |
| 0.12458E-6 | -7.5090 | -1.5388 | 5.6660 | 13.807 | 22.407 | 38.894 | 51.459 |
| 0.22840E-6 | -0.45936 | 5.3292 | 12.243 | 19.978 | 27.895 | 42.058 | 51.500 |
| 0.41528E-6 | 2.7474 | 8.2672 | 14.658 | 21.740 | 28.603 | 39.352 | 46.325 |
| 0.83057E-6 | 3.9742 | 8.8767 | 14.432 | 20.134 | 25.218 | 32.045 | 36.476 |
| 0.12458E-5 | 3.9848 | 8.3790 | 13.252 | 17.835 | 21.888 | 26.609 | 29.441 |
| 0.29070E-5 | 2.9223 | 5.7694 | 8.6600 | 11.093 | 12.996 | 15.007 | 16.097 |
| 0.62293E-5 | 1.3891 | 2.6637 | 3.8403 | 4.7845 | 5.4926 | 6.2008 | 6.5276 |
| 0.12458E-4 | 0.31222 | 0.62816 | 0.90778 | 1.1111 | 1.2927 | 1.4161 | 1.4924 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.11988E-7 | -176.20 | -170.04 | -162.50 | -153.94 | -144.68 | -125.40 | -106.01 |
| 0.21578E-7 | -91.967 | -85.844 | -78.342 | -69.844 | -60.729 | -41.954 | -24.014 |
| 0.40760E-7 | -43.096 | -37.031 | -29.652 | -21.299 | -12.366 | 5.5005 | 20.898 |
| 0.71929E-7 | -19.877 | -13.907 | -6.7025 | 1.4392 | 10.038 | 26.525 | 39.090 |
| 0.13187E-6 | -6.7157 | -0.92712 | 5.9872 | 13.722 | 21.639 | 35.801 | 45.243 |
| 0.23976E-6 | -0.26706 | 5.2528 | 11.644 | 18.725 | 25.589 | 36.338 | 43.310 |
| 0.47953E-6 | 2.8347 | 7.7372 | 13.293 | 18.994 | 24.079 | 30.906 | 35.336 |
| 0.71929E-6 | 3.4003 | 7.7945 | 12.667 | 17.250 | 21.303 | 26.024 | 28.857 |
| 0.16783E-5 | 2.8218 | 5.6689 | 8.5595 | 10.992 | 12.895 | 14.907 | 15.996 |
| 0.35964E-5 | 1.3776 | 2.6522 | 3.8288 | 4.7730 | 5.4812 | 6.1893 | 6.5161 |
| 0.71929E-5 | 0.31132 | 0.62726 | 0.90689 | 1.1102 | 1.2918 | 1.4153 | 1.4915 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.65662E-8 | -333.84 | -327.68 | -320.15 | -311.59 | -302.33 | -283.05 | -263.65 |
| 0.11819E-7 | -178.93 | 172.81 | -165.31 | -156.81 | -147.70 | -128.92 | -110.98 |
| 0.22325E-7 | -88.504 | -82.439 | -75.060 | -66.708 | -57.774 | -39.907 | -24.510 |
| 0.39397E-7 | -45.036 | -39.066 | -31.861 | -23.719 | -15.120 | 1.3664 | 13.931 |
| 0.72229E-7 | -19.862 | -14.074 | -7.1598 | 0.57524 | 8.4919 | 22.654 | 32.096 |
| 0.13132E-6 | -6.9685 | -1.4486 | 4.9428 | 12.024 | 18.887 | 29.637 | 36.609 |
| 0.26265E-6 | -0.93250E-2 | 4.8931 | 10.449 | 16.150 | 21.234 | 28.062 | 32.492 |
| 0.39397E-6 | 1.7806 | 6.1748 | 11.048 | 15.631 | 19.683 | 24.404 | 27.237 |
| 0.91927E-6 | 2.4315 | 5.2786 | 8.1693 | 10.602 | 12.505 | 14.517 | 15.606 |
| 0.19698E-5 | 1.3079 | 2.5826 | 3.7592 | 4.7034 | 5.4115 | 6.1197 | 6.4465 |
| 0.39397E-5 | 0.30261 | 0.61855 | 0.89817 | 1.1015 | 1.2831 | 1.4065 | 1.4828 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.37910E-8 | -589.98 | -583.82 | -576.28 | -567.72 | -558.46 | -539.18 | -519.79 |
| 0.68238E-8 | -320.67 | -314.55 | -307.05 | -298.55 | -289.43 | -270.66 | -252.72 |
| 0.12889E-7 | -162.95 | -156.89 | -149.51 | -141.15 | -132.22 | -114.35 | -98.960 |
| 0.22746E-7 | -86.691 | -80.721 | -73.516 | -65.374 | -56.775 | -40.288 | -27.723 |
| 0.41701E-7 | -42.036 | -36.247 | -29.333 | -21.598 | -13.681 | 0.48127 | 9.9231 |
| 0.75820E-7 | -18.644 | -13.124 | -6.7332 | 0.34814 | 7.2116 | 17.960 | 24.933 |
| 0.15164E-6 | -5.3179 | -0.41544 | 5.1407 | 10.842 | 15.926 | 22.753 | 27.183 |
| 0.22746E-6 | -1.4444 | 2.9496 | 7.8231 | 12.406 | 16.458 | 21.179 | 24.012 |
| 0.53074E-6 | 1.4594 | 4.3065 | 7.1972 | 9.6303 | 11.533 | 13.545 | 14.634 |
| 0.11373E-5 | 1.0655 | 2.3401 | 3.5167 | 4.4609 | 5.1691 | 5.8772 | 6.2040 |
| 0.22746E-5 | 0.25697 | 0.57291 | 0.85254 | 1.0559 | 1.2374 | 1.3609 | 1.4372 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.20764E-8 | -1091.4 | -1085.3 | -1077.7 | -1069.2 | -1059.9 | -1040.6 | -1021.2 |
| 0.37375E-8 | -598.67 | -592.55 | -585.04 | -576.55 | -567.43 | -548.66 | -530.72 |
| 0.70598E-8 | -309.48 | -303.41 | -296.03 | -287.68 | -278.75 | -260.88 | -245.48 |
| 0.12458E-7 | -169.13 | -163.16 | -155.95 | -147.81 | -139.21 | -122.72 | -110.16 |
| 0.22840E-7 | -86.389 | -80.600 | -73.686 | -65.951 | -58.034 | -43.871 | -34.430 |
| 0.41528E-7 | -42.446 | -36.926 | -30.534 | -23.453 | -16.589 | -5.8405 | 1.1319 |
| 0.83057E-7 | -16.591 | -11.689 | -6.1328 | -0.43142 | 4.6526 | 11.479 | 15.910 |
| 0.12458E-6 | -8.5694 | -4.1753 | 0.69817 | 5.2811 | 9.3338 | 14.054 | 16.887 |
| 0.29070E-6 | -1.0238 | 1.8232 | 4.7139 | 7.1470 | 9.0499 | 11.061 | 12.151 |
| 0.62293E-6 | 0.27636 | 1.5510 | 2.7276 | 3.6718 | 4.3799 | 5.0880 | 5.4149 |
| 0.12458E-5 | 0.48339E-1 | 0.36427 | 0.64390 | 0.84726 | 1.0288 | 1.1523 | 1.2285 |

250°C 400 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.41528E-7 | -58.135 | -8.8631 | 51.448 | 119.89 | 193.97 | 348.24 | 503.38 |
| 0.74751E-7 | -10.167 | 38.813 | 98.835 | 166.81 | 239.73 | 389.93 | 533.45 |
| 0.14119E-6 | 17.188 | 65.704 | 124.73 | 191.55 | 263.02 | 405.96 | 529.14 |
| 0.24917E-6 | 29.655 | 77.417 | 135.05 | 200.19 | 268.98 | 400.88 | 501.40 |
| 0.45681E-6 | 35.942 | 82.251 | 137.56 | 199.44 | 262.78 | 376.08 | 451.61 |
| 0.83057E-6 | 37.827 | 81.986 | 133.11 | 189.76 | 244.67 | 330.67 | 386.45 |
| 0.16611E-5 | 36.258 | 75.478 | 119.92 | 165.53 | 206.21 | 260.83 | 296.27 |
| 0.24917E-5 | 33.726 | 68.879 | 107.86 | 144.53 | 176.95 | 214.72 | 237.38 |
| 0.58140E-5 | 23.563 | 46.340 | 69.465 | 88.930 | 104.15 | 120.24 | 128.96 |
| 0.12458E-4 | 11.125 | 21.322 | 30.735 | 38.288 | 43.953 | 49.619 | 52.233 |
| 0.24917E-4 | 2.4983 | 5.0259 | 7.2629 | 8.8898 | 10.342 | 11.330 | 11.940 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.23976E-7 | -138.27 | -89.003 | -28.691 | 39.754 | 113.83 | 268.10 | 423.24 |
| 0.43157E-7 | -54.141 | -5.1602 | 54.861 | 122.84 | 195.76 | 345.96 | 489.47 |
| 0.81520E-7 | -5.5247 | 42.992 | 102.02 | 168.84 | 240.31 | 383.24 | 506.42 |
| 0.14385E-6 | 17.287 | 65.048 | 122.68 | 187.82 | 256.61 | 388.51 | 489.03 |
| 0.26374E-6 | 29.686 | 75.995 | 131.31 | 193.19 | 256.52 | 369.82 | 445.36 |
| 0.47953E-6 | 34.813 | 78.972 | 130.10 | 186.75 | 241.66 | 327.65 | 383.43 |
| 0.95906E-6 | 35.118 | 74.338 | 118.78 | 164.40 | 205.07 | 259.69 | 295.13 |
| 0.14385E-5 | 33.142 | 68.295 | 107.28 | 143.94 | 176.36 | 214.13 | 236.79 |
| 0.33567E-5 | 23.463 | 46-240 | 69.365 | 88.830 | 104.05 | 120.14 | 128.86 |
| 0.71929E-5 | 11.113 | 21.310 | 30.723 | 38.277 | 43.942 | 49.607 | 52.222 |
| 0.14385E-4 | 2.4974 | 5.0250 | 7.2620 | 8.8889 | 10.341 | 11.329 | 11.939 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.13132E-7 | -295.92 | -246.64 | -186.33 | -117.89 | -43.807 | 110.45 | 265.59 |
| 0.23638E-7 | -141.11 | -92.132 | -32.110 | 35.870 | 108.79 | 258.99 | 402.50 |
| 0.44650E-7 | -50.933 | -2.4162 | 56.617 | 123.43 | 194.90 | 337.84 | 461.02 |
| 0.78795E-7 | -7.8720 | 39.889 | 97.528 | 162.66 | 231.45 | 363.35 | 463.87 |
| 0.14445E-6 | 16.539 | 62.848 | 118.16 | 180.04 | 243.37 | 356.68 | 432.21 |
| 0.26265E-6 | 28.111 | 72.270 | 123.40 | 180.05 | 234.96 | 320.95 | 376.73 |
| 0.52530E-6 | 32.274 | 71.494 | 115.94 | 161.55 | 202.22 | 256.84 | 292.29 |
| 0.78795E-6 | 31.522 | 66.675 | 105.66 | 142.32 | 174.74 | 212.51 | 235.17 |
| 0.18385E-5 | 23.073 | 45.849 | 68.975 | 88.440 | 103.66 | 119.75 | 128.47 |
| 0.39397E-5 | 11.044 | 21.241 | 30.654 | 38.207 | 43.872 | 49.537 | 52.152 |
| 0.78795E-5 | 2.4887 | 5.0162 | 7.2533 | 8.8802 | 10.332 | 11.320 | 11.930 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.75820E-8 | -552.05 | -502.78 | -442.47 | -374.02 | -299.94 | -145.67 | 9.4624 |
| 0.13647E-7 | -282.85 | -233.87 | -173.84 | -105.86 | -32.946 | 117.25 | 260.76 |
| 0.25779E-7 | -125.38 | -76.866 | -17.833 | 48.986 | 120.45 | 263.39 | 386.57 |
| 0.45492E-7 | -49.526 | -1.7652 | 55.873 | 121.00 | 189.80 | 321.69 | 422.21 |
| 0.83402E-7 | -5.6341 | 40.674 | 95.989 | 157.87 | 221.20 | 334.50 | 410.04 |
| 0.15164E-6 | 16.435 | 60.594 | 111.72 | 168.37 | 223.28 | 309.27 | 365.05 |
| 0.30328E-6 | 26.966 | 66.186 | 110.63 | 156.24 | 196.92 | 251.53 | 286.98 |
| 0.45492E-6 | 28.297 | 63.450 | 102.43 | 139.10 | 171.52 | 209.29 | 231.95 |
| 0.10614E-5 | 22.100 | 44.877 | 68.003 | 87.467 | 102.69 | 118.78 | 127.50 |
| 0.22746E-5 | 10.801 | 20.998 | 30.411 | 37.965 | 43.630 | 49.295 | 51.910 |
| 0.45492E-5 | 2.4431 | 4.9706 | 7.2076 | 8.8345 | 10.287 | 11.274 | 11.885 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0 41528E-8 | -1053.5 | -1004.2 | -943.96 | -875.52 | -801.43 | -647.17 | -492.03 |
| 0.74751E-8 | -560.84 | -511.86 | -451.84 | -383.86 | -310.94 | -160.74 | -17.227 |
| 0.14119E-7 | -271.90 | -223.39 | -164.35 | -97.539 | -26.071 | 116.86 | 240.04 |
| 0.24917E-7 | -131.96 | -84.204 | -26.565 | 38.569 | 107.36 | 239.26 | 339.78 |
| 0.45681E-7 | -49.987 | -3.6785 | 51.636 | 113.51 | 176.85 | 290.15 | 365.68 |
| 0.83057E-7 | -7.3657 | 36.793 | 87.924 | 144.57 | 199.48 | 285.47 | 341.25 |
| 0.16611E-6 | 15.692 | 54.912 | 99.362 | 144.97 | 185.64 | 240.26 | 275.70 |
| 0.24917E-6 | 21.172 | 56.325 | 95.313 | 131.97 | 164.39 | 202.16 | 224.82 |
| 0.58140E-6 | 19.617 | 42.394 | 65.519 | 84.984 | 100.20 | 116.30 | 125.01 |
| 0.12458E-5 | 10.012 | 20.209 | 29.622 | 37.176 | 42.841 | 48.506 | 51.120 |
| 0.24917E-5 | 2.2345 | 4.7620 | 6.9990 | 8.6259 | 10.078 | 11.066 | 11.676 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.20764E-7 | -200.24 | -187.93 | -172.85 | -155.74 | -137.22 | -98.653 | -59.869 |
| 0.37375E-7 | -102.78 | -90.542 | -75.536 | -58.541 | -40.311 | -2.7616 | 33.117 |
| 0.70598E-7 | -46.167 | -34.037 | -19.279 | -2.5745 | 15.292 | 51.026 | 81.821 |
| 0.12458E-6 | -19.214 | -7.2745 | 7.1352 | 23.418 | 40.617 | 73.591 | 98.721 |
| 0.22840E-6 | -3.9152 | 7.6619 | 21.490 | 36.960 | 52.794 | 81.119 | 100.00 |
| 0.41528E-6 | 3.5460 | 14.585 | 27.368 | 41.531 | 55.258 | 76.757 | 90.702 |
| 0.83057E-6 | 6.9599 | 16.765 | 27.877 | 39.280 | 49.448 | 63.102 | 71.963 |
| 0.12458E-5 | 7.3832 | 16.171 | 25.918 | 35.084 | 43.189 | 52.631 | 58.296 |
| 0.29070E-5 | 5.7150 | 11.409 | 17.190 | 22.056 | 25.862 | 29.886 | 32.065 |
| 0.62293E-5 | 2.7604 | 5 3097 | 7.6629 | 9.5513 | 10.967 | 12.383 | 13.037 |
| 0 12458E-4 | 0.62285 | 1.2547 | 1.8139 | 2.2207 | 2.5838 | 2.8308 | 2.9833 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.11988E-7 | -361.78 | -349.46 | -334.38 | -317.27 | -298.75 | -260.18 | -221.40 |
| 0.21578E-7 | -191.97 | -179.72 | -164.72 | -147.72 | -129.49 | -91.945 | -56.066 |
| 0.40760E-7 | -92.799 | -80.670 | -65.912 | -49.207 | -31.340 | 4.3935 | 35.188 |
| 0.71929E-7 | -45.115 | -33.174 | -18.764 | -2.4813 | 14.717 | 47.691 | 72.821 |
| 0.13187E-6 | -17.511 | -5.9342 | 7.8944 | 23.364 | 39.197 | 67.523 | 86.407 |
| 0.23976E-6 | -3.4397 | 7.6000 | 20.382 | 34.545 | 48.272 | 69.771 | 83.716 |
| 0.47953E-6 | 3.9454 | 13.750 | 24.862 | 36.265 | 46.434 | 60.088 | 68.949 |
| 0.71929E-6 | 5.6399 | 14.428 | 24.175 | 33.341 | 41.446 | 50.888 | 56.553 |
| 0.16783E-5 | 5.2730 | 10.967 | 16.748 | 21.614 | 25.420 | 29.444 | 31.623 |
| 0.35964E-5 | 2.6757 | 5.2250 | 7.5782 | 9.4666 | 10.882 | 12.299 | 12.952 |
| 0.71929E-5 | 0.61137 | 1.2432 | 1.8025 | 2.2092 | 2.5723 | 2.8193 | 2.9718 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.65662E-8 | -678.44 | -666.12 | -651.05 | -633.93 | -615.41 | -576.85 | -538.06 |
| 0.11819E-7 | -367.28 | -355.03 | -340.03 | -323.03 | -304.80 | -267.25 | -231.37 |
| 0.22325E-7 | -184.96 | -172.83 | -158.08 | -141.37 | -123.50 | -87.774 | -56.979 |
| 0.39397E-7 | -96.756 | -84.816 | -70.406 | -54.123 | -36.924 | -3.9502 | 21.179 |
| 0.72229E-7 | -45.076 | -33.499 | -19.670 | -4.2004 | 11.632 | 39.958 | 58.842 |
| 0.13132E-6 | -18.025 | -6.9858 | 5.7970 | 19.959 | 33.686 | 55.185 | 69.130 |
| 0.26265E-6 | -2.7559 | 7.0490 | 18.161 | 29.564 | 39.732 | 53.387 | 62.247 |
| 0.39397E-6 | 1.5273 | 10.315 | 20.062 | 29.228 | 37.333 | 46.775 | 52.441 |
| 0.91927E-6 | 3.9870 | 9.6811 | 15.462 | 20.328 | 24.134 | 28.158 | 30.337 |
| 0.19698E-5 | 2.3350 | 4.8843 | 7.2375 | 9.1259 | 10.542 | 11.958 | 12.612 |
| 0.39397E-5 | 0.54173 | 1.1736 | 1.7328 | 2.1395 | 2.5027 | 2.7496 | 2.9022 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.37910E-8 | -1191.9 | -1179.6 | -1164.5 | -1147.4 | -1128.9 | -1090.3 | -1051.5 |
| 0.68238E-8 | -652.01 | -639.77 | -624.76 | -607.77 | -589.54 | -551.99 | -516.11 |
| 0.12889E-7 | -335.11 | -322.98 | -308.23 | -291.52 | -273.65 | -237.92 | -207.12 |
| 0.22746E-7 | -181.29 | -169.35 | -154.94 | -138.66 | -121.46 | -88.493 | -63.363 |
| 0.41701E-7 | -90.629 | -79.052 | -65.223 | -49.753 | -33.919 | -5.5941 | 13.289 |
| 0.75820E-7 | -42.535 | -31.495 | -18.712 | -4.5498 | 9.1772 | 30.675 | 44.620 |
| 0.15164E-6 | -14.432 | -4.6270 | 6.4853 | 17.888 | 28.056 | 41.710 | 50.571 |
| 0.22746E-6 | -5.8932 | 2.8949 | 12.641 | 21.807 | 29.913 | 39.355 | 45.020 |
| 0.53074E-6 | 1.3459 | 7.0401 | 12.821 | 17.687 | 21.493 | 25.517 | 27.696 |
| 0.11373E-5 | 1.4650 | 4.0143 | 6.3675 | 8.2559 | 9.6722 | 11.088 | 11.742 |
| 0.22746E-5 | 0.29926 | 0.93114 | 1.4903 | 1.8971 | 2.2602 | 2.5072 | 2.6597 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.20764E-8 | -2196.3 | -2184.0 | -2168.9 | -2151.8 | -2133.3 | -2094.7 | -2055.9 |
| 0.37375E-8 | -1209.3 | -1197.1 | -1182.1 | -1165.1 | -1146.9 | -1109.3 | -1073.4 |
| 0.70598E-8 | -629.54 | -617.41 | -602.65 | -585.95 | -568.08 | -532.35 | -501.55 |
| 0.12458E-7 | -347.54 | -335.60 | -321.19 | -304.91 | -287.71 | -254.73 | -229.60 |
| 0.22840E-7 | -180.68 | -169.10 | -155.28 | -139.81 | -123.97 | -95.651 | -76.767 |
| 0.41528E-7 | -91.457 | -80.418 | -67.635 | -53.472 | -39.745 | -18.246 | -4.3019 |
| 0.83057E-7 | -38.233 | -28.428 | -17.316 | -5.9131 | 4.2550 | 17.909 | 26.770 |
| 0.12458E-6 | -21.335 | -12.547 | -2.8005 | 6.3653 | 14.470 | 23.912 | 29.577 |
| 0.29070E-6 | -4.6018 | 1.0923 | 6.8737 | 11.739 | 15.545 | 19.569 | 21.748 |
| 0.62293E-6 | -0.79526 | 1.7540 | 4.1072 | 5.9956 | 7.4119 | 8.8282 | 9.4818 |
| 0.12458E-5 | -0.48988 | 0.14199 | 0.70124 | 1.1079 | 1.4711 | 1.7180 | 1.8705 |

250°C 800 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.41528E-7 | -124.39 | -25.849 | 94.774 | 231.66 | 379.83 | 688.36 | 998.64 |
| 0.74751E-7 | -27.136 | 70.827 | 190.86 | 326.83 | 472.67 | 773.07 | 1060.1 |
| 0.14119E-6 | 28.975 | 126.00 | 244.07 | 377.71 | 520.65 | 806.52 | 1052.8 |
| 0.24917E-6 | 55.114 | 150.63 | 265.91 | 396.18 | 533.77 | 797.56 | 998.60 |
| 0.45681E-6 | 68.889 | 161.50 | 272.13 | 395.89 | 522.56 | 749.17 | 900.24 |
| 0.83057E-6 | 73.706 | 162.02 | 264.28 | 377.59 | 487.40 | 659.39 | 770.95 |
| 0.16611E-5 | 71.528 | 149.96 | 238.86 | 330.09 | 411.43 | 520.67 | 591.55 |
| 0.24917E-5 | 66.867 | 137.17 | 215.14 | 288.47 | 353.31 | 428.85 | 474.17 |
| 0.58140E-5 | 46.997 | 92.551 | 138.80 | 177.73 | 208.17 | 240.36 | 257.79 |
| 0.12458E-4 | 22.232 | 42.627 | 61.452 | 76.559 | 87.890 | 99.220 | 104.44 |
| 0.24917E-4 | 4.9951 | 10.050 | 14.524 | 17.778 | 20.683 | 22.658 | 23.878 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.23976E-7 | -285.92 | -187.38 | -66.757 | 70.135 | 218.30 | 526.83 | 837.10 |
| 0.43157E-7 | -116.31 | -18.356 | 101.68 | 237.64 | 383.49 | 683.88 | 970.92 |
| 0.81520E-7 | -17.656 | 79.376 | 197.44 | 331.08 | 474.01 | 759.89 | 1006.2 |
| 0.14385E-6 | 29.214 | 124.73 | 240.01 | 370.28 | 507.87 | 771.66 | 972.70 |
| 0.26374E-6 | 55.292 | 147.91 | 258.54 | 382.30 | 508.96 | 735.57 | 886.64 |
| 0.47953E-6 | 66.720 | 155.03 | 257.30 | 370.60 | 480.42 | 652.40 | 763.96 |
| 0.95906E-6 | 68.513 | 146.95 | 235.85 | 327.07 | 408.42 | 517.65 | 588.54 |
| 0.14385E-5 | 65.123 | 135.42 | 213.40 | 286.73 | 351.57 | 427.11 | 472.43 |
| 0.33567E-5 | 46.555 | 92.109 | 138.36 | 177.28 | 207.73 | 239.92 | 257.35 |
| 0.71929E-5 | 22.147 | 42.542 | 61.368 | 76.475 | 87.805 | 99.135 | 104.36 |
| 0.14385E-4 | 4.9837 | 10.038 | 14.512 | 17.766 | 20.671 | 22.647 | 23.867 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.13132E-7 | -602.59 | -504.04 | -383.42 | -246.53 | -98.365 | 210.16 | 520.44 |
| 0.23638E-7 | -291.63 | -193.66 | -73.627 | 62.336 | 208.17 | 508.57 | 795.60 |
| 0.44650E-7 | -109.82 | -12.791 | 105.27 | 238.91 | 381.85 | 667.72 | 914.08 |
| 0.78795E-7 | -22.427 | 73.095 | 188.37 | 318.64 | 456.23 | 720.02 | 921.06 |
| 0.14445E-6 | 27.727 | 120.34 | 230.97 | 354.73 | 481.40 | 708.00 | 859.07 |
| 0.26265E-6 | 52.134 | 140.45 | 242.71 | 356.01 | 465.83 | 637.82 | 749.38 |
| 0.52530E-6 | 61.812 | 140.25 | 229.15 | 320.37 | 401.72 | 510.95 | 581.84 |
| 0.78795E-6 | 61.011 | 131.31 | 209.29 | 282.62 | 347.46 | 422.99 | 468.32 |
| 0.18385E-5 | 45.269 | 90.823 | 137.07 | 176.00 | 206.45 | 238.64 | 256.07 |
| 0.39397E-5 | 21.807 | 42.201 | 61.027 | 76.134 | 87.464 | 98.794 | 104.02 |
| 0.78795E-5 | 4.9140 | 9.9691 | 14.443 | 17.696 | 20.602 | 22.577 | 23.797 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.75820E-8 | -1116.1 | -1017.5 | -896.95 | -760.06 | -611.89 | -303.36 | 6.9122 |
| 0.13647E-7 | -576.36 | -478.40 | -358.36 | -222.39 | -76.556 | 223.84 | 510.87 |
| 0.25779E-7 | -259.97 | -162.94 | -44.873 | 88.765 | 231.70 | 517.57 | 763.93 |
| 0.45492E-7 | -106.97 | 11.447 | 103.83 | 234.10 | 371.69 | 635.48 | 836.52 |
| 0.83402E-7 | -17.825 | 74.792 | 185.42 | 309.18 | 435.85 | 662.45 | 813.52 |
| 0.15164E-6 | 27.625 | 115.94 | 218.20 | 331.50 | 441.32 | 613.31 | 724.87 |
| 0.30328E-6 | 50.136 | 128.57 | 217.47 | 308.69 | 390.04 | 499.27 | 570.16 |
| 0.45492E-6 | 53.590 | 123.89 | 201.87 | 275.19 | 340.04 | 415.57 | 460.89 |
| 0.10614E-5 | 42.628 | 88.182 | 134.43 | 173.36 | 203.80 | 235.99 | 253.43 |
| 0.22746E-5 | 20.937 | 41.331 | 60.157 | 75.264 | 86.594 | 97.924 | 103.15 |
| 0.45492E-5 | 4.6715 | 9.7266 | 14.200 | 17.454 | 20.359 | 22.335 | 23.555 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.41528E-8 | -2120.5 | -2021.9 | -1901.3 | -1764.4 | -1616.2 | -1307.7 | -997.47 |
| 0.74751E-8 | -1133.7 | -1035.7 | -915.73 | -779.76 | -633.92 | -333.53 | -46.496 |
| 0.14119E-7 | -554 40 | -457.37 | -339.30 | -205.66 | -62.728 | 223.14 | 469.50 |
| 0.24917E-7 | -273.21 | -177.69 | -62.415 | 67.853 | 205.44 | 469.23 | 670.27 |
| 0.45681E-7 | -107.88 | -15.264 | 95.365 | 219.12 | 345.79 | 572.39 | 723.46 |
| 0.83057E-7 | -21 297 | 67.020 | 169.28 | 282.58 | 392.40 | 564.39 | 675.95 |
| 0 16611E-6 | 26.334 | 104.77 | 193.67 | 284.89 | 366.24 | 475.47 | 546.36 |
| 0.24917E-6 | 38.148 | 108.45 | 186.42 | 259.75 | 324.60 | 400.13 | 445.45 |
| 0 58140E-6 | 36.681 | 82.234 | 128.48 | 167.41 | 197.86 | 230.05 | 247.48 |
| 0.12458E-5 | 18.676 | 39.071 | 57.897 | 73.004 | 84.334 | 95.664 | 100.89 |
| 0.24917E-5 | 3.8824 | 8.9374 | 13.411 | 16.665 | 19.570 | 21.546 | 22.766 |

| $H_0$ | V/kT Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.20764E-7 | -410.19 | -385.56 | -355.40 | -321.18 | -284.14 | -207.00 | -129.44 |
| 0.37375E-7 | -213.93 | -189.44 | -159.43 | -125.44 | -88.984 | -13.885 | 57.873 |
| 0.70598E-7 | -99.262 | -75.003 | -45.487 | -12.077 | 23.656 | 95.124 | 156.71 |
| 0.12458E-6 | -44.102 | -20.221 | 8.5980 | 41.165 | 75.562 | 141.51 | 191.77 |
| 0.22840E-6 | -12.207 | 10.946 | 38.604 | 69.544 | 101.21 | 157.86 | 195.63 |
| 0.41528E-6 | 3.9145 | 25.994 | 51.559 | 79.885 | 107.33 | 150.33 | 178.22 |
| 0.83057E-6 | 11.971 | 31.581 | 53.806 | 76.611 | 96.948 | 124.25 | 141.97 |
| 0.12458E-5 | 13.418 | 30.994 | 50.488 | 68.820 | 85.031 | 103.91 | 115.24 |
| 0.29070E-5 | 10.963 | 22.351 | 33.914 | 43.646 | 51.258 | 59.305 | 63.663 |
| 0.62293E-5 | 5.4097 | 10.508 | 15.214 | 18.991 | 21.824 | 24.656 | 25.964 |
| 0.12458E-4 | 1.2279 | 2.4917 | 3.6102 | 4.4237 | 5.1500 | 5.6438 | 5.9489 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.11988E-7 | -734.51 | -709.88 | -679.72 | -645.50 | -608.46 | -531.33 | -453.76 |
| 0.21578E-7 | -393.55 | -369.06 | -339.05 | -305.06 | -268.60 | -193.50 | -121.74 |
| 0.40760E-7 | -193.76 | -169.50 | -139.99 | -106.58 | -70.846 | 0.62155 | 62.211 |
| 0.71929E-7 | -97.116 | -73.236 | -44.416 | -11.849 | 22.548 | 88.496 | 138.75 |
| 0.13187E-6 | -40.571 | -17.417 | 10.240 | 41.180 | 72.847 | 129.49 | 167.26 |
| 0.23976E-6 | -11.155 | 10.923 | 36.489 | 64.815 | 92.269 | 135.26 | 163.15 |
| 0.47953E-6 | 4.9853 | 24.595 | 46.820 | 69.626 | 89.962 | 117.27 | 134.99 |
| 0.71929E-6 | 9.0947 | 26.671 | 46.165 | 64.496 | 80.707 | 99.591 | 110.92 |
| 0.16783E-5 | 9.5692 | 20.957 | 32.520 | 42.252 | 49.864 | 57.911 | 62.269 |
| 0.35964E-5 | 5.0217 | 10.120 | 14.826 | 18.603 | 21.436 | 24.268 | 25.576 |
| 0.71929E-5 | 1.1432 | 2.4070 | 3.5255 | 4.3389 | 5.0652 | 5.5591 | 5.8642 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.65662E-8 | -1369.2 | -1344.6 | -1314.4 | -1280.2 | -1243.1 | -1166.0 | -1088.4 |
| 0.11819E-7 | -745.56 | -721.07 | -691.06 | -657.06 | -620.60 | -545.50 | -473.75 |
| 0.22325E-7 | -379.47 | -355.21 | -325.69 | -292.28 | -256.55 | -185.08 | -123.49 |
| 0.39397E-7 | -201.75 | -177.87 | -149.05 | -116.48 | -82.091 | -16.143 | 34.116 |
| 0.72229E-7 | -97.030 | -73.876 | -46.218 | -15.278 | 16.388 | 73.039 | 110.80 |
| 0.13132E-6 | -41.608 | -19.529 | 6.0364 | 34.362 | 61.816 | 104.81 | 132.70 |
| 0.26265E-6 | -9.6005 | 10.009 | 32.234 | 55.040 | 75.376 | 102.68 | 120.40 |
| 0.39397E-6 | -0.22435 | 17.352 | 36.845 | 55.177 | 71.388 | 90.272 | 101.60 |
| 0.91927E-6 | 6.1850 | 17.573 | 29.136 | 38.868 | 46.480 | 54.527 | 58.885 |
| 0.19698E-5 | 3.8658 | 8.9645 | 13.670 | 17.447 | 20.280 | 23.112 | 24.420 |
| 0.39397E-5 | 0.80257 | 2.0663 | 3.1848 | 3.9982 | 4.7245 | 5.2184 | 5.5235 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.37910E-8 | -2397.5 | -2372.9 | -2342.7 | -2308.5 | -2271.5 | -2194.3 | -2116.8 |
| 0.68238E-8 | -1316.2 | -1291.7 | -1261.7 | -1227.7 | -1191.3 | -1116.2 | -1044.4 |
| 0.12889E-7 | -681.02 | -656.77 | -627.25 | -593.84 | -558.11 | -486.64 | -425.05 |
| 0.22746E-7 | -372.09 | -348.21 | -319.39 | -286.82 | -252.42 | -186.48 | -136.22 |
| 0.41701E-7 | -189.37 | -166.21 | -138.56 | -107.62 | -75.953 | -19.302 | 18.465 |
| 0.75820E-7 | -91.839 | -69.760 | -44.194 | -15.868 | 11.585 | 54.582 | 82.472 |
| 0.15164E-6 | -34.110 | -14.500 | 7.7246 | 30.530 | 50.866 | 78.175 | 95.897 |
| 0.22746E-6 | -16.172 | 1.4039 | 20.897 | 39.229 | 55.440 | 74.324 | 85.654 |
| 0.53074E-6 | -0.26557E-1 | 11.361 | 22.924 | 32.656 | 40.268 | 48.315 | 52.673 |
| 0.11373E-5 | 1.4561 | 6.5547 | 11.261 | 15.037 | 17.870 | 20.703 | 22.010 |
| 0.22746E-5 | -0.67463E-1 | 1.1962 | 2.3148 | 3.1282 | 3.8545 | 4.3484 | 4.6534 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.20764E-8 | -4407.7 | -4383.0 | -4352.9 | -4318.6 | -4281.6 | -4204.5 | -4126.9 |
| 0.37375E-8 | -2432.4 | -2407.9 | -2377.9 | -2343.9 | -2307.4 | -2232.3 | -2160.6 |
| 0.70598E-8 | -1271.2 | -1247.0 | -1217.4 | -1184.0 | -1148.3 | -1076.8 | -1015.2 |
| 0.12458E-7 | -705.96 | -682.08 | -653.26 | -620.69 | -586.29 | -520.35 | -470.09 |
| 0.22840E-7 | -370.85 | -347.70 | -320.04 | -289.10 | -257.43 | -200.78 | -163.01 |
| 0.41528E-7 | -191.03 | -168.95 | -143.39 | -115.06 | -87.614 | -44.617 | -16.727 |
| 0.83057E-7 | -83.032 | -63.422 | -41.198 | -18.392 | 1.9441 | 29.253 | 46.974 |
| 0.12458E-6 | -48.343 | -30.767 | -11.273 | 7.0582 | 23.269 | 42.153 | 53.483 |
| 0.29070E-6 | -13.085 | -1.6969 | 9.8657 | 19.598 | 27.209 | 35.257 | 39.614 |
| 0.62293E-6 | -4.0226 | 1.0759 | 5.7824 | 9.5591 | 12.391 | 15.224 | 16.531 |
| 0.12458E-5 | -2.3277 | -1.0639 | 0.54506E-1 | 0.86796 | 1.5942 | 2.0881 | 2.3931 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.41528E-7 | -258.48 | -61.400 | 179.84 | 453.63 | 749.96 | 1367.0 | 1987.5 |
| 0.74751E-7 | -62.634 | 133.29 | 373.37 | 645.30 | 936.98 | 1537.7 | 2111.8 |
| 0.14119E-6 | 51.023 | 245.09 | 481.22 | 748.50 | 1034.3 | 1606.1 | 2098.8 |
| 0.24917E-6 | 104.55 | 295.60 | 526.15 | 786.69 | 1061.8 | 1589.4 | 1991.5 |
| 0.45681E-6 | 133.40 | 318.63 | 539.89 | 787.41 | 1040.7 | 1493.9 | 1796.1 |
| 0.83057E-6 | 144.23 | 320.87 | 525.39 | 752.00 | 971.63 | 1315.6 | 1538.7 |
| 0.16611E-5 | 141.10 | 297.98 | 475.78 | 658.23 | 820.92 | 1039.3 | 1181.1 |
| 0.24917E-5 | 132.38 | 272.99 | 428.94 | 575.60 | 705.29 | 856.36 | 947.00 |
| 0.58140E-5 | 93.529 | 184.63 | 277.13 | 354.99 | 415.89 | 480.26 | 515.13 |
| 0.12458E-4 | 44.353 | 85.142 | 122.79 | 153.00 | 175.66 | 198.32 | 208.78 |
| 0.24917E-4 | 9.9726 | 20.082 | 29.030 | 35.538 | 41.348 | 45.299 | 47.740 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.23976E-7 | -582.81 | -385.72 | -144.47 | 129.31 | 425.64 | 1042.7 | 1663.2 |
| 0.43157E-7 | -242.25 | -46.326 | 193.75 | 465.68 | 757.36 | 1358.1 | 1932.2 |
| 0.81520E-7 | -43.479 | 150.58 | 386.72 | 654.00 | 939.87 | 1511.6 | 2004.3 |
| 0.14385E-6 | 51.542 | 242.58 | 473.14 | 733.68 | 1008.8 | 1536.4 | 1938.5 |
| 0.26374E-6 | 105.03 | 290.27 | 511.53 | 759.05 | 1012.3 | 1465.6 | 1767.7 |
| 0 47953E-6 | 129.16 | 305.80 | 510.32 | 736.93 | 956.56 | 1300.5 | 1523.6 |
| 0.95906E-6 | 134.12 | 291.00 | 468.80 | 651.24 | 813.93 | 1032.4 | 1174.1 |
| 0.14385E-5 | 128.06 | 268.67 | 424.62 | 571.28 | 700.96 | 852.03 | 942.68 |
| 0.33567E-5 | 92.135 | 183.24 | 275.74 | 353.60 | 414.49 | 478.87 | 513.73 |
| 0.71929E-5 | 43.965 | 84.754 | 122.40 | 152.62 | 175.28 | 197.94 | 208.40 |
| 0.14385E-4 | 9.8879 | 19.998 | 28.946 | 35.453 | 41.264 | 45.215 | 47.655 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.13132E-7 | -1217.5 | -1020.4 | -779.19 | -505.40 | -209.07 | 407.98 | 1028.5 |
| 0.23638E-7 | -594.25 | -398.33 | -158.24 | 113.68 | 405.36 | 1006.1 | 1580.2 |
| 0.44650E-7 | -229.18 | -35.119 | 201.01 | 468.29 | 754.16 | 1325.9 | 1818.6 |
| 0.78795E-7 | -53.097 | 137.94 | 368.50 | 629.04 | 904.22 | 1431.8 | 1833.8 |
| 0.14445E-6 | 48.578 | 233.81 | 455.07 | 702.59 | 955.93 | 1409.1 | 1711.2 |
| 0.26265E-6 | 98.712 | 275.34 | 479.87 | 706.48 | 926.11 | 1270.0 | 1493.2 |
| 0.52530E-6 | 119.53 | 276.41 | 454.21 | 636.66 | 799.35 | 1017.8 | 1159.5 |
| 0.78795E-6 | 118.74 | 259.35 | 415.30 | 561.96 | 691.64 | 842.71 | 933.36 |
| 0.18385E-5 | 88.750 | 179.85 | 272.35 | 350.21 | 411.11 | 475.49 | 510.35 |
| 0.39397E-5 | 42.810 | 83.599 | 121.25 | 151.46 | 174.12 | 196.78 | 207.24 |
| 0.78795E-5 | 9.5472 | 19.657 | 28.605 | 35.112 | 40.923 | 44.874 | 47.314 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.75820E-8 | -2245.8 | -2048.7 | -1807.5 | -1533.7 | -1237.4 | -620.33 | 0.21099 |
| 0.13647E-7 | -1164.9 | -969.06 | -728.97 | -457.04 | -165.36 | 435.42 | 1009.4 |
| 0.25779E-7 | -530.74 | -336.67 | -100.54 | 166.73 | 452.60 | 1024.3 | 1517.0 |
| 0.45492E-7 | -223.43 | -32.388 | 198.16 | 458.70 | 733.88 | 1261.4 | 1663.5 |
| 0.83402E-7 | -43.763 | 141.47 | 362.73 | 610.25 | 863.58 | 1316.7 | 1618.9 |
| 0.15164E-6 | 48.481 | 225.11 | 429.64 | 656.24 | 875.88 | 1219.8 | 1442.9 |
| 0.30328E-6 | 95.025 | 251.90 | 429.70 | 612.15 | 774.84 | 993.31 | 1135.0 |
| 0.45492E-6 | 102.79 | 243.40 | 399.35 | 546.01 | 675.70 | 826.77 | 917.41 |
| 0.10614E-5 | 82.539 | 173.64 | 266.14 | 344.00 | 404.90 | 469.27 | 504.14 |
| 0.22746E-5 | 40.400 | 81.189 | 118.84 | 149.05 | 171.71 | 194.37 | 204.83 |
| 0.45492E-5 | 8.6771 | 18.787 | 27.735 | 34.242 | 40.053 | 44.004 | 46.444 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.41528E-8 | -4255.9 | -4058.9 | -3817.6 | -3543.8 | -3247.5 | -2630.4 | -2009.9 |
| 0.74751E-8 | -2281.1 | -2085.1 | -1845.1 | -1573.1 | -1281.4 | -680.70 | -106.63 |
| 0.14119E-7 | -1120.9 | -926.91 | -690.78 | -423.50 | -137.63 | 434.10 | 926.83 |
| 0.24917E-7 | -557.30 | -366.26 | -135.70 | 124.63 | 400.01 | 927.59 | 1329.6 |
| 0.45681E-7 | -225.24 | -40.013 | 181.24 | 428.76 | 682.10 | 1135.3 | 1437.4 |
| 0.83057E-7 | -50.718 | 125.91 | 330.44 | 557.04 | 776.68 | 1120.6 | 1343.7 |
| 0.16611E-6 | 46.103 | 202.98 | 380.78 | 563.22 | 725.92 | 944.39 | 1086.1 |
| 0.24917E-6 | 70.624 | 211.23 | 367.18 | 513.84 | 643.52 | 794.59 | 885.24 |
| 0.58140E-6 | 69.480 | 160.58 | 253.08 | 330.94 | 391.84 | 456.22 | 491.08 |
| 0.12458E-5 | 34.921 | 75.710 | 113.36 | 143.57 | 166.23 | 188.89 | 199.35 |
| 0.24917E-5 | 6.4168 | 16.526 | 25.475 | 31.982 | 37.793 | 41.744 | 44.184 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.20764E-7 | -831.68 | -782.41 | -722.10 | -653.65 | -579.57 | -425.30 | -270.17 |
| 0.37375E-7 | -437.81 | -388.83 | -328.81 | -260.83 | -187.91 | -37.713 | 105.80 |
| 0.70598E-7 | -207.01 | -158.49 | -99.466 | -32.646 | 38.821 | 181.75 | 304.93 |
| 0.12458E-6 | -95.413 | -47.651 | 9.9873 | 75.121 | 143.91 | 275.81 | 376.33 |
| 0.22840E-6 | -30.278 | 16.030 | 71.345 | 133.22 | 196.55 | 309.86 | 385.39 |
| 0.41528E-6 | 3.2523 | 47.411 | 98.542 | 155.19 | 210.10 | 296.09 | 351.87 |
| 0.83057E-6 | 20.764 | 59.984 | 104.43 | 150.04 | 190.71 | 245.33 | 280.78 |
| 0.12458E-5 | 24.404 | 59.557 | 98.545 | 135.20 | 167.63 | 205.39 | 228.05 |
| 0.29070E-5 | 20.778 | 43.555 | 66.681 | 86.145 | 101.36 | 117.46 | 126.17 |
| 0.62293E-5 | 10.400 | 20.598 | 30.010 | 37.564 | 43.229 | 48.894 | 51.509 |
| 0.12458E-4 | 2.3447 | 4.8722 | 7.1092 | 8.7362 | 10.188 | 11.176 | 11.786 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.11988E-7 | -1481.5 | -1432.3 | -1372.0 | -1303.5 | -1229.4 | -1075.2 | -920.07 |
| 0.21578E-7 | -798.31 | -749.33 | -689.31 | -621.32 | -548.40 | -398.21 | -254.69 |
| 0.40760E-7 | -397.27 | -348.75 | -289.72 | -222.90 | -151.43 | -8.5012 | 114.67 |
| 0.71929E-7 | -202.68 | -154.92 | -97.282 | -32.147 | 36.647 | 168.54 | 269.06 |
| 0.13187E-6 | -88.224 | -41.915 | 13.399 | 75.280 | 138.61 | 251.91 | 327.45 |
| 0.23976E-6 | -28.068 | 16.090 | 67.222 | 123.87 | 178.78 | 264.77 | 320.55 |
| 0.47953E-6 | 5.6941 | 44.914 | 89.363 | 134.97 | 175.64 | 230.26 | 265.70 |
| 0.71929E-6 | 14.732 | 49.885 | 88.873 | 125.53 | 157.95 | 195.72 | 218.38 |
| 0.16783E-5 | 17.206 | 39.983 | 63.108 | 82.573 | 97.796 | 113.89 | 122.60 |
| 0.35964E-5 | 9.1433 | 19.340 | 28.753 | 36.306 | 41.972 | 47.637 | 50.251 |
| 0.71929E-5 | 1.9567 | 4.4842 | 6.7212 | 8.3481 | 9.8007 | 10.788 | 11.398 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.65662E-8 | -2752.4 | -2703.1 | -2642.8 | -2574.3 | -2500.3 | -2346.0 | -2190.9 |
| 0.11819E-7 | -1503.7 | -1454.7 | -1394.7 | -1326.7 | -1253.8 | -1103.6 | -960.09 |
| 0.22325E-7 | -770.06 | -721.55 | -662.51 | -595.69 | -524.22 | -381.29 | -258.11 |
| 0.39397E-7 | -413.33 | -365.57 | -307.93 | -242.79 | -174.00 | -42.108 | 58.411 |
| 0.72229E-7 | -202.50 | -156.19 | -100.87 | -38.996 | 24.337 | 137.63 | 213.17 |
| 0.13132E-6 | -90.308 | -46.149 | 4.9824 | 61.633 | 116.54 | 202.53 | 258.31 |
| 0.26265E-6 | -24.758 | 14.461 | 58.911 | 104.52 | 145.19 | 199.81 | 235.25 |
| 0.39397E-6 | -5.1364 | 30.016 | 69.004 | 105.66 | 138.08 | 175.85 | 198.51 |
| 0.91927E-6 | 9.3852 | 32.161 | 55.287 | 74.752 | 89.975 | 106.07 | 114.78 |
| 0.19698E-5 | 6.0480 | 16.245 | 25.658 | 33.211 | 38.876 | 44.541 | 47.156 |
| 0.39397E-5 | 0.80089 | 3.3284 | 5.5654 | 7.1923 | 8.6449 | 9.6327 | 10.242 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.37910E-8 | -4810.2 | -4761.0 | -4700.6 | -4632.2 | -4558.1 | -4403.9 | -4248.7 |
| 0.68238E-8 | -2646.4 | -2597.4 | -2537.4 | -2469.4 | -2396.5 | -2246.3 | -2102.8 |
| 0.12889E-7 | -1374.4 | -1325.9 | -1266.8 | -1200.0 | -1128.6 | -985.67 | -862.49 |
| 0.22746E-7 | -755.26 | -707.50 | -649.86 | -584.73 | -515.93 | -384.04 | -283.52 |
| 0.41701E-7 | -388.43 | -342.12 | -286.81 | -224.93 | -161.59 | -48.296 | 27.238 |
| 0.75820E-7 | -192.00 | -147.85 | -96.718 | -40.067 | 14.841 | 100.83 | 156.61 |
| 0.15164E-6 | -74.989 | -35.769 | 8.6802 | 54.291 | 94.964 | 149.58 | 185.02 |
| 0.22746E-6 | -38.216 | -3.0638 | 35.923 | 72.587 | 105.00 | 142.77 | 165.43 |
| 0.53074E-6 | -4.1205 | 18.656 | 41.781 | 61.246 | 76.469 | 92.564 | 101.28 |
| 0.11373E-5 | 0.31848 | 10.515 | 19.928 | 27.482 | 33.147 | 38.812 | 41.427 |
| 0.22746E-5 | -1.6088 | 0.91864 | 3.1556 | 4.7825 | 6.2351 | 7.2229 | 7.8330 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.20764E-8 | -8832.0 | -8782.7 | -8722.4 | -8653.9 | -8579.8 | -8425.6 | -8270.4 |
| 0.37375E-8 | -4880.1 | -4831.1 | -4771.0 | -4703.1 | -4630.1 | -4479.9 | -4336.4 |
| 0.70598E-8 | -2556.3 | -2507.7 | -2448.7 | -2381.9 | -2310.4 | -2167.5 | -2044.3 |
| 0.12458E-7 | -1424.3 | -1376.6 | -1318.9 | -1253.8 | -1185.0 | -1053.1 | -952.64 |
| 0.22840E-7 | -752.78 | -706.47 | -651.16 | -589.28 | -525.94 | -412.64 | -337.11 |
| 0.41528E-7 | -391.77 | -347.62 | -296.48 | -239.83 | -184.92 | -98.935 | -43.155 |
| 0.83057E-7 | -174.18 | -134.96 | -90.519 | -44.907 | -4.2348 | 50.382 | 85.826 |
| 0.12458E-6 | -103.89 | -68.743 | -29.755 | 6.9078 | 39.329 | 77.097 | 99.758 |
| 0.29070E-6 | -31.508 | -8.7315 | 14.393 | 33.858 | 49.081 | 65.176 | 73.892 |
| 0.62293E-6 | -11.787 | -1.5906 | 7.8222 | 15.375 | 21.040 | 26.706 | 29.320 |
| 0.12458E-5 | -7.0876 | -4.5601 | -2.3230 | -0.69618 | 0.75641 | 1.7441 | 2.3542 |

250°C 3200 Å z = 1

| $H_0$ | V/kT Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.41528E-7 | -528.26 | -134.09 | 348.40 | 895.97 | 1488.6 | 2722.7 | 3963.8 |
| 0.74751E-7 | -135.21 | 256.64 | 736.81 | 1280.6 | 1864.0 | 3065.6 | 4213.7 |
| 0.14119E-6 | 93.555 | 481.68 | 953.95 | 1488.5 | 2060.2 | 3203.7 | 4189.1 |
| 0.24917E-6 | 201.90 | 583.99 | 1045.1 | 1566.1 | 2116.5 | 3171.7 | 3975.8 |
| 0.45681E-6 | 260.93 | 631.40 | 1073.9 | 1568.9 | 2075.6 | 2982.0 | 3586.3 |
| 0.83057E-6 | 283.89 | 637.16 | 1046.2 | 1499.4 | 1938.6 | 2626.6 | 3072.8 |
| 0.16611E-5 | 279.03 | 592.79 | 948.39 | 1313.2 | 1638.6 | 2075.6 | 2359.1 |
| 0.24917E-5 | 262.34 | 543.56 | 855.46 | 1148.7 | 1408.1 | 1710.2 | 1891.5 |
| 0.58140E-5 | 185.91 | 368.12 | 553.12 | 708.84 | 830.63 | 959.39 | 1029.1 |
| 0.12458E-4 | 88.289 | 169.86 | 245.17 | 305.59 | 350.91 | 396.24 | 417.15 |
| 0.24917E-4 | 19.834 | 40.054 | 57.950 | 70.965 | 82.586 | 90.488 | 95.369 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.23976E-7 | -1178.1 | -783.99 | -301.50 | 246.07 | 838.73 | 2072.8 | 3313.9 |
| 0.43157E-7 | -495.70 | -103.85 | 376.31 | 920.16 | 1503.5 | 2705.1 | 3853.2 |
| 0.81520E-7 | -96.703 | 291.43 | 763.70 | 1298.2 | 1870.0 | 3013.4 | 3998.9 |
| 0.14385E-6 | 94.634 | 476.72 | 937.84 | 1458.9 | 2009.2 | 3064.4 | 3868.6 |
| 0.26374E-6 | 202.99 | 573.46 | 1015.9 | 1511.0 | 2017.6 | 2924.1 | 3528.4 |
| 0.47953E-6 | 252.57 | 605.84 | 1014.8 | 1468.1 | 1907.3 | 2595.3 | 3041.5 |
| 0.95906E-6 | 263.96 | 577.72 | 933.32 | 1298.2 | 1623.6 | 2060.5 | 2344.0 |
| 0.14385E-5 | 252.66 | 533.89 | 845.79 | 1139.1 | 1398.4 | 1700.6 | 1881.9 |
| 0.33567E-5 | 182.33 | 364.55 | 549.55 | 705.27 | 827.05 | 955.81 | 1025.5 |
| 0.71929E-5 | 87.031 | 168.60 | 243.91 | 304.34 | 349.66 | 394.98 | 415.90 |
| 0.14385E-4 | 19.446 | 39.666 | 57.562 | 70.577 | 82.198 | 90.100 | 94.981 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.13132E-7 | -2449.0 | -2054.8 | -1572.3 | -1024.7 | -432.09 | 802.03 | 2043.1 |
| 0.23638E-7 | -1201.1 | -809.25 | -329.08 | 214.77 | 798.13 | 1999.7 | 3147.8 |
| 0.44650E-7 | -469.49 | -81.361 | 390.90 | 925.46 | 1497.2 | 2640.6 | 3626.1 |
| 0.78795E-7 | -116.01 | 266.07 | 727.18 | 1248.2 | 1798.6 | 2853.7 | 3657.9 |
| 0.14445E-6 | 88.716 | 459.18 | 901.70 | 1396.7 | 1903.4 | 2809.8 | 3414.1 |
| 0.26265E-6 | 190.33 | 543.60 | 952.65 | 1405.8 | 1845.1 | 2533.0 | 2979.3 |
| 0.52530E-6 | 233.51 | 547.27 | 902.87 | 1267.7 | 1593.1 | 2030.0 | 2313.6 |
| 0.78795E-6 | 232.79 | 514.02 | 825.92 | 1119.2 | 1378.6 | 1680.7 | 1862.0 |
| 0.18385E-5 | 174.51 | 356.73 | 541.73 | 697.45 | 819.23 | 947.99 | 1017.7 |
| 0.39397E-5 | 83.936 | 165.51 | 240.81 | 301.24 | 346.56 | 391.88 | 412.80 |
| 0.78795E-5 | 18.290 | 38.510 | 56.406 | 69.421 | 81.042 | 88.944 | 93.825 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.75820E-8 | -4506.8 | -4112.6 | -3630.1 | -3082.6 | -2489.9 | -1255.8 | -14.724 |
| 0.13647E-7 | -2343.8 | -1951.9 | -1471.7 | -927.94 | -344.57 | 857.01 | 2005.1 |
| 0.25779E-7 | -1073.8 | -685.74 | -213.47 | 321.08 | 892.82 | 2036.3 | 3021.7 |
| 0.45492E-7 | -457.95 | -75.858 | 385.25 | 906.33 | 1456.6 | 2511.8 | 3316.0 |
| 0.83402E-7 | -97.219 | 273.25 | 715.77 | 1210.8 | 1717.4 | 2623.9 | 3228.1 |
| 0.15164E-6 | 88.633 | 441.90 | 850.95 | 1304.1 | 1743.4 | 2431.3 | 2877.6 |
| 0.30328E-6 | 183.28 | 497.04 | 852.64 | 1217.5 | 1542.9 | 1979.8 | 2263.4 |
| 0.45492E-6 | 199.71 | 480.94 | 792.84 | 1086.1 | 1345.5 | 1647.6 | 1828.9 |
| 0.10614E-5 | 161.01 | 343.22 | 528.22 | 683.94 | 805.73 | 934.49 | 1004.2 |
| 0.22746E-5 | 78.206 | 159.78 | 235.08 | 295.51 | 340.83 | 386.15 | 407.07 |
| 0.45492E-5 | 15.880 | 36.100 | 53.996 | 67.011 | 78.632 | 86.534 | 91.415 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.41528E-8 | -8528.5 | -8134.4 | -7651.9 | -7104.3 | -6511.6 | -5277.5 | -4036.4 |
| 0.74751E-8 | -4577.4 | -4185.6 | -3705.4 | -3161.6 | -2578.2 | -1376.6 | -228.52 |
| 0.14119E-7 | -2255.7 | -1867.6 | -1395.3 | -860.77 | -289.03 | 854.45 | 1839.8 |
| 0.24917E-7 | -1127.0 | -744.98 | -283.86 | 237.20 | 787.57 | 1842.7 | 2646.8 |
| 0.45681E-7 | -461.56 | -91.098 | 351.42 | 846.46 | 1353.1 | 2259.5 | 2863.8 |
| 0.83057E-7 | -111.13 | 242.13 | 651.18 | 1104.3 | 1543.6 | 2231.6 | 2677.8 |
| 0.16611E-6 | 84.083 | 397.84 | 753.44 | 1118.3 | 1443.7 | 1880.6 | 2164.2 |
| 0.24917E-6 | 134.03 | 415.26 | 727.16 | 1020.4 | 1279.8 | 1581.9 | 1763.2 |
| 0.58140E-6 | 133.62 | 315.83 | 500.84 | 656.55 | 778.34 | 907.10 | 976.82 |
| 0.12458E-5 | 66.100 | 147.67 | 222.98 | 283.40 | 328.73 | 374.05 | 394.96 |
| 0.24917E-5 | 10.401 | 30.621 | 48.517 | 61.533 | 73.153 | 81.056 | 85.936 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.20764E-7 | -1676.2 | -1577.7 | -1457.0 | -1320.2 | -1172.0 | -863.50 | -553.23 |
| 0.37375E-7 | -887.16 | -789.20 | -669.16 | -533.19 | -387.35 | -86.959 | 200.07 |
| 0.70598E-7 | -424.10 | -327.07 | -209.00 | -75.366 | 67.569 | 353.44 | 599.80 |
| 0.12458E-6 | -199.60 | -104.08 | 11.198 | 141.46 | 279.05 | 542.84 | 743.88 |
| 0.22840E-6 | -67.960 | 24.656 | 135.28 | 259.04 | 385.71 | 612.32 | 763.39 |
| 0.41528E-6 | 0.43260 | 88.750 | 191.01 | 304.31 | 414.13 | 586.12 | 697.68 |
| 0.83057E-6 | 36.952 | 115.39 | 204.29 | 295.51 | 376.86 | 486.09 | 556.98 |
| 0.12458E-5 | 45.066 | 115.37 | 193.34 | 266.67 | 331.51 | 407.05 | 452.37 |
| 0.29070E-5 | 39.390 | 84.943 | 131.19 | 170.12 | 200.57 | 232.76 | 250.19 |
| 0.62293E-5 | 19.737 | 40.132 | 58.957 | 74.064 | 85.395 | 96.725 | 101.95 |
| 0.12458E-4 | 4.2708 | 9.3258 | 13.799 | 17.053 | 19.958 | 21.934 | 23.154 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.11988E-7 | -2977.3 | -2878.8 | -2758.1 | -2621.2 | -2473.1 | -2164.5 | -1854.3 |
| 0.21578E-7 | -1609.4 | -1511.4 | -1391.4 | -1255.4 | -1109.6 | -809.21 | -522.17 |
| 0.40760E-7 | -805.88 | -708.85 | -590.78 | -457.14 | -314.20 | -28.337 | 218.02 |
| 0.71929E-7 | -415.39 | -319.87 | -204.59 | -74.326 | 63.263 | 327.05 | 528.09 |
| 0.13187E-6 | -185.09 | -92.478 | 18.151 | 141.91 | 268.57 | 495.18 | 646.25 |
| 0.23976E-6 | -63.431 | 24.886 | 127.14 | 240.45 | 350.26 | 522.25 | 633.81 |
| 0.47953E-6 | 5.6319 | 84.072 | 172.97 | 264.19 | 345.54 | 454.77 | 525.66 |
| 0.71929E-6 | 24.584 | 94.890 | 172.86 | 246.19 | 311.03 | 386.57 | 431.89 |
| 0.16783E-5 | 31.254 | 76.808 | 123.05 | 161.98 | 192.43 | 224.62 | 242.05 |
| 0.35964E-5 | 16.463 | 36.857 | 55.683 | 70.790 | 82.120 | 93.451 | 98.680 |
| 0.71929E-5 | 3.0133 | 8.0684 | 12.542 | 15.796 | 18.701 | 20.677 | 21.897 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.65662E-8 | -5520.2 | -5421.7 | -5301.1 | -5164.2 | -5016.0 | -4707.5 | -4397.2 |
| 0.11819E-7 | -3021.5 | -2923.6 | -2803.5 | -2667.6 | -2521.7 | -2221.3 | -1934.3 |
| 0.22325E-7 | -1552.8 | -1455.8 | -1337.7 | -1204.1 | -1061.1 | -775.30 | -528.94 |
| 0.39397E-7 | -838.08 | -742.55 | -627.28 | -497.01 | -359.42 | -95.629 | 105.41 |
| 0.72229E-7 | -415.02 | -322.40 | -211.77 | -88.014 | 38.652 | 265.25 | 416.32 |
| 0.13132E-6 | -189.27 | -100.95 | 1.3083 | 114.61 | 224.42 | 396.41 | 507.97 |
| 0.26265E-6 | -56.607 | 21.832 | 110.73 | 201.95 | 283.30 | 392.53 | 463.42 |
| 0.39397E-6 | -16.461 | 53.844 | 131.82 | 205.14 | 269.99 | 345.52 | 390.84 |
| 0.91927E-6 | 14.405 | 59.959 | 106.21 | 145.13 | 175.58 | 207.77 | 225.20 |
| 0.19698E-5 | 9.2399 | 29.634 | 48.460 | 63.567 | 74.897 | 86.227 | 91.457 |
| 0.39397E-5 | -0.81946E-1 | 4.9731 | 9.4471 | 12.700 | 15.606 | 17.581 | 18.801 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.37910E-8 | -9637.4 | -9538.8 | -9418.2 | -9281.3 | -9133.2 | -8824.6 | -8514.3 |
| 0.68238E-8 | -5308.3 | -5210.3 | -5090.3 | -4954.3 | -4808.5 | -4508.1 | -4221.0 |
| 0.12889E-7 | -2762.8 | -2665.8 | -2547.7 | -2414.1 | -2271.1 | -1985.3 | -1738.9 |
| 0.22746E-7 | -1523.2 | -1427.6 | -1312.4 | -1182.1 | -1044.5 | -780.75 | -579.71 |
| 0.41701E-7 | -788.15 | -695.53 | -584.90 | -461.14 | -334.47 | -107.87 | 43.196 |
| 0.75820E-7 | -393.92 | -305.61 | -203.34 | -90.044 | 19.771 | 191.75 | 303.31 |
| 0.15164E-6 | -158.30 | -79.868 | 9.0306 | 100.25 | 181.59 | 290.83 | 361.72 |
| 0.22746E-6 | -83.847 | -13.541 | 64.434 | 137.76 | 202.60 | 278.14 | 323.46 |
| 0.53074E-6 | -13.776 | 31.777 | 78.028 | 116.95 | 147.40 | 179.59 | 197.02 |
| 0.11373E-5 | -3.2897 | 17.104 | 35.930 | 51.037 | 62.367 | 73.698 | 78.927 |
| 0.22746E-5 | -5.8114 | -0.75644 | 3.7175 | 6.9713 | 9.8765 | 11.852 | 13.072 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.20764E-8 | -17681 | -17582 | -17462 | -17325 | -17177 | -16868 | -16558 |
| 0.37375E-8 | -9776.9 | -9679.0 | -9558.9 | -9422.9 | -9277.1 | -8976.7 | -8689.7 |
| 0.70598E-8 | -5128.0 | -5030.9 | -4912.9 | -4779.2 | -4636.3 | -4350.4 | -4104.1 |
| 0.12458E-7 | -2862.8 | -2767.3 | -2652.0 | -2521.7 | -2384.1 | -2120.3 | -1919.3 |
| 0.22840E-7 | -1518.2 | -1425.6 | -1314.9 | -1191.2 | -1064.5 | -837.95 | -686.88 |
| 0.41528E-7 | -794.85 | -706.53 | -604.27 | -490.96 | -381.15 | -209.16 | -97.603 |
| 0.83057E-7 | -358.07 | -279.63 | -190.74 | -99.516 | -18.171 | 91.064 | 161.95 |
| 0.12458E-6 | -216.56 | -146.26 | -68.288 | 5.0391 | 69.883 | 145.41 | 190.73 |
| 0.29070E-6 | -69.880 | -24.326 | 21.924 | 60.853 | 91.300 | 123.49 | 140.92 |
| 0.62293E-6 | -28.764 | -8.3700 | 10.455 | 25.562 | 36.892 | 48.223 | 53.452 |
| 0.12458E-5 | -17.917 | -12.862 | -8.3887 | -5.1349 | -2.2297 | -0.25423 | 0.96594 |

300°C 50 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.39467E-7 | -4.2301 | 0.72895 | 6.7991 | 13.688 | 21.144 | 36.670 | 52.284 |
| 0.71041E-7 | 0.59869 | 5.5285 | 11.569 | 18.411 | 25.750 | 40.868 | 55.312 |
| 0.13418E-6 | 2.9891 | 7.8722 | 13.813 | 20.538 | 27.732 | 42.118 | 54.515 |
| 0.23680E-6 | 3.8317 | 8.6387 | 14.440 | 20.995 | 27.919 | 41.194 | 51.311 |
| 0.43414E-6 | 4.0811 | 8.7419 | 14.309 | 20.537 | 26.911 | 38.315 | 45.917 |
| 0.78934E-6 | 4.0165 | 8.4610 | 13.607 | 19.309 | 24.835 | 33.490 | 39.104 |
| 0.15786E-5 | 3.7119 | 7.6593 | 12.133 | 16.723 | 20.817 | 26.314 | 29.881 |
| 0.23680E-5 | 3.4208 | 6.9588 | 10.882 | 14.572 | 17.836 | 21.637 | 23.918 |
| 0.55254E-5 | 2.3742 | 4.6666 | 6.9942 | 8.9532 | 10.485 | 12.105 | 12.982 |
| 0.11840E-4 | 1.1198 | 2.1462 | 3.0935 | 3.8538 | 4.4240 | 4.9941 | 5.2573 |
| 0.23680E-4 | 0.25146 | 0.50585 | 0.73099 | 0.89474 | 1.0409 | 1.1403 | 1.2017 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.22786E-7 | -12.925 | -7.9662 | -1.8959 | 4.9929 | 12.449 | 27.975 | 43.589 |
| 0.41015E-7 | -3.8116 | 1.1182 | 7.1591 | 14.001 | 21.340 | 36.457 | 50.902 |
| 0.77474E-7 | 1.0313 | 5.9144 | 11.856 | 18.581 | 25.774 | 40.160 | 52.558 |
| 0.13671E-6 | 2.9858 | 7.7929 | 13.594 | 20.149 | 27.073 | 40.348 | 50.465 |
| 0.25065E-6 | 3.7948 | 8.4556 | 14.022 | 20.251 | 26.625 | 38.028 | 45.631 |
| 0.45573E-6 | 3.9418 | 8.3863 | 13.532 | 19.234 | 24.760 | 33.415 | 39.029 |
| 0.91146E-6 | 3.7019 | 7.6493 | 12.123 | 16.713 | 20.807 | 26.304 | 29.871 |
| 0.13671E-5 | 3.4184 | 6.9564 | 10.880 | 14.570 | 17.833 | 21.634 | 23.915 |
| 0.31901E-5 | 2.3742 | 4.6666 | 6.9941 | 8.9532 | 10.485 | 12.105 | 12.982 |
| 0.68359E-5 | 1.1198 | 2.1462 | 3.0935 | 3.8538 | 4.4240 | 4.9941 | 5.2573 |
| 0.13671E-4 | 0.25146 | 0.50585 | 0.73099 | 0.89474 | 1.0409 | 1.1403 | 1.2017 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.12480E-7 | -30.799 | -25.840 | -19.770 | -12.881 | -5.4251 | 10.101 | 25.715 |
| 0.22465E-7 | -13.239 | -8.3094 | -2.2684 | 4.5736 | 11.912 | 27.029 | 41.474 |
| 0.42434E-7 | -3.4763 | 1.4066 | 7.3482 | 14.073 | 21.266 | 35.652 | 48.050 |
| 0.74884E-7 | 0.80949 | 5.6165 | 11.417 | 17.973 | 24.897 | 38.172 | 48.289 |
| 0.13728E-6 | 2.9076 | 7.5685 | 13.135 | 19.363 | 25.738 | 37.141 | 44.744 |
| 0.24961E-6 | 3.6392 | 8.0837 | 13.229 | 18.931 | 24.458 | 33.113 | 38.727 |
| 0.49922E-6 | 3.6406 | 7.5880 | 12.061 | 16.652 | 20.746 | 26.243 | 29.810 |
| 0.74884E-6 | 3.3991 | 6.9371 | 10.861 | 14.551 | 17.814 | 21.615 | 23.896 |
| 0.17472E-5 | 2.3732 | 4.6656 | 6.9931 | 8.9522 | 10.484 | 12.104 | 12.981 |
| 0.37442E-5 | 1.1198 | 2.1461 | 3.0935 | 3.8537 | 4.4239 | 4.9941 | 5.2573 |
| 0.74884E-5 | 0.25146 | 0.50585 | 0.73099 | 0.89474 | 1.0409 | 1.1403 | 1.2017 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.72057E-8 | -60.570 | -55.611 | -49.540 | -42.651 | -35.195 | -19.669 | -4.0551 |
| 0.12970E-7 | -29.296 | -24.366 | -18.325 | -11.483 | -4.1442 | 10.972 | 25.417 |
| 0.24499E-7 | -11.494 | -6.6109 | -0.66938 | 6.0558 | 13.248 | 27.634 | 40.032 |
| 0.43234E-7 | -3.3290 | 1.4780 | 7.2792 | 13.834 | 20.758 | 34.033 | 44.150 |
| 0.79263E-7 | 1.0102 | 5.6710 | 11.238 | 17.466 | 23.840 | 35.244 | 42.846 |
| 0.14411E-6 | 2.8625 | 7.3070 | 12.453 | 18.155 | 23.681 | 32.336 | 37.950 |
| 0.28822E-6 | 3.4255 | 7.3729 | 11.846 | 16.437 | 20.530 | 26.028 | 29.595 |
| 0.43234E-6 | 3.3138 | 6.8519 | 10.775 | 14.466 | 17.729 | 21.530 | 23.811 |
| 0.10088E-5 | 2.3661 | 4.6585 | 6.9860 | 8.9451 | 10.477 | 12.097 | 12.974 |
| 0.21617E-5 | 1.1194 | 2.1458 | 3.0931 | 3.8534 | 4.4236 | 4.9937 | 5.2569 |
| 0.43234E-5 | 0.25144 | 0.50583 | 0.73098 | 0.89472 | 1.0409 | 1.1403 | 1.2017 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.39467E-8 | -119.69 | -114.73 | -108.66 | -101.77 | -94.317 | -78.790 | -63.176 |
| 0.71041E-8 | -61.598 | -56.668 | -50.627 | -43.785 | -36.445 | -21.328 | -6.8842 |
| 0.13418E-7 | -28.037 | -23.154 | -17.212 | -10.487 | -3.2942 | 11.091 | 23.489 |
| 0.23680E-7 | -12.216 | -7.4098 | -1.6086 | 4.9469 | 11.870 | 25.145 | 35.262 |
| 0.43414E-7 | -3.3741 | 1.2866 | 6.8539 | 13.082 | 19.456 | 30.860 | 38.462 |
| 0.78934E-7 | 0.83782 | 5.2823 | 10.428 | 16.130 | 21.656 | 30.311 | 35.925 |
| 0.15786E-6 | 2.7216 | 6.6690 | 11.142 | 15.733 | 19.827 | 25.324 | 28.891 |
| 0.23680E-6 | 2.9779 | 6.5159 | 10.439 | 14.130 | 17.393 | 21.194 | 23.475 |
| 0.55254E-6 | 2.3194 | 4.6118 | 6.9393 | 8.8984 | 10.430 | 12.050 | 12.927 |
| 0.11840E-5 | 1.1153 | 2.1416 | 3.0890 | 3.8492 | 4.4194 | 4.9896 | 5.2527 |
| 0.23680E-5 | 0.25118 | 0.50557 | 0.73072 | 0.89446 | 1.0406 | 1.1400 | 1.2014 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.19733E-7 | -19.485 | -18.246 | -16.728 | -15.006 | -13.142 | -9.2607 | -5.3572 |
| 0.35520E-7 | -8.7850 | -7.5526 | -6.0423 | -4.3318 | -2.4970 | 1.2822 | 4.8933 |
| 0.67094E-7 | -3.0054 | -1.7846 | -0.29927 | 1.3820 | 3.1802 | 6.7768 | 9.8762 |
| 0.11840E-6 | -0.58842 | 0.61334 | 2.0636 | 3.7025 | 5.4335 | 8.7522 | 11.281 |
| 0.21707E-6 | 0.51521 | 1.6804 | 3.0722 | 4.6292 | 6.2228 | 9.0737 | 10.974 |
| 0.39467E-6 | 0.87323 | 1.9843 | 3.2709 | 4.6963 | 6.0779 | 8.2417 | 9.6452 |
| 0.78934E-6 | 0.90980 | 1.8966 | 3.0150 | 4.1627 | 5.1861 | 6.5604 | 7.4522 |
| 0.11840E-5 | 0.85068 | 1.7351 | 2.7161 | 3.6387 | 4.4545 | 5.4048 | 5.9749 |
| 0.27627E-5 | 0.59343 | 1.1665 | 1.7484 | 2.2381 | 2.6212 | 3.0262 | 3.2455 |
| 0.59201E-5 | 0.27996 | 0.53655 | 0.77339 | 0.96345 | 1.1059 | 1.2485 | 1.3143 |
| 0.11840E-4 | 0.62865E-1 | 0.12646 | 0.18274 | 0.22368 | 0.26023 | 0.28508 | 0.30044 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.11393E-7 | -37.913 | -36.674 | -35.156 | -33.434 | -31.570 | -27.688 | -23.785 |
| 0.20507E-7 | -18.558 | -17.325 | -15.815 | -14.105 | -12.270 | -8.4910 | -4.8798 |
| 0.38737E-7 | 7.7281 | -6.5073 | -5.0219 | -3.3406 | -1.5424 | 2.0541 | 5.1535 |
| 0.68359E-7 | -2.9054 | -1.7036 | -0.25338 | 1.3855 | 3.1165 | 6.4352 | 8.9645 |
| 0.12532E-6 | -0.45563 | 0.70957 | 2.1013 | 3.6584 | 5.2520 | 8.1029 | 10.003 |
| 0.22786E-6 | 0.52818 | 1.6393 | 2.9258 | 4.3513 | 5.7329 | 7.8966 | 9.3001 |
| 0.45573E-6 | 0.83508 | 1.8219 | 2.9403 | 4.0880 | 5.1114 | 6.4857 | 7.3775 |
| 0.68359E-6 | 0.82606 | 1.7105 | 2.6915 | 3.6140 | 4.4298 | 5.3801 | 5.9503 |
| 0.15950E-5 | 0.59211 | 1.1652 | 1.7470 | 2.2368 | 2.6199 | 3.0248 | 3.2441 |
| 0.34179E-5 | 0.27992 | 0.53650 | 0.77334 | 0.96340 | 1.1059 | 1.2484 | 1.3142 |
| 0.68359E-5 | 0.62864E-1 | 0.12646 | 0.18274 | 0.22368 | 0.26023 | 0.28508 | 0.30043 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.62403E-8 | -74.854 | -73.614 | -72.097 | -70.375 | -68.511 | -64.629 | -60.725 |
| 0.11232E-7 | -38.549 | -37.316 | -35.806 | -34.095 | -32.260 | -28.481 | -24.870 |
| 0.21217E-7 | -17.775 | -16.554 | -15.068 | -13.387 | -11.589 | -7.9927 | -4.8933 |
| 0.37442E-7 | -8.1447 | -6.9430 | -5.4926 | -3.8537 | -2.1227 | 1.1959 | 3.7252 |
| 0.68643E-7 | -2.9029 | -1.7377 | -0.34589 | 1.2111 | 2.8047 | 5.6556 | 7.5562 |
| 0.12480E-6 | -0.50452 | 0.60659 | 1.8931 | 3.3186 | 4.7001 | 6.8639 | 8.2674 |
| 0.24961E-6 | 0.53247 | 1.5193 | 2.6377 | 3.7854 | 4.8088 | 6.1831 | 7.0749 |
| 0.37442E-6 | 0.70057 | 1.5850 | 2.5660 | 3.4886 | 4.3044 | 5.2547 | 5.8248 |
| 0.87364E-6 | 0.58026 | 1.1533 | 1.7352 | 2.2250 | 2.6080 | 3.0130 | 3.2323 |
| 0.18721E-5 | 0.27921 | 0.53579 | 0.77263 | 0.96269 | 1.1052 | 1.2477 | 1.3135 |
| 0.37442E-5 | 0.62833E-1 | 0.12643 | 0.18271 | 0.22365 | 0.26020 | 0.28505 | 0.30040 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.36028E-8 | -135.51 | -134.27 | -132.75 | -131.03 | -129.17 | -125.28 | -121.38 |
| 0.64851E-8 | -71.750 | -70.518 | -69.007 | -67.297 | -65.462 | -61.683 | -58.072 |
| 0.12249E-7 | -34.839 | -33.618 | -32.133 | -30.451 | -28.653 | -25.057 | -21.957 |
| 0.21617E-7 | -17.364 | -16.162 | -14.712 | -13.073 | -11.342 | -8.0238 | -5.4946 |
| 0.39631E-7 | -7.4986 | -6.3334 | -4.9416 | -3.3845 | -1.7910 | 1.0598 | 2.9604 |
| 0.72057E-7 | -2.6642 | -1.5531 | -0.26654 | 1.1589 | 2.5404 | 4.7042 | 6.1077 |
| 0.14411E-6 | -0.24420 | 0.74264 | 1.8610 | 3.0087 | 4.0321 | 5.4064 | 6.2982 |
| 0.21617E-6 | 0.31913 | 1.2036 | 2.1846 | 3.1071 | 3.9229 | 4.8732 | 5.4434 |
| 0.50440E-6 | 0.52273 | 1.0958 | 1.6777 | 2.1674 | 2.5505 | 2.9555 | 3.1748 |
| 0.10808E-5 | 0.27359 | 0.53017 | 0.76701 | 0.95707 | 1.0996 | 1.2421 | 1.3079 |
| 0.21617E-5 | 0.62454E-1 | 0.12605 | 0.18233 | 0.22327 | 0.25982 | 0.28467 | 0.30002 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.19733E-8 | -254.99 | -253.76 | -252.24 | -250.52 | -248.65 | -244.77 | -240.87 |
| 0.35520E-8 | -137.57 | -136.34 | -134.83 | -133.12 | -131.29 | -127.51 | -123.89 |
| 0.67094E-8 | -69.112 | -67.891 | -66.406 | -64.725 | -62.926 | -59.330 | -56.230 |
| 0.11840E-7 | -36.269 | -35.067 | -33.617 | -31.978 | -30.247 | -26.928 | -24.399 |
| 0.21707E-7 | -17.293 | -16.128 | -14.736 | -13.179 | -11.586 | -8.7353 | -6.8347 |
| 0.39467E-7 | -7.5839 | -6.4728 | -5.1862 | -3.7608 | -2.3792 | -0.21549 | 1.1880 |
| 0.78934E-7 | -2.2689 | -1.2820 | -0.16364 | 0.98402 | 2.0074 | 3.3817 | 4.2735 |
| 0.11840E-6 | -0.80187 | 0.82634E-1 | 1.0636 | 1.9861 | 2.8019 | 3.7522 | 4.3224 |
| 0.27627E-6 | 0.27679 | 0.84989 | 1.4317 | 1.9215 | 2.3045 | 2.7095 | 2.9288 |
| 0.59201E-6 | 0.23503 | 0.49161 | 0.72845 | 0.91851 | 1.0610 | 1.2036 | 1.2693 |
| 0.11840E-5 | 0.78279E-1 | 0.12187 | 0.17816 | 0.21909 | 0.25564 | 0.28050 | 0.29585 |

| $H_0$ | V/kT Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.39467E-7 | -11.851 | -1.9332 | 10.207 | 23.985 | 38.897 | 69.950 | 101.17 |
| 0.71041E-7 | -1.1709 | 8.6887 | 20.770 | 34.455 | 49.133 | 79.367 | 108.25 |
| 0.13418E-6 | 4.5574 | 14.323 | 26.206 | 39.657 | 54.043 | 82.815 | 107.61 |
| 0.23680E-6 | 6.8926 | 16.506 | 28.109 | 41.220 | 55.068 | 81.618 | 101.85 |
| 0.43414E-6 | 7.8427 | 17.164 | 28.299 | 40.755 | 53.503 | 76.311 | 91.515 |
| 0.78934E-6 | 7.9346 | 16.823 | 27.116 | 38.519 | 49.572 | 66.882 | 78.110 |
| 0.15786E-5 | 7.4083 | 15.303 | 24.250 | 33.431 | 41.619 | 52.613 | 59.747 |
| 0.23680E-5 | 6.8375 | 13.913 | 21.761 | 29.141 | 35.668 | 43.270 | 47.832 |
| 0.55254E-5 | 4.7484 | 9.3332 | 13.988 | 17.906 | 20.970 | 24.210 | 25.964 |
| 0.11840E-4 | 2.2397 | 4.2924 | 6.1871 | 7.7076 | 8.8480 | 9.9883 | 10.514 |
| 0.23680E-4 | 0.50292 | 1.0117 | 1.4619 | 1.7894 | 2.0818 | 2.2807 | 2.4035 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.22786E-7 | -30.279 | -20.361 | -8.2206 | 5.5572 | 20.469 | 51.522 | 82.750 |
| 0.41015E-7 | -10.944 | -1.0845 | 10.997 | 24.681 | 39.360 | 69.594 | 98.483 |
| 0.77474E-7 | -0.16520 | 9.6009 | 21.484 | 34.934 | 49.320 | 78.092 | 102.88 |
| 0.13671E-6 | 4.5755 | 14.189 | 25.792 | 38.903 | 52.751 | 79.301 | 99.535 |
| 0.25065E-6 | 6.8719 | 16.193 | 27.328 | 39.784 | 52.533 | 75.340 | 90.545 |
| 0.45573E-6 | 7.5896 | 16.478 | 26.771 | 38.174 | 49.227 | 66.537 | 77.765 |
| 0.91146E-6 | 7.3336 | 15.228 | 24.175 | 33.357 | 41.544 | 52.538 | 59.673 |
| 0.13671E-5 | 6.8129 | 13.889 | 21.737 | 29.117 | 35.643 | 43.245 | 47.807 |
| 0.31901E-5 | 4.7471 | 9.3319 | 13.986 | 17.905 | 20.969 | 24.209 | 25.963 |
| 0.68359E-5 | 2.2397 | 4.2923 | 6.1871 | 7.7076 | 8.8479 | 9.9883 | 10.514 |
| 0.13671E-4 | 0.50292 | 1.0117 | 1.4619 | 1.7894 | 2.0818 | 2.2807 | 2.4035 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.12480E-7 | -67.220 | -57.301 | -45.161 | -31.383 | -16.471 | 14.581 | 45.809 |
| 0.22465E-7 | -30.934 | -21.075 | -8.9932 | 4.6911 | 19.369 | 49.603 | 78.492 |
| 0.42434E-7 | -10.212 | -0.44592 | 11.437 | 24.887 | 39.273 | 68.045 | 92.841 |
| 0.74884E-7 | -0.66371 | 8.9503 | 20.552 | 33.664 | 47.512 | 74.062 | 94.296 |
| 0.13728E-6 | 4.4246 | 13.746 | 24.880 | 37.337 | 50.085 | 72.892 | 88.097 |
| 0.24961E-6 | 6.5569 | 15.445 | 25.738 | 37.141 | 48.194 | 65.504 | 76.732 |
| 0.49922E-6 | 7.0310 | 14.925 | 23.873 | 33.054 | 41.241 | 52.236 | 59.370 |
| 0.74884E-6 | 6.6874 | 13.763 | 21.611 | 28.991 | 35.518 | 43.120 | 47.681 |
| 0.17472E-5 | 4.7352 | 9.3200 | 13.975 | 17.893 | 20.957 | 24.197 | 25.951 |
| 0.37442E-5 | 2.2390 | 4.2916 | 6.1864 | 7.7069 | 8.8472 | 9.9876 | 10.513 |
| 0.74884E-5 | 0.50289 | 1.0116 | 1.4619 | 1.7894 | 2.0818 | 2.2806 | 2.4034 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.72057E-8 | -127.87 | -117.96 | -105.82 | -92.042 | -77.130 | -46.077 | -14.849 |
| 0.12970E-7 | -64.136 | -54.276 | -42.194 | -28.510 | -13.831 | 16.402 | 45.291 |
| 0.24499E-7 | -27.276 | -17.510 | -5.6272 | 7.8231 | 22.209 | 50.981 | 75.776 |
| 0.43234E-7 | -9.8835 | -0.26944 | 11.332 | 24.444 | 38.292 | 64.842 | 85.076 |
| 0.79263E-7 | -0.17110 | 9.1506 | 20.285 | 32.741 | 45.490 | 68.297 | 83.502 |
| 0.14411E-6 | 4.3972 | 13.286 | 23.578 | 34.982 | 46.034 | 63.345 | 74.573 |
| 0.28822E-6 | 6.2543 | 14.149 | 23.096 | 32.277 | 40.465 | 51.459 | 58.593 |
| 0.43234E-6 | 6.3060 | 13.382 | 21.230 | 28.610 | 35.136 | 42.739 | 47.300 |
| 0.10088E-5 | 4.6777 | 9.2625 | 13.917 | 17.835 | 20.900 | 24.139 | 25.894 |
| 0.21617E-5 | 2.2334 | 4.2860 | 6.1808 | 7.7012 | 8.8416 | 9.9820 | 10.508 |
| 0.43234E-5 | 0.50251 | 1.0112 | 1.4615 | 1.7890 | 2.0814 | 2.2803 | 2.4031 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.39467E-8 | -247.36 | -237.44 | -225.30 | -211.52 | -196.61 | -165.56 | -134.33 |
| 0.71041E-8 | -129.96 | -120.10 | -108.02 | -94.338 | -79.659 | -49.425 | -20.536 |
| 0.13418E-7 | -61.549 | -51.783 | -39.900 | -26.449 | -12.063 | 16.708 | 41.503 |
| 0.23680E-7 | -28.788 | -19.173 | -7.5714 | 5.5397 | 19.387 | 45.937 | 66.171 |
| 0.43414E-7 | -9.9663 | -0.64466 | 10.489 | 22.946 | 35.694 | 58.502 | 73.706 |
| 0.78934E-7 | -0.52251 | 8.3664 | 18.658 | 30.062 | 41.115 | 58.425 | 69.653 |
| 0.15786E-6 | 4.2296 | 12.124 | 21.071 | 30.253 | 38.440 | 49.434 | 56.569 |
| 0.23680E-6 | 5.1850 | 12.261 | 20.109 | 27.489 | 34.015 | 41.618 | 46.179 |
| 0.55254E-6 | 4.4317 | 9.0166 | 13.671 | 17.589 | 20.654 | 23.893 | 25.648 |
| 0.11840E-5 | 2.1948 | 4.2474 | 6.1422 | 7.6627 | 8.8030 | 9.9434 | 10.469 |
| 0.23680E-5 | 0.49834 | 1.0071 | 1.4574 | 1.7849 | 2.0773 | 2.2761 | 2.3989 |

| $H_0$ | V/kT: Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.19733E-7 | -43.681 | -41.201 | -38.166 | -34.722 | -30.994 | -23.230 | -15.423 |
| 0.35520E-7 | -21.155 | -18.690 | -15.669 | -12.248 | -8.5792 | -1.0206 | 6.2016 |
| 0.67094E-7 | -8.4734 | -6.0319 | -3.0611 | 0.30143 | 3.8979 | 11.090 | 17.289 |
| 0.11840E-6 | -2.7677 | -0.36417 | 2.5364 | 5.8142 | 9.2762 | 15.913 | 20.972 |
| 0.21707E-6 | 0.17388 | 2.5043 | 5.2879 | 8.4020 | 11.589 | 17.290 | 21.092 |
| 0.39467E-6 | 1.3725 | 3.5948 | 6.1679 | 9.0188 | 11.782 | 16.109 | 18.916 |
| 0.78934E-6 | 1.7211 | 3.6948 | 5.9317 | 8.2270 | 10.273 | 13.022 | 14.806 |
| 0.11840E-5 | 1.6656 | 3.4346 | 5.3966 | 7.2416 | 8.8732 | 10.773 | 11.914 |
| 0.27627E-5 | 1.1845 | 2.3307 | 3.4945 | 4.4740 | 5.2401 | 6.0501 | 6.4887 |
| 0.59201E-5 | 0.55984 | 1.0730 | 1.5466 | 1.9268 | 2.2119 | 2.4969 | 2.6285 |
| 0.11840E-4 | 0.12572 | 0.25292 | 0.36549 | 0.44736 | 0.52046 | 0.57017 | 0.60087 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.11393E-7 | -81.632 | -79.153 | -76.117 | -72.673 | -68.945 | -61.182 | -53.375 |
| 0.20507E-7 | -41.750 | -39.285 | -36.265 | -32.844 | -29.174 | -21.616 | -14.393 |
| 0.38737E-7 | -18.881 | -16.440 | -13.469 | -10.106 | -6.5101 | 0.68288 | 6.8817 |
| 0.68359E-7 | -8.2425 | -5.8390 | -2.9384 | 0.33934 | 3.8013 | 10.438 | 15.497 |
| 0.12532E-6 | -2.4237 | -0.93370E-1 | 2.6902 | 5.8043 | 8.9914 | 14.693 | 18.494 |
| 0.22786E-6 | 0.24827 | 2.4705 | 5.0436 | 7.8945 | 10.657 | 14.985 | 17.792 |
| 0.45573E-6 | 1.3761 | 3.3498 | 5.5867 | 7.8820 | 9.9288 | 12.677 | 14.461 |
| 0.68359E-6 | 1.5171 | 3.2862 | 5.2482 | 7.0932 | 8.7248 | 10.625 | 11.765 |
| 0.15950E-5 | 1.1691 | 2.3153 | 3.4791 | 4.486 | 5.2247 | 6.0347 | 6.4733 |
| 0.34179E-5 | 0.55884 | 1.0720 | 1.5456 | 1.9258 | 2.2109 | 2.4959 | 2.6275 |
| 0.68359E-5 | 0.12568 | 0.25287 | 0.36544 | 0.44732 | 0.52042 | 0.57012 | 0.60083 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.62403E-8 | -156.74 | -154.26 | -151.22 | -147.78 | -144.05 | -136.29 | -128.48 |
| 0.11232E-7 | -82.931 | -80.466 | -77.446 | -74.025 | -70.355 | -62.796 | -55.574 |
| 0.21217E-7 | -40.117 | -37.676 | -34.705 | -31.342 | -27.746 | -20.553 | -14.354 |
| 0.37442E-7 | -19.777 | -17.373 | -14.473 | -11.195 | -7.7333 | -1.0959 | 3.9626 |
| 0.68643E-7 | -8.2306 | -5.9002 | -3.1166 | -0.25511E-2 | 3.1846 | 8.8864 | 12.687 |
| 0.12480E-6 | -2.5272 | -0.30498 | 2.2681 | 5.1190 | 7.8822 | 12.209 | 15.016 |
| 0.24961E-6 | 0.34343 | 2.3171 | 4.5539 | 6.8493 | 8.8961 | 11.644 | 13.428 |
| 0.37442E-6 | 0.99460 | 2.7636 | 4.7256 | 6.5706 | 8.2022 | 10.102 | 11.243 |
| 0.87364E-6 | 1.0827 | 2.2290 | 3.3927 | 4.3722 | 5.1383 | 5.9483 | 6.3869 |
| 0.18721E-5 | 0.54939 | 1.0625 | 1.5362 | 1.9163 | 2.2014 | 2.4865 | 2.6181 |
| 0.37442E-5 | 0.12497 | 0.25216 | 0.36474 | 0.44661 | 0.51971 | 0.56942 | 0.60012 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.36028E-8 | -279.19 | -276.72 | -273.68 | -270.24 | -266.51 | -258.74 | -250.94 |
| 0.64851E-8 | -150.45 | -147.99 | -144.97 | -141.54 | -137.88 | -130.32 | -123.09 |
| 0.12249E-7 | -75.337 | -72.895 | -69.925 | -66.562 | -62.966 | -55.772 | -49.574 |
| 0.21617E-7 | -39.260 | -36.856 | -33.956 | -30.678 | -27.216 | -20.578 | -15.520 |
| 0.39631E-7 | -18.380 | -16.050 | -13.266 | -10.152 | -6.9655 | -1.2637 | 2.5374 |
| 0.72057E-7 | -7.6736 | -5.4513 | -2.8782 | -0.27357E-1 | 2.7358 | 7.0633 | 9.8703 |
| 0.14411E-6 | -1.8162 | 0.15743 | 2.3942 | 4.6896 | 6.7364 | 9.4849 | 11.268 |
| 0.21617E-6 | -0.22249 | 1.5465 | 3.5085 | 5.3535 | 6.9851 | 8.8857 | 10.026 |
| 0.50440E-6 | 0.79997 | 1.9461 | 3.1099 | 4.0894 | 4.8555 | 5.6655 | 6.1041 |
| 0.10808E-5 | 0.50153 | 1.0146 | 1.4883 | 1.8685 | 2.1535 | 2.4386 | 2.5702 |
| 0.21617E-5 | 0.11935 | 0.24654 | 0.35911 | 0.44099 | 0.51409 | 0.56379 | 0.59450 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.19733E-8 | -519.42 | -516.94 | -513.91 | -510.46 | -506.74 | -498.97 | -491.17 |
| 0.35520E-8 | -283.35 | -280.89 | -277.87 | -274.45 | -270.78 | -263.22 | -256.00 |
| 0.67094E-8 | -145.11 | -142.66 | -139.69 | -136.33 | -132.73 | -125.54 | -119.34 |
| 0.11840E-7 | -78.265 | -75.861 | -72.961 | -69.683 | -66.221 | -59.583 | -54.52 |
| 0.21707E-7 | -39.110 | -36.780 | -33.996 | -30.882 | -27.695 | -21.993 | -18.192 |
| 0.39467E-7 | -18.559 | -16.336 | -13.763 | -10.912 | -8.1496 | -3.8221 | -1.0150 |
| 0.78934E-7 | -6.7360 | -4.7623 | -2.5254 | -0.23011 | 1.8166 | 4.5652 | 6.3488 |
| 0.11840E-6 | -3.1946 | -1.4255 | 0.53641 | 2.3814 | 4.0130 | 5.9136 | 7.0540 |
| 0.27627E-6 | -0.78357E-1 | 1.0678 | 2.2316 | 3.2111 | 3.9772 | 4.7871 | 5.2257 |
| 0.59201E-6 | 0.28894 | 0.80210 | 1.2757 | 1.6559 | 1.9410 | 2.2260 | 2.3576 |
| 0.11840E-5 | 0.80793E-1 | 0.20798 | 0.32056 | 0.40243 | 0.47553 | 0.52524 | 0.55594 |

300°C 200 Å z = 1

| $H_0$ | V/kT: Z = 2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.39467E-7 | -28.412 | -8.5758 | 15.705 | 43.260 | 73.085 | 135.19 | 197.64 |
| 0.71041E-7 | -5.9271 | 13.792 | 37.956 | 65.324 | 94.681 | 155.15 | 212.92 |
| 0.13418E-6 | 6.6523 | 26.184 | 49.950 | 76.851 | 105.62 | 163.16 | 212.75 |
| 0.23680E-6 | 12.194 | 31.422 | 54.627 | 80.849 | 108.54 | 161.64 | 202.11 |
| 0.43414E-6 | 14.828 | 33.472 | 55.741 | 80.654 | 106.15 | 151.76 | 182.17 |
| 0.78934E-6 | 15.495 | 33.273 | 53.858 | 76.665 | 98.771 | 133.39 | 155.84 |
| 0.15786E-5 | 14.718 | 30.507 | 48.402 | 66.765 | 83.139 | 105.12 | 119.39 |
| 0.23680E-5 | 13.639 | 27.791 | 43.487 | 58.247 | 71.300 | 86.505 | 95.628 |
| 0.55254E-5 | 9.4945 | 18.664 | 27.974 | 35.810 | 41.939 | 48.418 | 51.927 |
| 0.11840E-4 | 4.4794 | 8.5847 | 12.374 | 15.415 | 17.695 | 19.976 | 21.029 |
| 0.23680E-4 | 1.0058 | 2.0234 | 2.9239 | 3.5789 | 4.1637 | 4.5614 | 4.8070 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.22786E-7 | -66.363 | -46.527 | -22.246 | 5.3095 | 35.134 | 97.240 | 159.69 |
| 0.41015E-7 | -26.522 | -6.8030 | 17.360 | 44.729 | 74.086 | 134.55 | 192.33 |
| 0.77474E-7 | -3.7557 | 15.776 | 39.542 | 66.443 | 95.215 | 152.76 | 202.35 |
| 0.13671E-6 | 6.7195 | 25.947 | 49.152 | 75.375 | 103.07 | 156.17 | 196.63 |
| 0.25065E-6 | 12.231 | 30.874 | 53.143 | 78.056 | 103.55 | 149.16 | 179.57 |
| 0.45573E-6 | 14.371 | 32.149 | 52.734 | 75.541 | 97.646 | 132.26 | 154.72 |
| 0.91146E-6 | 14.373 | 30.162 | 48.057 | 66.420 | 82.794 | 104.78 | 119.05 |
| 0.13671E-5 | 13.490 | 27.643 | 43.339 | 58.099 | 71.152 | 86.357 | 95.479 |
| 0.31901E-5 | 9.4791 | 18.648 | 27.958 | 35.795 | 41.923 | 48.403 | 51.912 |
| 0.68359E-5 | 4.4784 | 8.5837 | 12.373 | 15.414 | 17.694 | 19.975 | 21.028 |
| 0.13671E-4 | 1.0058 | 2.0233 | 2.9239 | 3.5789 | 4.1637 | 4.5613 | 4.8070 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.12480E-7 | -141.47 | -121.63 | -97.357 | -69.801 | -39.976 | 22.128 | 84.585 |
| 0.22465E-7 | -67.703 | -47.983 | -23.820 | 3.5486 | 32.905 | 93.373 | 151.15 |
| 0.42434E-7 | -24.991 | -5.4593 | 18.306 | 45.207 | 73.979 | 131.52 | 181.11 |
| 0.74884E-7 | -4.8152 | 14.412 | 37.617 | 63.840 | 91.536 | 144.63 | 185.10 |
| 0.13728E-6 | 6.4244 | 25.067 | 47.337 | 72.249 | 97.746 | 143.36 | 173.77 |
| 0.24961E-6 | 11.595 | 29.373 | 49.958 | 72.765 | 94.871 | 129.49 | 151.94 |
| 0.49922E-6 | 13.340 | 29.130 | 47.025 | 65.387 | 81.762 | 103.75 | 118.01 |
| 0.74884E-6 | 12.968 | 27.120 | 42.816 | 57.576 | 70.629 | 85.834 | 94.957 |
| 0.17472E-5 | 9.3928 | 18.562 | 27.872 | 35.708 | 41.837 | 48.317 | 51.825 |
| 0.37442E-5 | 4.4690 | 8.5743 | 12.363 | 15.404 | 17.685 | 19.966 | 21.018 |
| 0.74884E-5 | 1.0050 | 2.0226 | 2.9232 | 3.5782 | 4.1630 | 4.5606 | 4.8062 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.72057E-8 | -263.93 | -244.09 | -219.81 | -192.25 | -162.43 | -100.32 | -37.870 |
| 0.12970E-7 | -135.22 | -115.50 | -91.344 | -63.976 | -34.619 | 25.849 | 83.627 |
| 0.24499E-7 | -60.211 | -40.679 | -16.913 | 9.9877 | 38.759 | 96.304 | 145.89 |
| 0.43234E-7 | -24.298 | -5.0700 | 18.134 | 44.357 | 72.053 | 125.15 | 165.62 |
| 0.79263E-7 | -3.7257 | 14.917 | 37.186 | 62.099 | 87.596 | 133.21 | 163.62 |
| 0.14411E-6 | 6.4493 | 24.227 | 44.812 | 67.619 | 89.724 | 124.34 | 146.80 |
| 0.28822E-6 | 11.180 | 26.970 | 44.865 | 63.228 | 79.602 | 101.59 | 115.86 |
| 0.43234E-6 | 11.751 | 25.903 | 41.599 | 56.359 | 69.412 | 84.617 | 93.740 |
| 0.10088E-5 | 9.1099 | 18.279 | 27.589 | 35.425 | 41.554 | 48.034 | 51.543 |
| 0.21617E-5 | 4.4211 | 8.5264 | 12.315 | 15.356 | 17.637 | 19.918 | 20.970 |
| 0.43234E-5 | 0.99947 | 2.0170 | 2.9176 | 3.5725 | 4.1573 | 4.5550 | 4.8006 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.39467E-8 | -504.15 | -484.32 | -460.04 | -432.48 | -402.66 | -340.55 | -278.09 |
| 0.71041E-8 | -268.12 | -248.41 | -224.24 | -196.87 | -167.52 | -107.05 | -49.274 |
| 0.13418E-7 | -129.98 | -110.45 | -86.685 | -59.785 | -31.012 | 26.531 | 76.122 |
| 0.23680E-7 | -63.303 | -44.074 | -20.870 | 5.3523 | 33.048 | 86.148 | 126.61 |
| 0.43414E-7 | -24.455 | -5.8123 | 16.456 | 41.369 | 66.866 | 112.48 | 142.89 |
| 0.78934E-7 | -4.4361 | 13.341 | 33.926 | 56.733 | 78.839 | 113.45 | 135.91 |
| 0.15786E-6 | 6.2611 | 22.050 | 39.945 | 58.308 | 74.682 | 96.671 | 110.94 |
| 0.23680E-6 | 8.7791 | 22.931 | 38.627 | 53.387 | 66.440 | 81.645 | 90.768 |
| 0.55254E-6 | 8.2316 | 17.401 | 26.711 | 34.547 | 40.676 | 47.155 | 50.664 |
| 0.11840E-5 | 4.2085 | 8.3138 | 12.103 | 15.144 | 17.425 | 19.705 | 20.758 |
| 0.23680E-5 | 0.96091 | 1.9784 | 2.8790 | 3.5340 | 4.1188 | 4.5165 | 4.7621 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.19733E-7 | -93.459 | -88.500 | -82.429 | -75.540 | -68.084 | -52.558 | -36.944 |
| 0.35520E-7 | -47.227 | -42.297 | -36.256 | -29.414 | -22.075 | -6.9581 | 7.4864 |
| 0.67094E-7 | -20.638 | -15.755 | -9.8138 | -3.0886 | 4.1043 | 18.490 | 30.888 |
| 0.11840E-6 | -8.2086 | -3.4016 | 2.3995 | 8.9551 | 15.879 | 29.154 | 39.271 |
| 0.21707E-6 | -1.3664 | 3.2944 | 8.8617 | 15.089 | 21.464 | 32.867 | 40.470 |
| 0.39467E-6 | 1.7887 | 6.2332 | 11.379 | 17.081 | 22.607 | 31.262 | 36.876 |
| 0.78934E-6 | 3.0684 | 7.0158 | 11.489 | 16.080 | 20.173 | 25.671 | 29.238 |
| 0.11840E-5 | 3.1500 | 6.6881 | 10.612 | 14.302 | 17.565 | 21.366 | 23.647 |
| 0.27627E-5 | 2.3459 | 4.6384 | 6.9659 | 8.9249 | 10.457 | 12.077 | 12.954 |
| 0.59201E-5 | 1.1179 | 2.1442 | 3.0916 | 3.8518 | 4.4220 | 4.9922 | 5.2553 |
| 0.11840E-4 | 0.25136 | 0.50575 | 0.73089 | 0.89464 | 1.0408 | 1.1402 | 1.2016 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.11393E-7 | -170.48 | -165.52 | -159.45 | -152.56 | -145.11 | -129.58 | -113.97 |
| 0.20507E-7 | -89.519 | -84.589 | -78.548 | -71.706 | -64.367 | -49.250 | -34.805 |
| 0.38737E-7 | -42.509 | -37.626 | -31.684 | -24.959 | -17.766 | -3.3802 | 9.0174 |
| 0.68359E-7 | -20.141 | -15.334 | -9.5335 | -2.9779 | 3.9460 | 17.221 | 27.338 |
| 0.12532E-6 | -7.4245 | -2.7636 | 2.8036 | 9.0317 | 15.406 | 26.809 | 34.412 |
| 0.22786E-6 | -1.1483 | 3.2961 | 8.4423 | 14.144 | 19.670 | 28.325 | 33.939 |
| 0.45573E-6 | 1.9441 | 5.8915 | 10.365 | 14.955 | 19.049 | 24.546 | 28.113 |
| 0.68359E-6 | 2.5669 | 6.1049 | 10.029 | 13.719 | 16.982 | 20.783 | 23.064 |
| 0.15950E-5 | 2.2422 | 4.5346 | 6.8621 | 8.8212 | 10.353 | 11.973 | 12.850 |
| 0.34179E-5 | 1.1055 | 2.1318 | 3.0792 | 3.8395 | 4.4096 | 4.9798 | 5.2430 |
| 0.68359E-5 | 0.25035 | 0.50474 | 0.72989 | 0.89363 | 1.0398 | 1.1392 | 1.2006 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.62403E-8 | -321.95 | -317.00 | -310.92 | -304.04 | -296.58 | -281.05 | -265.44 |
| 0.11232E-7 | -173.11 | -168.18 | -162.14 | -155.30 | -147.96 | -132.84 | -118.40 |
| 0.21217E-7 | -86.184 | -81.301 | -75.359 | -68.634 | -61.441 | -47.055 | -34.657 |
| 0.37442E-7 | -44.367 | -39.560 | -33.759 | -27.203 | -20.279 | -7.0047 | 3.1123 |
| 0.68643E-7 | -20.110 | -15.449 | -9.8821 | -3.6540 | 2.7202 | 14.123 | 21.726 |
| 0.12480E-6 | -7.6383 | -3.1938 | 1.9523 | 7.6541 | 13.180 | 21.835 | 27.449 |
| 0.24961E-6 | -0.83130 | 3.1160 | 7.5898 | 12.180 | 16.274 | 21.771 | 25.338 |
| 0.37442E-6 | 0.97505 | 4.5130 | 8.4370 | 12.127 | 15.390 | 19.191 | 21.472 |
| 0.87364E-6 | 1.8494 | 4.1418 | 6.4693 | 8.4284 | 9.9606 | 11.580 | 12.457 |
| 0.18721E-5 | 1.0330 | 2.0593 | 3.0067 | 3.7669 | 4.3371 | 4.9073 | 5.1704 |
| 0.37442E-5 | 0.24091 | 0.49530 | 0.72045 | 0.88419 | 1.0303 | 1.1298 | 1.1912 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.36028E-8 | -568.01 | -563.05 | -556.98 | -550.09 | -542.64 | -527.11 | -511.50 |
| 0.64851E-8 | -309.30 | -304.37 | -298.33 | -291.49 | -284.15 | -269.03 | -254.59 |
| 0.12249E-7 | -157.74 | -152.86 | -146.92 | -140.19 | -133.00 | -118.61 | -106.22 |
| 0.21617E-7 | -84.432 | -79.625 | -73.823 | -67.268 | -60.344 | -47.069 | -36.952 |
| 0.39631E-7 | -41.462 | -36.802 | -31.234 | -25.006 | -18.632 | -7.2287 | 0.37364 |
| 0.72057E-7 | -18.906 | -14.461 | -9.3153 | -3.6135 | 1.9127 | 10.567 | 16.181 |
| 0.14411E-6 | -5.9776 | -2.0302 | 2.4434 | 7.0341 | 11.127 | 16.624 | 20.192 |
| 0.21617E-6 | -2.1652 | 1.3728 | 5.2968 | 8.9869 | 12.250 | 16.051 | 18.332 |
| 0.50440E-6 | 0.88787 | 3.1802 | 5.5077 | 7.4668 | 8.9990 | 10.618 | 11.496 |
| 0.10808E-5 | 0.78708 | 1.8134 | 2.7607 | 3.5210 | 4.0912 | 4.6613 | 4.9245 |
| 0.21617E-5 | 0.19305 | 0.44744 | 0.67259 | 0.83633 | 0.98253 | 1.0819 | 1.1433 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.19733E-8 | -1049.7 | -1044.7 | -1038.7 | -1031.8 | -1024.3 | -1008.8 | -993.21 |
| 0.35520E-8 | -576.36 | -571.43 | -565.39 | -558.55 | -551.21 | -536.09 | -521.65 |
| 0.67094E-8 | -298.54 | -293.65 | -287.71 | -280.99 | -273.79 | -259.41 | -247.01 |
| 0.11840E-7 | -163.67 | -158.86 | -153.06 | -146.50 | -139.58 | -126.31 | -116.19 |
| 0.21707E-7 | -84.124 | -79.464 | -73.896 | -67.668 | -61.294 | -49.890 | -42.288 |
| 0.39467E-7 | -41.827 | -37.383 | -32.236 | -26.535 | -21.008 | -12.353 | -6.7395 |
| 0.78934E-7 | -16.863 | -12.915 | -8.4420 | -3.8513 | 0.24222 | 5.7393 | 9.3066 |
| 0.11840E-6 | -9.0625 | -5.5244 | -1.6004 | 2.0896 | 5.3528 | 9.1540 | 11.434 |
| 0.27627E-6 | -1.5393 | 0.75305 | 3.0805 | 5.0396 | 6.5718 | 8.1917 | 9.0689 |
| 0.59201E-6 | 0.27288E-2 | 1.0290 | 1.9764 | 2.7366 | 3.3068 | 3.8770 | 4.1401 |
| 0.11840E-5 | -0.19538E-1 | 0.23484 | 0.45999 | 0.62374 | 0.76994 | 0.86935 | 0.93076 |

300°C 400 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ M | | | |
| 0.39467E-7 | -62.920 | -23.248 | 25.313 | 80.425 | 140.07 | 264.28 | 389.19 |
| 0.71041E-7 | -16.771 | 22.667 | 70.995 | 125.73 | 184.44 | 305.38 | 420.94 |
| 0.13418E-6 | 9.6132 | 48.677 | 96.210 | 150.01 | 207.55 | 322.64 | 421.82 |
| 0.23680E-6 | 21.715 | 60.171 | 106.58 | 159.02 | 214.41 | 320.61 | 401.55 |
| 0.43414E-6 | 27.943 | 65.230 | 109.76 | 159.59 | 210.58 | 301.81 | 362.63 |
| 0.78934E-6 | 30.034 | 65.590 | 106.76 | 152.37 | 196.58 | 265.82 | 310.73 |
| 0.15786E-5 | 29.062 | 60.642 | 96.431 | 133.15 | 165.90 | 209.88 | 238.42 |
| 0.23680E-5 | 27.097 | 55.401 | 86.794 | 116.31 | 142.42 | 172.82 | 191.07 |
| 0.55254E-5 | 18.966 | 37.305 | 55.925 | 71.598 | 83.855 | 96.814 | 103.83 |
| 0.11840E-4 | 8.9571 | 17.167 | 24.746 | 30.828 | 35.390 | 39.951 | 42.056 |
| 0.23680E-4 | 2.0116 | 4.0467 | 5.8478 | 7.1578 | 8.3274 | 9.1227 | 9.6140 |
| | | | | $3 \times 10^{-5}$ M | | | |
| 0.22786E-7 | -139.94 | -100.27 | -51.715 | 3.3965 | 63.046 | 187.25 | 312.17 |
| 0.41015E-7 | -59.063 | -19.624 | 28.703 | 83.440 | 142.15 | 263.09 | 378.64 |
| 0.77474E-7 | -12.257 | 26.807 | 74.339 | 128.14 | 185.68 | 300.77 | 399.95 |
| 0.13671E-6 | 9.7823 | 48.238 | 94.648 | 147.09 | 202.48 | 308.68 | 389.62 |
| 0.25065E-6 | 21.885 | 59.172 | 103.71 | 153.53 | 204.53 | 295.75 | 356.57 |
| 0.45573E-6 | 27.097 | 62.653 | 103.82 | 149.43 | 193.64 | 262.88 | 307.80 |
| 0.91146E-6 | 27.938 | 59.517 | 95.307 | 132.03 | 164.78 | 208.75 | 237.29 |
| 0.13671E-5 | 26.514 | 54.818 | 86.210 | 115.73 | 141.83 | 172.24 | 190.49 |
| 0.31901E-5 | 18.862 | 37.201 | 55.821 | 71.494 | 83.751 | 96.710 | 103.72 |
| 0.68359E-5 | 8.9448 | 17.155 | 24.734 | 30.816 | 35.377 | 39.939 | 42.044 |
| 0.13671E-4 | 2.0106 | 4.0457 | 5.8468 | 7.1568 | 8.3264 | 9.1217 | 9.6130 |
| | | | | $10 \times 10^{-5}$ M | | | |
| 0.12480E-7 | -291.42 | -251.74 | -203.18 | -148.07 | -88.425 | 35.786 | 160.69 |
| 0.22465E-7 | -142.65 | -103.21 | -54.891 | -0.15450 | 58.559 | 179.49 | 295.05 |
| 0.42434E-7 | -55.932 | -16.868 | 30.664 | 84.466 | 142.01 | 257.09 | 356.28 |
| 0.74884E-7 | -14.443 | 24.013 | 70.422 | 122.86 | 178.25 | 284.45 | 365.39 |
| 0.13728E-6 | 9.1998 | 46.486 | 91.025 | 140.85 | 191.84 | 283.07 | 343.89 |
| 0.24961E-6 | 20.607 | 56.163 | 97.333 | 142.94 | 187.15 | 256.39 | 301.31 |
| 0.49922E-6 | 25.163 | 56.742 | 92.532 | 129.25 | 162.00 | 205.98 | 234.52 |
| 0.74884E-6 | 24.922 | 53.226 | 84.618 | 114.13 | 140.24 | 170.65 | 188.90 |
| 0.17472E-5 | 18.469 | 36.808 | 55.428 | 71.101 | 83.358 | 96.318 | 103.33 |
| 0.37442E-5 | 8.8722 | 17.082 | 24.661 | 30.743 | 35.305 | 39.866 | 41.971 |
| 0.74884E-5 | 2.0011 | 4.0362 | 5.8374 | 7.1474 | 8.3170 | 9.1123 | 9.6035 |
| | | | | $30 \times 10^{-5}$ M | | | |
| 0.72057E-8 | -537.47 | -497.80 | -449.24 | -394.13 | -334.48 | -210.27 | -85.358 |
| 0.12970E-7 | -278.84 | -239.40 | -191.08 | -136.34 | -77.629 | 43.307 | 158.86 |
| 0.24499E-7 | -127.49 | -88.431 | -40.899 | 12.902 | 70.446 | 185.53 | 284.71 |
| 0.43234E-7 | -54.507 | -16.051 | 30.358 | 82.803 | 138.19 | 244.39 | 325.33 |
| 0.79263E-7 | -12.152 | 25.134 | 69.672 | 119.49 | 170.49 | 261.72 | 322.53 |
| 0.14411E-6 | 9.3397 | 44.895 | 86.065 | 131.67 | 175.89 | 245.13 | 290.04 |
| 0.28822E-6 | 20.016 | 51.595 | 87.385 | 124.11 | 156.85 | 200.83 | 229.37 |
| 0.43234E-6 | 21.782 | 50.086 | 81.478 | 110.99 | 137.10 | 167.51 | 185.76 |
| 0.10088E-5 | 17.507 | 35.847 | 54.467 | 70.139 | 82.397 | 95.356 | 102.37 |
| 0.21617E-5 | 8.6263 | 16.836 | 24.415 | 30.497 | 35.059 | 39.620 | 41.726 |
| 0.43234E-5 | 1.9533 | 3.9884 | 5.7895 | 7.0995 | 8.2691 | 9.0644 | 9.5557 |
| | | | | $100 \times 10^{-5}$ M | | | |
| 0.39467E-8 | -1019.1 | -979.52 | -930.96 | -875.84 | -816.20 | -691.98 | -567.07 |
| 0.71041E-8 | -545.90 | -506.46 | -458.14 | -403.40 | -344.68 | -223.75 | -108.19 |
| 0.13418E-7 | -268.28 | -229.22 | -181.69 | -127.89 | -70.346 | 44.742 | 143.92 |
| 0.23680E-7 | -133.74 | -95.293 | -48.883 | 3.5615 | 58.953 | 165.15 | 246.08 |
| 0.43414E-7 | -54.814 | -17.527 | 27.010 | 76.835 | 127.83 | 219.05 | 279.87 |
| 0.78934E-7 | -13.581 | 21.974 | 63.144 | 108.75 | 152.96 | 222.20 | 267.12 |
| 0.15786E-6 | 9.1311 | 40.710 | 76.500 | 113.22 | 145.97 | 189.95 | 218.48 |
| 0.23680E-6 | 14.885 | 43.189 | 74.581 | 104.10 | 130.20 | 160.61 | 178.86 |
| 0.55254E-6 | 15.080 | 33.419 | 52.040 | 67.712 | 79.970 | 92.929 | 99.946 |
| 0.11840E-5 | 7.8419 | 16.052 | 23.631 | 29.713 | 34.274 | 38.836 | 40.941 |
| 0.23680E-5 | 1.7407 | 3.7758 | 5.5769 | 6.8869 | 8.0565 | 8.8518 | 9.3431 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.19733E-7 | -194.43 | -184.52 | -172.37 | -158.60 | -143.68 | -112.63 | -81.408 |
| 0.35520E-7 | -100.76 | -90.906 | -78.824 | -65.140 | -50.461 | -20.227 | 8.6617 |
| 0.67094E-7 | -46.306 | -36.540 | -24.657 | -11.207 | 3.1788 | 31.950 | 56.746 |
| 0.11840E-6 | -20.344 | -10.730 | 0.87224 | 13.983 | 27.831 | 54.381 | 74.615 |
| 0.21707E-6 | -5.5559 | 3.7657 | 14.900 | 27.356 | 40.105 | 62.912 | 78.117 |
| 0.39467E-6 | 1.7236 | 10.612 | 20.905 | 32.308 | 43.361 | 60.671 | 71.899 |
| 0.78934E-6 | 5.1806 | 13.075 | 22.022 | 31.204 | 39.391 | 50.385 | 57.520 |
| 0.11840E-5 | 5.7249 | 12.801 | 20.649 | 28.029 | 34.555 | 42.158 | 46.719 |
| 0.27627E-5 | 4.5599 | 9.1448 | 13.799 | 17.717 | 20.782 | 24.022 | 25.776 |
| 0.59201E-5 | 2.2169 | 4.2696 | 6.1643 | 7.6848 | 8.8252 | 9.9655 | 10.491 |
| 0.11840E-4 | 0.50096 | 1.0097 | 1.4600 | 1.7875 | 2.0799 | 2.2787 | 2.4015 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.11393E-7 | -349.63 | -339.71 | -327.57 | -313.80 | -298.88 | -267.83 | -236.60 |
| 0.20507E-7 | -186.47 | -176.62 | -164.53 | -150.85 | -136.17 | -105.94 | -77.051 |
| 0.38737E-7 | -91.152 | -81.386 | -69.503 | -56.053 | -41.667 | -12.895 | 11.900 |
| 0.68359E-7 | -45.276 | -35.662 | -24.060 | -10.948 | 2.8991 | 29.449 | 49.683 |
| 0.12532E-6 | -18.668 | -9.3469 | 1.7876 | 14.243 | 26.992 | 49.799 | 65.004 |
| 0.22786E-6 | -5.0359 | 3.8530 | 14.145 | 25.549 | 36.601 | 53.911 | 65.140 |
| 0.45573E-6 | 2.2434 | 10.138 | 19.085 | 28.267 | 36.454 | 47.448 | 54.583 |
| 0.68359E-6 | 4.0154 | 11.091 | 18.939 | 26.319 | 32.846 | 40.448 | 45.009 |
| 0.15950E-5 | 4.1167 | 8.7015 | 13.356 | 17.274 | 20.339 | 23.578 | 25.333 |
| 0.34179E-5 | 2.1292 | 4.1818 | 6.0766 | 7.5970 | 8.7374 | 9.8778 | 10.404 |
| 0.68359E-5 | 0.48859 | 0.99737 | 1.4476 | 1.7751 | 2.0675 | 2.2663 | 2.3891 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.62403E-8 | -653.83 | -643.92 | -631.78 | -618.00 | -603.08 | -572.03 | -540.80 |
| 0.11232E-7 | -354.92 | -345.06 | -332.97 | -319.29 | -304.61 | -274.38 | -245.49 |
| 0.21217E-7 | -179.73 | -169.97 | -158.08 | -144.63 | -130.25 | -101.48 | -76.685 |
| 0.37442E-7 | -94.938 | -85.324 | -73.722 | -60.611 | -46.763 | -20.213 | 0.20945E-1 |
| 0.68643E-7 | -45.205 | -35.883 | -24.749 | -12.292 | 0.45581 | 23.263 | 38.467 |
| 0.12480E-6 | -19.104 | -10.215 | 0.77282E-1 | 11.480 | 22.533 | 39.843 | 51.071 |
| 0.24961E-6 | -4.2465 | 3.6482 | 12.595 | 21.777 | 29.964 | 40.958 | 48.093 |
| 0.37442E-6 | 0.17031E-1 | 7.0931 | 14.941 | 22.321 | 28.847 | 36.450 | 41.011 |
| 0.87364E-6 | 2.8485 | 7.4333 | 12.088 | 16.006 | 19.070 | 22.310 | 24.065 |
| 0.18721E-5 | 1.7853 | 3.8380 | 5.7327 | 7.2532 | 8.3936 | 9.5339 | 10.060 |
| 0.37442E-5 | 0.41606 | 0.92483 | 1.3751 | 1.7026 | 1.9950 | 2.1938 | 2.3166 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.36028E-8 | -1147.1 | -1137.1 | -1125.0 | -1111.2 | -1096.3 | -1065.3 | -1034.0 |
| 0.64851E-8 | -628.44 | -618.58 | -606.50 | -592.82 | -578.14 | -547.90 | -519.01 |
| 0.12249E-7 | -324.00 | -314.24 | -302.35 | -288.90 | -274.52 | -245.74 | -220.95 |
| 0.21617E-7 | -176.19 | -166.58 | -154.97 | -141.86 | -128.01 | -101.46 | -81.235 |
| 0.39631E-7 | -89.013 | -79.692 | -68.557 | -56.101 | -43.352 | -20.545 | -5.3407 |
| 0.72057E-7 | -42.700 | -33.811 | -23.519 | -12.115 | -1.0631 | 16.246 | 27.475 |
| 0.14411E-6 | -15.514 | -7.6194 | 1.3279 | 10.509 | 18.696 | 29.690 | 36.825 |
| 0.21617E-6 | -7.1606 | -0.84557E-1 | 7.7634 | 15.143 | 21.670 | 29.272 | 33.833 |
| 0.50440E-6 | 0.27161 | 4.8564 | 9.5114 | 13.429 | 16.493 | 19.733 | 21.488 |
| 0.10808E-5 | 0.92326 | 2.9759 | 4.8706 | 6.3911 | 7.5315 | 8.6718 | 9.1981 |
| 0.21617E-5 | 0.17011 | 0.67889 | 1.1291 | 1.4566 | 1.7490 | 1.9479 | 2.0707 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.19733E-8 | -2111.8 | -2101.8 | -2089.7 | -2075.9 | -2061.0 | -2030.0 | -1998.7 |
| 0.35520E-8 | -1163.8 | -1153.9 | -1141.8 | -1128.2 | -1113.5 | -1083.2 | -1054.4 |
| 0.67094E-8 | -606.85 | -597.08 | -585.20 | -571.75 | -557.36 | -528.59 | -503.79 |
| 0.11840E-7 | -335.92 | -326.31 | -314.71 | -301.60 | -287.75 | -261.20 | -240.96 |
| 0.21707E-7 | -175.57 | -166.25 | -155.11 | -142.65 | -129.91 | -107.10 | -91.899 |
| 0.39467E-7 | -89.751 | -80.862 | -70.570 | -59.166 | -48.113 | -30.803 | -19.575 |
| 0.78934E-7 | -38.435 | -30.540 | -21.593 | -12.412 | -4.2249 | 6.7693 | 13.903 |
| 0.11840E-6 | -22.051 | -14.975 | -7.1278 | 0.25235 | 6.7787 | 14.381 | 18.942 |
| 0.27627E-6 | -5.4933 | -0.90855 | 3.7464 | 7.6646 | 10.728 | 13.968 | 15.723 |
| 0.59201E-6 | -1.2885 | 0.76414 | 2.6588 | 4.1793 | 5.3197 | 6.4600 | 6.9874 |
| 0.11840E-5 | -0.61423 | -0.10545 | 0.34483 | 0.67232 | 0.96472 | 1.1635 | 1.2863 |

300°C 800 Å z = 1

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.39467E-7 | -133.36 | -54.016 | 43.107 | 153.33 | 272.62 | 521.05 | 770.87 |
| 0.71041E-7 | -39.853 | 39.024 | 135.68 | 245.15 | 362.58 | 604.45 | 835.56 |
| 0.13418E-6 | 14.196 | 92.325 | 187.39 | 294.99 | 410.08 | 640.25 | 838.62 |
| 0.23680E-6 | 39.504 | 116.41 | 209.23 | 314.12 | 424.91 | 637.31 | 799.18 |
| 0.43414E-6 | 53.064 | 127.63 | 216.71 | 316.36 | 418.35 | 600.81 | 722.44 |
| 0.78934E-6 | 58.215 | 129.32 | 211.66 | 302.89 | 391.31 | 529.79 | 619.62 |
| 0.15786E-5 | 57.169 | 120.32 | 191.90 | 265.35 | 330.85 | 418.80 | 475.88 |
| 0.23680E-5 | 53.620 | 110.22 | 173.01 | 232.05 | 284.26 | 345.08 | 381.57 |
| 0.55254E-5 | 37.800 | 74.478 | 111.71 | 143.06 | 167.57 | 193.49 | 207.53 |
| 0.11840E-4 | 17.895 | 34.316 | 49.474 | 61.638 | 70.761 | 79.884 | 84.094 |
| 0.23680E-4 | 4.0214 | 8.0916 | 11.694 | 14.313 | 16.653 | 18.243 | 19.226 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.22786E-7 | -288.56 | -209.21 | -112.09 | -1.8680 | 117.43 | 365.85 | 615.68 |
| 0.41015E-7 | -125.56 | -46.689 | 49.966 | 159.44 | 276.86 | 518.74 | 749.85 |
| 0.77474E-7 | -30.649 | 47.479 | 142.54 | 250.14 | 365.23 | 595.41 | 793.77 |
| 0.13671E-6 | 14.571 | 91.484 | 184.30 | 289.19 | 399.97 | 612.37 | 774.25 |
| 0.25065E-6 | 39.951 | 114.52 | 203.60 | 303.25 | 405.24 | 587.69 | 709.33 |
| 0.45573E-6 | 51.455 | 122.56 | 204.90 | 296.13 | 384.55 | 523.03 | 612.86 |
| 0.91146E-6 | 54.232 | 117.39 | 188.97 | 262.42 | 327.91 | 415.87 | 472.94 |
| 0.13671E-5 | 51.910 | 108.51 | 171.30 | 230.34 | 282.55 | 343.37 | 379.86 |
| 0.31901E-5 | 37.356 | 74.035 | 111.27 | 142.62 | 167.13 | 193.05 | 207.08 |
| 0.68359E-5 | 17.807 | 34.228 | 49.386 | 61.550 | 70.673 | 79.796 | 84.007 |
| 0.13671E-4 | 4.0090 | 8.0793 | 11.681 | 14.301 | 16.640 | 18.231 | 19.213 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.12480E-7 | -592.76 | -513.41 | -416.29 | -306.06 | -186.77 | 61.652 | 311.47 |
| 0.22465E-7 | -294.00 | -215.13 | -118.47 | -9.0000 | 108.42 | 350.30 | 581.41 |
| 0.42434E-7 | -119.23 | -41.106 | 53.958 | 161.56 | 276.65 | 506.82 | 705.19 |
| 0.74884E-7 | -35.090 | 41.822 | 134.64 | 239.53 | 350.31 | 562.71 | 724.58 |
| 0.13728E-6 | 13.414 | 87.988 | 177.06 | 276.71 | 378.70 | 561.16 | 682.80 |
| 0.24961E-6 | 37.387 | 108.49 | 190.83 | 282.06 | 370.48 | 508.97 | 598.79 |
| 0.49922E-6 | 47.742 | 110.90 | 182.48 | 255.93 | 321.42 | 409.38 | 466.45 |
| 0.74884E-6 | 47.912 | 104.52 | 167.30 | 226.34 | 278.55 | 339.37 | 375.86 |
| 0.17472E-5 | 36.088 | 72.767 | 110.00 | 141.35 | 165.86 | 191.78 | 205.82 |
| 0.37442E-5 | 17.463 | 33.885 | 49.043 | 61.206 | 70.329 | 79.452 | 83.663 |
| 0.74884E-5 | 3.9365 | 8.0067 | 11.609 | 14.229 | 16.568 | 18.158 | 19.141 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.72057E-8 | -1086.0 | -1006.6 | -909.55 | -799.33 | -680.03 | -431.61 | -181.78 |
| 0.12970E-7 | -567.53 | -488.65 | -392.00 | -282.52 | -165.09 | 76.775 | 307.88 |
| 0.24499E-7 | -263.50 | -185.37 | -90.308 | 17.294 | 132.38 | 362.56 | 560.92 |
| 0.43234E-7 | -116.34 | -39.434 | 53.385 | 158.27 | 269.05 | 481.45 | 643.33 |
| 0.79263E-7 | -30.393 | 44.180 | 133.25 | 232.90 | 334.89 | 517.35 | 638.99 |
| 0.14411E-6 | 13.790 | 84.902 | 167.24 | 258.47 | 346.89 | 485.37 | 575.19 |
| 0.28822E-6 | 36.474 | 99.632 | 171.21 | 244.66 | 310.16 | 398.11 | 455.19 |
| 0.43234E-6 | 40.734 | 97.343 | 160.12 | 219.16 | 271.37 | 332.19 | 368.69 |
| 0.10088E-5 | 33.511 | 70.190 | 107.43 | 138.77 | 163.29 | 189.20 | 203.24 |
| 0.21617E-5 | 16.601 | 33.022 | 48.180 | 60.344 | 69.467 | 78.590 | 82.801 |
| 0.43234E-5 | 3.6906 | 7.7608 | 11.363 | 13.983 | 16.322 | 17.912 | 18.895 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.39467E-8 | -2050.7 | -1971.3 | -1874.2 | -1764.0 | -1644.7 | -1396.3 | -1146.4 |
| 0.71041E-8 | -1102.9 | -1024.0 | -927.38 | -817.90 | -700.48 | -458.60 | -227.49 |
| 0.13418E-7 | -546.34 | -468.21 | -373.15 | -265.54 | -150.46 | 79.716 | 278.08 |
| 0.23680E-7 | -276.08 | -199.16 | -106.34 | -1.4581 | 109.32 | 321.72 | 483.59 |
| 0.43414E-7 | -116.95 | -42.378 | 46.698 | 146.34 | 248.33 | 430.79 | 552.43 |
| 0.78934E-7 | -33.259 | 37.851 | 120.19 | 211.42 | 299.84 | 438.32 | 528.14 |
| 0.15786E-6 | 13.553 | 76.711 | 148.29 | 221.74 | 287.23 | 375.19 | 432.26 |
| 0.23680E-6 | 25.843 | 82.451 | 145.23 | 204.27 | 256.48 | 317.30 | 353.7 |
| 0.55254E-6 | 27.746 | 64.425 | 101.66 | 133.01 | 157.52 | 183.44 | 197.47 |
| 0.11840E-5 | 14.389 | 30.811 | 45.969 | 58.133 | 67.255 | 76.378 | 80.589 |
| 0.23680E-5 | 2.9062 | 6.9764 | 10.578 | 13.198 | 15.537 | 17.128 | 18.111 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}\ M$ | | | |
| 0.19733E-7 | -397.83 | -378.00 | -353.72 | -326.16 | -296.34 | -234.23 | -171.77 |
| 0.35520E-7 | -209.26 | -189.55 | -165.38 | -138.01 | -108.66 | -48.192 | 9.5855 |
| 0.67094E-7 | -99.041 | -79.509 | -55.743 | -28.842 | -0.70141E-1 | 57.474 | 107.06 |
| 0.11840E-6 | -45.967 | -26.739 | -3.5345 | 22.687 | 50.384 | 103.48 | 143.95 |
| 0.21707E-6 | -15.204 | 3.4391 | 25.708 | 50.620 | 76.118 | 121.73 | 152.14 |
| 0.39467E-6 | 0.45737 | 18.235 | 38.820 | 61.627 | 83.732 | 118.35 | 140.80 |
| 0.78934E-6 | 8.5073 | 24.296 | 42.191 | 60.554 | 76.928 | 98.917 | 113.18 |
| 0.11840E-5 | 10.156 | 24.308 | 40.004 | 54.764 | 67.817 | 83.022 | 92.144 |
| 0.27627E-5 | 8.6596 | 17.829 | 27.139 | 34.975 | 41.104 | 47.583 | 51.092 |
| 0.59201E-5 | 4.3202 | 8.4255 | 12.215 | 15.256 | 17.536 | 19.817 | 20.870 |
| 0.11840E-4 | 0.98304 | 2.0005 | 2.9011 | 3.5561 | 4.1409 | 4.5386 | 4.7842 |
| | | | | $3 \times 10^{-5}\ M$ | | | |
| 0.11393E-7 | -709.38 | -689.54 | -665.26 | -637.71 | -607.88 | -545.78 | -483.32 |
| 0.20507E-7 | -381.84 | -362.12 | -337.95 | -310.58 | -281.23 | -220.76 | -162.98 |
| 0.38737E-7 | -189.86 | -170.33 | -146.56 | -119.66 | -90.892 | -33.348 | 16.242 |
| 0.68359E-7 | -96.942 | -77.714 | -54.509 | -28.287 | -0.59132 | 52.508 | 92.976 |
| 0.12532E-6 | -42.503 | -23.859 | -1.5904 | 23.322 | 48.819 | 94.433 | 124.84 |
| 0.22786E-6 | -14.071 | 3.7061 | 24.291 | 47.098 | 69.203 | 103.82 | 126.28 |
| 0.45573E-6 | 1.7477 | 17.537 | 35.432 | 53.794 | 70.169 | 92.157 | 106.42 |
| 0.68359E-6 | 5.9576 | 20.109 | 35.805 | 50.566 | 63.618 | 78.823 | 87.946 |
| 0.15950E-5 | 7.2882 | 16.457 | 25.767 | 33.604 | 39.732 | 46.212 | 49.721 |
| 0.34179E-5 | 3.9302 | 8.0355 | 11.825 | 14.865 | 17.146 | 19.427 | 20.480 |
| 0.68359E-5 | 0.89528 | 1.9128 | 2.8134 | 3.4684 | 4.0532 | 4.4508 | 4.6964 |
| | | | | $10 \times 10^{-5}\ M$ | | | |
| 0.62403E-8 | -1319.0 | -1299.2 | -1274.9 | -1247.3 | -1217.5 | -1155.4 | -1092.9 |
| 0.11232E-7 | -719.98 | -700.26 | -676.09 | -648.73 | -619.37 | -558.90 | -501.12 |
| 0.21217E-7 | -368.28 | -348.75 | -324.98 | -298.08 | -269.31 | -211.77 | -162.18 |
| 0.37442E-7 | -197.50 | -178.27 | -155.07 | -128.85 | -101.15 | -48.055 | -7.5869 |
| 0.68643E-7 | -96.791 | -78.148 | -55.879 | -30.966 | -5.4695 | 40.144 | 70.554 |
| 0.12480E-6 | -43.382 | -25.604 | -5.0194 | 17.787 | 39.893 | 74.513 | 96.969 |
| 0.24961E-6 | -12.320 | 3.4691 | 21.364 | 39.726 | 56.101 | 78.089 | 92.358 |
| 0.37442E-6 | -3.0492 | 11.102 | 26.798 | 41.559 | 54.611 | 69.816 | 78.939 |
| 0.87364E-6 | 3.9917 | 13.161 | 22.471 | 30.307 | 36.436 | 42.916 | 46.424 |
| 0.18721E-5 | 2.7885 | 6.8938 | 10.683 | 13.724 | 16.004 | 18.285 | 19.338 |
| 0.37442E-5 | 0.55143 | 1.5689 | 2.4695 | 3.1245 | 3.7093 | 4.1070 | 4.3526 |
| | | | | $30 \times 10^{-5}\ M$ | | | |
| 0.36028E-8 | -2306.7 | -2286.9 | -2262.6 | -2235.0 | -2205.2 | -2143.1 | -2080.6 |
| 0.64851E-8 | -1268.1 | -1248.4 | -1224.3 | -1196.9 | -1167.5 | -1107.1 | -1049.3 |
| 0.12249E-7 | -657.97 | -638.43 | -614.67 | -587.77 | -558.99 | -501.45 | -451.86 |
| 0.21617E-7 | -361.16 | -341.93 | -318.72 | -292.50 | -264.81 | -211.71 | -171.24 |
| 0.39631E-7 | -185.53 | -166.89 | -144.62 | -119.71 | -94.216 | -48.602 | -18.192 |
| 0.72057E-7 | -91.684 | -73.906 | -53.321 | -30.513 | -8.4084 | 26.211 | 48.667 |
| 0.14411E-6 | -35.917 | -20.127 | -2.2327 | 16.129 | 32.504 | 54.492 | 68.761 |
| 0.21617E-6 | -18.421 | -4.2694 | 11.426 | 26.186 | 39.239 | 54.444 | 63.567 |
| 0.50440E-6 | -2.0233 | 7.1463 | 16.456 | 24.292 | 30.421 | 36.900 | 40.409 |
| 0.10808E-5 | 0.43479 | 4.5400 | 8.3295 | 11.370 | 13.651 | 15.931 | 16.984 |
| 0.21617E-5 | -0.31065 | 0.70689 | 1.6074 | 2.2624 | 2.8472 | 3.2449 | 3.4905 |
| | | | | $100 \times 10^{-5}\ M$ | | | |
| 0.19733E-8 | -4237.4 | -4217.5 | -4193.2 | -4165.7 | -4135.9 | -4073.8 | -4011.3 |
| 0.35520E-8 | -2340.2 | -2320.5 | -2296.2 | -2268.9 | -2239.6 | -2179.1 | -2121.3 |
| 0.67094E-8 | -1224.9 | -1205.3 | -1181.6 | -1154.7 | -1125.9 | -1068.4 | -1018.8 |
| 0.11840E-7 | -681.88 | -662.65 | -639.45 | -613.23 | -585.53 | -532.43 | -491.96 |
| 0.21707E-7 | -359.90 | -341.26 | -318.99 | -294.08 | -268.58 | -222.97 | -192.56 |
| 0.39467E-7 | -187.02 | -169.24 | -148.66 | -125.85 | -103.74 | -69.127 | -46.671 |
| 0.78934E-7 | -82.967 | -67.178 | -49.283 | -30.920 | -14.546 | 7.4421 | 21.711 |
| 0.11840E-6 | -49.382 | -35.230 | -19.534 | -4.7743 | 8.2784 | 23.483 | 32.606 |
| 0.27627E-6 | -14.624 | -5.4545 | 3.8554 | 11.691 | 17.820 | 24.300 | 27.808 |
| 0.59201E-6 | -4.8788 | -0.77359 | 3.0159 | 6.0568 | 8.3375 | 10.618 | 11.670 |
| 0.11840E-5 | -2.5224 | -1.5048 | -0.60428 | 0.50687E-1 | 0.63548 | 1.0331 | 1.2787 |

| $H_0$ | V/kT: Z=2 | 3 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|
| | | | $1 \times 10^{-5}$ M | | | | |
| 0.39467E-7 | -275.68 | -116.99 | 77.253 | 297.69 | 536.29 | 1033.1 | 1532.7 |
| 0.71041E-7 | -87.444 | 70.311 | 263.62 | 482.57 | 717.42 | 1201.1 | 1663.3 |
| 0.13418E-6 | 21.965 | 178.22 | 368.35 | 583.56 | 813.73 | 1274.0 | 1670.8 |
| 0.23680E-6 | 73.729 | 227.55 | 413.19 | 622.97 | 844.54 | 1269.3 | 1593.0 |
| 0.43414E-6 | 102.03 | 251.18 | 429.33 | 628.63 | 832.61 | 1197.5 | 1440.8 |
| 0.78934E-6 | 113.44 | 255.66 | 420.34 | 602.80 | 779.64 | 1056.6 | 1236.2 |
| 0.15786E-5 | 112.48 | 238.80 | 381.96 | 528.86 | 659.85 | 835.76 | 949.91 |
| 0.23680E-5 | 105.94 | 219.16 | 344.73 | 462.81 | 567.23 | 688.87 | 761.85 |
| 0.55254E-5 | 75.139 | 148.49 | 222.97 | 285.66 | 334.69 | 386.53 | 414.60 |
| 0.11840E-4 | 35.677 | 68.519 | 98.835 | 123.16 | 141.40 | 159.65 | 168.07 |
| 0.23680E-4 | 8.0240 | 16.164 | 23.369 | 28.608 | 33.287 | 36.468 | 38.433 |
| | | | $3 \times 10^{-5}$ M | | | | |
| 0.22786E-7 | -587.23 | -428.54 | -234.29 | -13.848 | 224.75 | 721.59 | 1221.2 |
| 0.41015E-7 | -260.01 | -102.25 | 91.052 | 310.00 | 544.85 | 1028.6 | 1490.8 |
| 0.77474E-7 | -68.857 | 87.400 | 277.53 | 492.73 | 722.91 | 1183.2 | 1579.9 |
| 0.13671E-6 | 22.753 | 176.57 | 362.21 | 571.99 | 793.56 | 1218.3 | 1542.1 |
| 0.25065E-6 | 74.737 | 223.88 | 402.03 | 601.33 | 805.31 | 1170.2 | 1413.5 |
| 0.45573E-6 | 98.911 | 241.13 | 405.81 | 588.27 | 765.11 | 1042.0 | 1221.7 |
| 0.91146E-6 | 105.72 | 232.04 | 375.20 | 522.10 | 653.09 | 829.00 | 943.15 |
| 0.13671E-5 | 101.74 | 214.96 | 340.53 | 458.61 | 563.03 | 684.67 | 757.65 |
| 0.31901E-5 | 73.768 | 147.12 | 221.60 | 284.29 | 333.32 | 385.16 | 413.23 |
| 0.68359E-5 | 35.287 | 68.129 | 98.445 | 122.77 | 141.01 | 159.26 | 167.68 |
| 0.13671E-4 | 7.9362 | 16.076 | 23.281 | 28.521 | 33.199 | 36.380 | 38.345 |
| | | | $10 \times 10^{-5}$ M | | | | |
| 0.12480E-7 | -1196.8 | -1038.2 | -843.95 | -623.51 | -384.91 | 111.93 | 611.58 |
| 0.22465E-7 | -598.15 | -440.40 | -247.09 | -28.141 | 206.71 | 690.46 | 1152.6 |
| 0.42434E-7 | -247.28 | -91.022 | 99.107 | 314.31 | 544.49 | 1004.8 | 1401.5 |
| 0.74884E-7 | -77.809 | 76.016 | 261.65 | 471.43 | 693.00 | 1117.8 | 1441.5 |
| 0.13728E-6 | 20.448 | 169.59 | 347.74 | 547.04 | 751.02 | 1115.9 | 1359.2 |
| 0.24961E-6 | 69.601 | 211.82 | 376.50 | 558.96 | 735.80 | 1012.7 | 1192.4 |
| 0.49922E-6 | 91.656 | 217.97 | 361.13 | 508.03 | 639.02 | 814.93 | 929.09 |
| 0.74884E-6 | 92.740 | 205.95 | 331.52 | 449.60 | 554.03 | 675.66 | 748.65 |
| 0.17472E-5 | 70.471 | 143.82 | 218.30 | 280.99 | 330.02 | 381.86 | 409.93 |
| 0.37442E-5 | 34.145 | 66.987 | 97.303 | 121.63 | 139.87 | 158.12 | 166.54 |
| 0.74884E-5 | 7.5924 | 15.732 | 22.937 | 28.177 | 32.855 | 36.037 | 38.002 |
| | | | $30 \times 10^{-5}$ M | | | | |
| 0.72057E-8 | -2184.5 | -2025.8 | -1831.6 | -1611.2 | -1372.6 | -875.75 | -376.10 |
| 0.12970E-7 | -1146.3 | -988.60 | -79.29 | -576.34 | -341.48 | 142.26 | 604.48 |
| 0.24499E-7 | -536.96 | -380.70 | -190.57 | 24.630 | 254.80 | 715.16 | 1111.8 |
| 0.43234E-7 | -241.46 | -87.639 | 97.999 | 307.77 | 529.34 | 954.14 | 1277.8 |
| 0.79263E-7 | -68.298 | 80.848 | 259.00 | 458.30 | 662.28 | 1027.1 | 1270.4 |
| 0.14411E-6 | 21.299 | 163.52 | 328.20 | 510.65 | 687.50 | 964.46 | 1144.1 |
| 0.28822E-6 | 68.060 | 194.37 | 337.53 | 484.43 | 615.43 | 791.34 | 905.49 |
| 0.43234E-6 | 77.368 | 190.58 | 316.15 | 434.23 | 538.65 | 660.29 | 733.28 |
| 0.10088E-5 | 64.456 | 137.81 | 212.29 | 274.98 | 324.01 | 375.85 | 403.92 |
| 0.21617E-5 | 31.791 | 64.634 | 94.950 | 119.27 | 137.52 | 155.76 | 164.19 |
| 0.43234E-5 | 6.7303 | 14.870 | 22.075 | 27.315 | 31.993 | 35.175 | 37.139 |
| | | | $100 \times 10^{-5}$ M | | | | |
| 0.39467E-8 | -4115.2 | -3956.5 | -3762.3 | -3541.8 | -3303.2 | -2806.4 | -2306.7 |
| 0.71041E-8 | -2218.3 | -2060.6 | -1867.3 | -1648.3 | -1413.5 | -929.77 | -467.55 |
| 0.13418E-7 | -1103.9 | -947.65 | -757.52 | -542.31 | -312.14 | 148.21 | 544.94 |
| 0.23680E-7 | -562.18 | -408.36 | -222.72 | -12.945 | 208.62 | 633.42 | 957.16 |
| 0.43414E-7 | -242.66 | -93.519 | 84.633 | 283.93 | 487.91 | 852.82 | 1096.1 |
| 0.78934E-7 | -74.039 | 68.183 | 232.86 | 415.32 | 592.16 | 869.12 | 1048.7 |
| 0.15786E-6 | 21.009 | 147.32 | 290.48 | 437.38 | 568.38 | 744.29 | 858.44 |
| 0.23680E-6 | 46.407 | 159.62 | 285.19 | 403.27 | 507.69 | 629.33 | 702.31 |
| 0.55254E-6 | 51.855 | 125.21 | 199.69 | 262.38 | 311.41 | 363.25 | 391.32 |
| 0.11840E-5 | 26.478 | 59.320 | 89.636 | 113.96 | 132.20 | 150.45 | 158.87 |
| 0.23680E-5 | 4.5185 | 12.658 | 19.863 | 25.103 | 29.781 | 32.963 | 34.928 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | $1 \times 10^{-5}$ $M$ | | | | |
| 0.19733E-7 | -806.08 | -766.41 | -717.85 | -662.74 | -603.09 | -478.87 | -353.96 |
| 0.35520E-7 | -427.72 | -388.28 | -339.95 | -285.21 | -226.50 | -105.56 | 9.9888 |
| 0.67094E-7 | -205.93 | -166.87 | -119.34 | -65.541 | -7.9968 | 107.09 | 206.27 |
| 0.11840E-6 | -98.619 | -60.162 | -13.753 | 38.691 | 94.083 | 200.28 | 281.21 |
| 0.21707E-6 | -35.861 | 1.4251 | 45.963 | 95.788 | 146.78 | 238.01 | 298.83 |
| 0.39467E-6 | -3.3605 | 32.195 | 73.365 | 118.97 | 163.19 | 232.43 | 277.34 |
| 0.78934E-6 | 14.024 | 45.603 | 81.393 | 118.11 | 150.86 | 194.84 | 223.38 |
| 0.11840E-5 | 18.010 | 46.314 | 77.706 | 107.22 | 133.33 | 163.74 | 181.98 |
| 0.27627E-5 | 16.212 | 34.552 | 53.172 | 68.844 | 81.102 | 94.061 | 101.07 |
| 0.59201E-5 | 8.2263 | 16.436 | 24.015 | 30.097 | 34.659 | 39.220 | 41.326 |
| 0.11840E-4 | 1.8523 | 3.8875 | 5.6886 | 6.9986 | 8.1682 | 8.9635 | 9.4547 |
| | | | $3 \times 10^{-5}$ $M$ | | | | |
| 0.11393E-7 | -1430.3 | -1390.6 | -1342.0 | -1286.9 | -1227.3 | -1103.1 | -978.21 |
| 0.20507E-7 | -774.01 | -734.57 | -686.24 | -631.50 | -572.79 | -451.85 | -336.30 |
| 0.38737E-7 | -388.72 | -349.66 | -302.13 | -248.33 | -190.78 | -75.697 | 23.484 |
| 0.68359E-7 | -201.70 | -163.24 | -116.83 | -64.392 | -9.0005 | 97.199 | 178.13 |
| 0.12532E-6 | -91.573 | -54.286 | -9.7484 | 40.076 | 91.071 | 182.29 | 243.11 |
| 0.22786E-6 | -33.499 | 2.0563 | 43.226 | 88.840 | 133.05 | 202.29 | 247.20 |
| 0.45573E-6 | -0.50440 | 31.074 | 66.864 | 103.58 | 136.33 | 180.31 | 208.85 |
| 0.68359E-6 | 8.6683 | 36.972 | 68.364 | 97.885 | 123.99 | 154.40 | 172.64 |
| 0.15950E-5 | 12.737 | 31.077 | 49.697 | 65.369 | 77.627 | 90.586 | 97.604 |
| 0.34179E-5 | 6.9875 | 15.198 | 22.777 | 28.859 | 33.420 | 37.981 | 40.087 |
| 0.68359E-5 | 1.4623 | 3.4974 | 5.2986 | 6.6085 | 7.7781 | 8.5735 | 9.0647 |
| | | | $10 \times 10^{-5}$ $M$ | | | | |
| 0.62403E-8 | -2650.9 | -2611.2 | -2562.6 | -2507.5 | -2447.9 | -2323.7 | -2198.7 |
| 0.11232E-7 | -1451.5 | -1412.1 | -1363.7 | -1309.0 | -1250.3 | -1129.4 | -1013.8 |
| 0.21217E-7 | -746.83 | -707.77 | -660.23 | -606.43 | -548.89 | -433.80 | -334.62 |
| 0.37442E-7 | -404.08 | -365.62 | -319.21 | -266.77 | -211.38 | -105.18 | -24.245 |
| 0.68643E-7 | -201.39 | -164.10 | -119.56 | -69.742 | -18.748 | 72.480 | 133.29 |
| 0.12480E-6 | -93.340 | -57.784 | -16.614 | 28.999 | 73.210 | 142.45 | 187.36 |
| 0.24961E-6 | -29.814 | 1.7642 | 37.554 | 74.279 | 107.02 | 151.00 | 179.54 |
| 0.3742E-6 | -10.475 | 17.828 | 49.220 | 78.741 | 104.84 | 135.25 | 153.50 |
| 0.87364E-6 | 5.1711 | 23.510 | 42.130 | 57.803 | 70.060 | 83.019 | 90.037 |
| 0.18721E-5 | 3.9696 | 12.180 | 19.759 | 25.841 | 30.402 | 34.964 | 37.069 |
| 0.37442E-5 | 0.32066 | 2.3557 | 4.1569 | 5.4669 | 6.6365 | 7.4318 | 7.9230 |
| | | | $30 \times 10^{-5}$ $M$ | | | | |
| 0.36028E-8 | -4627.4 | -4587.8 | -4539.2 | -4484.1 | -4424.4 | -4300.2 | -4175.3 |
| 0.64851E-8 | -2549.1 | -2509.6 | -2461.3 | -2406.6 | -2347.9 | -2226.9 | -2111.4 |
| 0.12249E-7 | -1327.3 | -1288.2 | -1240.7 | -1186.9 | -1129.4 | -1014.3 | -915.14 |
| 0.21617E-7 | -732.54 | -694.09 | -647.68 | -595.23 | -539.84 | -433.64 | -352.70 |
| 0.39631E-7 | -380.03 | -342.74 | -298.20 | -248.38 | -197.38 | -106.15 | -45.338 |
| 0.72057E-7 | -191.07 | -155.52 | -114.35 | -68.736 | -24.525 | 44.714 | 89.627 |
| 0.14411E-6 | -78.116 | -46.537 | -10.747 | 25.977 | 58.726 | 102.70 | 131.24 |
| 0.21617E-6 | -42.304 | -14.000 | 17.391 | 46.912 | 73.017 | 103.42 | 121.67 |
| 0.50440E-6 | -7.8546 | 10.484 | 29.104 | 44.777 | 57.034 | 69.993 | 77.011 |
| 0.10808E-5 | -1.5817 | 6.6288 | 14.207 | 20.289 | 24.851 | 29.412 | 31.517 |
| 0.21617E-5 | -2.0330 | 0.20386E-2 | 1.8032 | 3.1131 | 4.2827 | 5.0781 | 5.5693 |
| | | | $100 \times 10^{-5}$ $M$ | | | | |
| 0.19733E-8 | -8489.9 | -8450.3 | -8401.7 | -8346.6 | -8286.9 | -8162.7 | -8037.8 |
| 0.35520E-8 | -4694.4 | -4654.9 | -4606.6 | -4551.9 | -4493.2 | -4372.2 | -4256.7 |
| 0.67094E-8 | -2462.5 | -2423.4 | -2375.9 | -2322.1 | -2264.5 | -2149.4 | -2050.3 |
| 0.11840E-7 | -1375.2 | -1336.8 | -1290.3 | -1237.9 | -1182.5 | -1076.3 | -995.41 |
| 0.21707E-7 | -730.02 | -692.73 | -648.20 | -598.37 | -547.38 | -456.15 | -395.33 |
| 0.39467E-7 | -383.00 | -347.45 | -306.28 | -260.66 | -216.45 | -147.21 | -102.30 |
| 0.78934E-7 | -173.45 | -141.87 | -106.08 | -69.361 | -36.612 | 7.3644 | 35.902 |
| 0.11840E-6 | -105.44 | -77.145 | -45.753 | -16.232 | 9.8727 | 40.282 | 58.528 |
| 0.27627E-6 | -34.221 | -15.881 | 2.7383 | 18.410 | 30.668 | 43.627 | 50.645 |
| 0.59201E-6 | -13.267 | -5.0568 | 2.5221 | 8.6040 | 13.165 | 17.726 | 19.832 |
| 0.11840E-5 | -7.3467 | -5.3116 | -3.5104 | -2.2005 | -1.0309 | -0.23558 | 0.25565 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}$ $M$ | | | |
| 0.39467E-7 | -561.78 | -244.39 | 144.09 | 584.98 | 1062.1 | 2055.8 | 3055.1 |
| 0.71041E-7 | -184.07 | 131.44 | 518.06 | 955.96 | 1425.6 | 2393.1 | 3317.6 |
| 0.13418E-6 | 36.073 | 348.59 | 728.85 | 1159.2 | 1619.6 | 2540.3 | 3333.7 |
| 0.23680E-6 | 140.77 | 448.42 | 819.70 | 1239.2 | 1682.4 | 2531.9 | 3179.4 |
| 0.43414E-6 | 198.61 | 496.91 | 853.22 | 1251.8 | 1659.7 | 2389.6 | 2876.1 |
| 0.78934E-6 | 222.60 | 507.05 | 836.41 | 1201.3 | 1555.0 | 2108.9 | 2468.2 |
| 0.15786E-5 | 221.97 | 474.61 | 760.93 | 1054.7 | 1316.7 | 1668.5 | 1896.8 |
| 0.23680E-5 | 209.59 | 436.02 | 687.16 | 923.32 | 1132.1 | 1375.4 | 1521.4 |
| 0.55254E-5 | 149.17 | 295.88 | 444.84 | 570.22 | 668.28 | 771.96 | 828.10 |
| 0.11840E-4 | 70.940 | 136.62 | 197.25 | 245.91 | 282.40 | 318.89 | 335.73 |
| 0.23680E-4 | 15.934 | 32.215 | 46.624 | 57.104 | 66.461 | 72.823 | 76.753 |
| | | | | $3 \times 10^{-5}$ $M$ | | | |
| 0.22786E-7 | -1186.0 | -868.64 | -480.15 | -39.257 | 437.93 | 1431.6 | 2430.9 |
| 0.41015E-7 | -530.36 | -214.85 | 171.77 | 609.67 | 1079.3 | 2046.8 | 2971.3 |
| 0.77474E-7 | -146.71 | 165.80 | 546.06 | 976.47 | 1436.8 | 2357.5 | 3150.9 |
| 0.13671E-6 | 37.689 | 345.34 | 716.61 | 1136.1 | 1579.3 | 2428.9 | 3076.4 |
| 0.25065E-6 | 142.90 | 441.20 | 797.50 | 1196.1 | 1604.0 | 2333.8 | 2820.4 |
| 0.45573E-6 | 192.46 | 476.91 | 806.27 | 1171.1 | 1524.8 | 2078.7 | 2438.0 |
| 0.91146E-6 | 207.45 | 460.08 | 746.40 | 1040.2 | 1302.1 | 1654.0 | 1882.3 |
| 0.13671E-5 | 200.24 | 426.68 | 677.81 | 913.98 | 1122.8 | 1366.1 | 1512.0 |
| 0.31901E-5 | 145.69 | 292.41 | 441.37 | 566.75 | 664.81 | 768.48 | 824.62 |
| 0.68359E-5 | 69.701 | 135.38 | 196.01 | 244.67 | 281.16 | 317.65 | 334.49 |
| 0.13671E-4 | 15.544 | 31.825 | 46.234 | 56.714 | 66.071 | 72.433 | 76.363 |
| | | | | $10 \times 10^{-5}$ $M$ | | | |
| 0.12480E-7 | -2406.6 | -2089.2 | -1700.7 | -1259.8 | -782.64 | 211.04 | 1210.3 |
| 0.22465E-7 | -1207.9 | -892.39 | -505.77 | -67.872 | 401.83 | 1369.3 | 2293.7 |
| 0.42434E-7 | -504.82 | -192.30 | 187.95 | 618.36 | 1078.7 | 1999.4 | 2792.8 |
| 0.74884E-7 | -164.69 | 142.96 | 514.23 | 933.79 | 1376.9 | 2226.5 | 2874.0 |
| 0.13728E-6 | 33.088 | 331.38 | 687.69 | 1086.2 | 1494.2 | 2224.0 | 2710.6 |
| 0.24961E-6 | 132.62 | 417.07 | 746.43 | 1111.3 | 1465.0 | 2018.9 | 2378.2 |
| 0.49922E-6 | 178.13 | 430.77 | 717.09 | 1010.8 | 1272.8 | 1624.7 | 1853.0 |
| 0.74884E-6 | 181.10 | 407.53 | 658.67 | 894.84 | 1103.6 | 1346.9 | 1492.9 |
| 0.17472E-5 | 138.13 | 284.84 | 433.80 | 559.18 | 657.24 | 760.91 | 817.06 |
| 0.37442E-5 | 66.683 | 132.36 | 193.00 | 241.65 | 278.14 | 314.63 | 331.48 |
| 0.74884E-5 | 14.402 | 30.683 | 45.092 | 55.572 | 64.929 | 71.291 | 75.221 |
| | | | | $30 \times 10^{-5}$ $M$ | | | |
| 0.72057E-8 | -4383.1 | -4065.7 | -3677.3 | -3236.4 | -2759.2 | -1765.5 | -766.21 |
| 0.12970E-7 | -2305.4 | -1989.9 | -1603.3 | -1165.4 | -695.73 | 271.76 | 1196.2 |
| 0.24499E-7 | -1085.3 | -772.82 | -392.56 | 37.848 | 498.20 | 1418.9 | 2212.3 |
| 0.43234E-7 | -493.15 | -185.50 | 185.77 | 605.33 | 1048.4 | 1898.0 | 2545.5 |
| 0.79263E-7 | -145.54 | 152.74 | 509.05 | 907.65 | 1315.6 | 2045.4 | 2531.9 |
| 0.14411E-6 | 34.890 | 319.33 | 648.69 | 1013.6 | 1367.2 | 1921.2 | 2280.5 |
| 0.28822E-6 | 129.83 | 382.47 | 668.78 | 962.59 | 1224.5 | 1576.3 | 1804.7 |
| 0.43234E-6 | 149.27 | 375.71 | 626.84 | 863.01 | 1071.8 | 1315.1 | 1461.0 |
| 0.10088E-5 | 125.10 | 271.82 | 420.78 | 546.16 | 644.22 | 747.89 | 804.03 |
| 0.21617E-5 | 61.132 | 126.81 | 187.44 | 236.10 | 272.59 | 309.08 | 325.92 |
| 0.43234E-5 | 12.048 | 28.329 | 42.739 | 53.218 | 62.575 | 68.938 | 72.868 |
| | | | | $100 \times 10^{-5}$ $M$ | | | |
| 0.39467E-8 | -8245.6 | -7928.2 | -7539.7 | -7098.9 | -6621.7 | -5628.0 | -4628.7 |
| 0.71041E-8 | -4450.7 | -4135.2 | -3748.6 | -3310.7 | -2841.0 | -1873.5 | -949.07 |
| 0.13418E-7 | -2220.5 | -1907.9 | -1527.7 | -1097.3 | -636.96 | 283.74 | 1077.1 |
| 0.23680E-7 | -1135.8 | -828.21 | -456.93 | -37.375 | 405.76 | 1255.3 | 1902.8 |
| 0.43414E-7 | -495.54 | -197.25 | 159.05 | 557.65 | 965.61 | 1695.4 | 2181.9 |
| 0.78934E-7 | -157.04 | 127.40 | 456.76 | 821.68 | 1175.3 | 1729.2 | 2088.5 |
| 0.15786E-6 | 34.499 | 287.13 | 573.45 | 867.25 | 1129.2 | 1481.0 | 1709.3 |
| 0.23680E-6 | 86.130 | 312.56 | 563.70 | 799.86 | 1008.7 | 1251.9 | 1397.9 |
| 0.55254E-6 | 98.739 | 245.45 | 394.41 | 519.79 | 617.85 | 721.52 | 777.66 |
| 0.11840E-5 | 49.446 | 115.13 | 175.76 | 224.41 | 260.91 | 297.40 | 314.24 |
| 0.23680E-5 | 6.7352 | 23.016 | 37.425 | 47.905 | 57.261 | 63.624 | 67.554 |

| $H_0$ | $V/kT$ | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Z=2$ | 3 | 4 | 5 | 6 | 8 | 10 |
| | | | | $1 \times 10^{-5}\ M$ | | | |
| 0.19733E-7 | -1624.0 | -1544.6 | -1447.5 | -1337.3 | -1218.0 | -969.62 | -719.79 |
| 0.35520E-7 | -866.07 | -787.19 | -690.54 | -581.06 | -463.64 | -221.76 | 9.3456 |
| 0.67094E-7 | -421.18 | -343.05 | -247.98 | -140.38 | -25.295 | 204.88 | 403.24 |
| 0.11840E-6 | -205.35 | -128.44 | -35.622 | 69.266 | 180.05 | 392.45 | 554.32 |
| 0.21707E-6 | -78.586 | -4.0124 | 85.064 | 184.71 | 286.70 | 469.16 | 590.79 |
| 0.39467E-6 | -12.365 | 58.745 | 141.08 | 232.31 | 320.73 | 459.21 | 549.04 |
| 0.78934E-6 | 23.774 | 86.932 | 158.51 | 231.96 | 297.46 | 385.41 | 442.49 |
| 0.11840E-5 | 32.510 | 89.119 | 151.90 | 210.94 | 263.15 | 323.97 | 360.46 |
| 0.27627E-5 | 30.368 | 67.047 | 104.28 | 135.63 | 160.14 | 186.06 | 200.10 |
| 0.59201E-5 | 15.425 | 31.846 | 47.004 | 59.168 | 68.291 | 77.414 | 81.624 |
| 0.11840E-4 | 3.2906 | 7.3608 | 10.963 | 13.583 | 15.922 | 17.512 | 18.495 |
| | | | | $3 \times 10^{-5}\ M$ | | | |
| 0.11393E-7 | -2873.6 | -2794.3 | -2697.2 | -2587.0 | -2467.7 | -2219.2 | -1969.4 |
| 0.20507E-7 | -1559.8 | -1480.9 | -1384.2 | -1274.8 | -1157.3 | -915.50 | -684.39 |
| 0.38737E-7 | -787.90 | -709.78 | -614.71 | -507.11 | -392.02 | -161.84 | 36.518 |
| 0.68359E-7 | -412.66 | -335.75 | -242.93 | -138.04 | -27.263 | 185.13 | 347.00 |
| 0.12532E-6 | -191.14 | -116.57 | -27.495 | 72.154 | 174.14 | 356.60 | 478.23 |
| 0.22786E-6 | -73.762 | -2.6503 | 79.689 | 170.91 | 259.34 | 397.82 | 487.64 |
| 0.45573E-6 | -6.3647 | 56.793 | 128.37 | 201.82 | 267.32 | 355.27 | 412.35 |
| 0.68359E-6 | 12.782 | 69.391 | 132.17 | 191.21 | 243.42 | 304.24 | 340.73 |
| 0.15950E-5 | 22.504 | 59.182 | 96.422 | 127.76 | 152.28 | 178.20 | 192.23 |
| 0.34179E-5 | 12.237 | 28.658 | 43.816 | 55.980 | 65.103 | 74.226 | 78.437 |
| 0.68359E-5 | 2.0518 | 6.1220 | 9.7244 | 12.344 | 14.683 | 16.274 | 17.256 |
| | | | | $10 \times 10^{-5}\ M$ | | | |
| 0.62403E-8 | -5316.1 | -5236.7 | -5139.6 | -5029.4 | -4910.1 | -4661.7 | -4411.8 |
| 0.11232E-7 | -2916.1 | -2837.3 | -2740.6 | -2631.1 | -2513.7 | -2271.8 | -2040.7 |
| 0.21217E-7 | -1505.3 | -1427.2 | -1332.1 | -1224.5 | -1109.4 | -879.32 | -680.95 |
| 0.37442E-7 | -818.69 | -741.77 | -648.95 | -544.06 | -433.28 | -220.88 | -59.011 |
| 0.68643E-7 | -412.03 | -337.46 | -248.38 | -148.73 | -46.750 | 135.70 | 257.34 |
| 0.12480E-6 | -194.68 | -123.57 | -41.237 | 49.991 | 138.41 | 276.89 | 366.71 |
| 0.24961E-6 | -66.205 | -3.0475 | 68.531 | 141.98 | 207.48 | 295.43 | 352.51 |
| 0.37442E-6 | -26.702 | 29.906 | 92.690 | 151.73 | 203.94 | 264.76 | 301.25 |
| 0.87364E-6 | 6.2615 | 42.940 | 80.180 | 111.52 | 136.04 | 161.95 | 175.99 |
| 0.18721E-5 | 5.2456 | 21.666 | 36.824 | 48.988 | 58.111 | 67.234 | 71.445 |
| 0.37442E-5 | -0.96610 | 3.1041 | 6.7064 | 9.3263 | 11.665 | 13.256 | 14.238 |
| | | | | $30 \times 10^{-5}\ M$ | | | |
| 0.36028E-8 | -9270.2 | -9190.9 | -9093.8 | -8983.6 | -8864.3 | -8615.8 | -8366.0 |
| 0.64851E-8 | -5112.4 | -5033.5 | -4936.9 | -4827.4 | -4710.0 | -4468.1 | -4237.0 |
| 0.12249E-7 | -2667.5 | -2589.4 | -2494.3 | -2386.7 | -2271.6 | -2041.5 | -1843.1 |
| 0.21617E-7 | -1476.7 | -1399.8 | -1307.0 | -1202.1 | -1091.3 | -878.96 | -717.08 |
| 0.39631E-7 | -770.46 | -695.89 | -606.81 | -507.16 | -405.17 | -222.71 | -101.08 |
| 0.72057E-7 | -391.30 | -320.19 | -237.85 | -146.62 | -58.202 | 80.277 | 170.10 |
| 0.14411E-6 | -163.94 | -100.78 | -29.203 | 44.246 | 109.74 | 197.69 | 254.77 |
| 0.21617E-6 | -91.480 | -34.872 | 27.911 | 86.953 | 139.16 | 199.98 | 236.47 |
| 0.50440E-6 | -20.862 | 15.815 | 53.055 | 84.401 | 108.91 | 134.83 | 148.86 |
| 0.10808E-5 | -6.8422 | 9.5789 | 24.736 | 36.900 | 46.023 | 55.146 | 59.357 |
| 0.21617E-5 | -6.5174 | -2.4472 | 1.1551 | 3.7750 | 6.1142 | 7.7049 | 8.6873 |
| | | | | $100 \times 10^{-5}\ M$ | | | |
| 0.19733E-8 | -16996 | -16917 | -16819 | -16709 | -16590 | -16341 | -16092 |
| 0.35520E-8 | -9404.4 | -9325.5 | -9228.8 | -9119.4 | -9001.9 | -8760.1 | -8528.9 |
| 0.67094E-8 | -4939.1 | -4861.0 | -4765.9 | -4658.3 | -4543.2 | -4313.1 | -4114.7 |
| 0.11840E-7 | -2763.4 | -2686.5 | -2593.7 | -2488.8 | -2378.0 | -2165.6 | -2003.7 |
| 0.21707E-7 | -1471.7 | -1397.1 | -1308.0 | -1208.4 | -1106.4 | -923.97 | -802.33 |
| 0.39467E-7 | -776.42 | -705.31 | -622.97 | -531.74 | -443.32 | -304.84 | -215.01 |
| 0.78934E-7 | -355.87 | -292.71 | -221.13 | -147.68 | -82.186 | 5.7672 | 62.843 |
| 0.11840E-6 | -219.01 | -162.40 | -99.623 | -40.582 | 11.628 | 72.448 | 108.93 |
| 0.27627E-6 | -74.810 | -38.132 | -0.89193 | 30.453 | 54.968 | 80.886 | 94.921 |
| 0.59201E-6 | -31.371 | -14.949 | 0.20803 | 12.371 | 21.494 | 30.617 | 34.828 |
| 0.11840E-5 | -18.203 | -14.132 | -10.530 | -7.9106 | -5.5714 | -3.9808 | -2.9983 |

Table A2. Factor for Calculation of $H_N$

$H_N = a\ Q(T,c_o)$ (see eq. 50, p. 25)

| $c_o$, g/liter | $Q(T,c_o)$* 25°C | 90°C | 150°C | 200°C | 250°C | 300°C |
|---|---|---|---|---|---|---|
| 1 | 37.0 | 37.4 | 38.1 | 38.9 | 39.9 | 41.6 |
| 2 | 28.9 | 29.3 | 29.8 | 30.4 | 31.3 | 32.6 |
| 5 | 20.8 | 21.1 | 21.4 | 21.9 | 22.5 | 23.5 |
| 10 | 16.1 | 16.3 | 16.6 | 17.0 | 17.5 | 18.2 |
| 20 | 12.4 | 12.5 | 12.8 | 13.1 | 13.4 | 14.1 |
| 50 | 8.59 | 8.70 | 8.89 | 9.10 | 9.39 | 9.83 |
| 100 | 6.40 | 6.49 | 6.64 | 6.81 | 7.03 | 7.38 |
| 200 | 4.66 | 4.74 | 4.85 | 4.98 | 5.16 | 5.44 |
| 400 | 3.29 | 3.34 | 3.44 | 3.54 | 3.68 | 3.90 |
| 600 | 2.62 | 2.67 | 2.74 | 2.83 | 2.95 | 3.14 |
| 800 | 2.20 | 2.24 | 2.31 | 2.39 | 2.49 | 2.66 |
| 1000 | 1.90 | 1.94 | 2.00 | 2.07 | 2.17 | 2.32 |
| 1200 | 1.67 | 1.70 | 1.76 | 1.82 | 1.92 | 2.06 |
| 1400 | 1.48 | 1.52 | 1.57 | 1.63 | 1.72 | 1.84 |
| 1600 | 1.33 | 1.36 | 1.41 | 1.47 | 1.55 | 1.67 |
| 2000 | 1.09 | 1.12 | 1.16 | 1.21 | 1.28 | 1.39 |

$$*Q(T,c_o) = \left[\frac{4\sqrt{2}\,\pi}{3}\left(\frac{0.997}{\rho}\ \frac{10.0}{c_o} - \frac{0.997}{\rho} + 1\right)\right]^{1/3} - 2$$

where both $\rho$ and $c_o$ are in g/cm$^3$.

Table A3. Factors for Approximate Calculation of $Z_C/z$

| Temperature (T) °C | °K | $\ln\left(\frac{T^{1/2}\rho^{3/2}}{\epsilon^{1/2}\eta}\right)$* |
|---|---|---|
| 25 | 298.1 | 5.38 |
| 90 | 363.1 | 6.62 |
| 150 | 423.1 | 7.29 |
| 200 | 473.1 | 7.68 |
| 250 | 523.1 | 7.92 |
| 300 | 573.1 | 8.14 |

*T in °K, $\rho$ in g/cm$^3$, $\eta$ in poises

| Particle Radius (a), Å | $\ln \frac{16 \cdot 2^{1/2} k^{1/2} e}{\pi^{1/2} d_o \rho_o^{3/2}} - 2 \ln a$* |
|---|---|
| 50 | -10.45 |
| 100 | -11.84 |
| 200 | -13.23 |
| 400 | -14.61 |
| 800 | -16.00 |
| 1600 | -17.38 |
| 3200 | -18.77 |

*k in ergs/°K, e in absolute e.s.u., $d_o$ in g/cm$^3$, $\rho$ in g/cm$^3$, a in cm

| Valence (z) | ln z |
|---|---|
| 1 | 0.00 |
| 2 | 0.69 |

| Electrolyte Conc. ($n_o$), M | 1/2 ln $n_o$* |
|---|---|
| $1 \times 10^{-5}$ | 18.17 |
| $3 \times 10^{-5}$ | 18.72 |
| $10 \times 10^{-5}$ | 19.32 |
| $30 \times 10^{-5}$ | 19.87 |
| $100 \times 10^{-5}$ | 20.47 |

*$n_o$ in molecules/cm$^3$ (1 mole = 6.025 x $10^{23}$ molecules)

| Suspension Conc. ($c_o$), g/liter | ln $c_o$* |
|---|---|
| 1 | -6.91 |
| 2 | -6.21 |
| 5 | -5.30 |
| 10 | -4.60 |
| 20 | -3.91 |
| 50 | -3.00 |
| 100 | -2.30 |
| 200 | -1.61 |
| 400 | -0.92 |
| 600 | -0.51 |
| 800 | -0.22 |
| 1000 | 0.00 |
| 1200 | +0.18 |
| 1400 | +0.34 |
| 1600 | +0.47 |

*$c_o$ in g/cm$^3$

| Flocculation Time ($t_f$) | ln $t_f$* |
|---|---|
| 0.5 day | 10.67 |
| 1 day | 11.37 |
| 2 days | 12.06 |
| 4 days | 12.75 |
| 1 week | 13.31 |
| 2 weeks | 14.00 |
| 1 month | 14.77 |
| 2 months | 15.46 |
| 4 months | 16.15 |
| 8 months | 16.85 |
| 1 year | 17.27 |

*$t_f$ in sec

Table A4. Factors for Regular Calculation of $Z_C/z$

| Temperature (T) °C | °K | $\log\left(\frac{T\rho}{\eta}\right)^*$ |
|---|---|---|
| 25 | 298.1 | 4.52 |
| 90 | 363.1 | 5.04 |
| 150 | 423.1 | 5.32 |
| 200 | 473.1 | 5.48 |
| 250 | 523.1 | 5.57 |
| 300 | 573.1 | 5.63 |

*T in °K, $\rho$ in g/cm$^3$, $\eta$ in poise

| Particle Radius (a), Å | $\log \frac{2k}{\pi d_o \rho_o} - 3 \log a^*$ |
|---|---|
| 50 | 1.85 |
| 100 | 0.95 |
| 200 | 0.04 |
| 400 | -0.86 |
| 800 | -1.76 |
| 1600 | -2.67 |
| 3200 | -3.57 |

*k in ergs/°K, $d_o$ in g/cm$^3$, $\rho_o$ in g/cm$^3$, a in cm

| Suspension Conc. ($c_o$), g/liter | $\log c_o^*$ |
|---|---|
| 1 | -3.00 |
| 2 | -2.70 |
| 5 | -2.30 |
| 10 | -2.00 |
| 20 | -1.70 |
| 50 | -1.30 |
| 100 | -1.00 |
| 200 | -0.70 |
| 400 | -0.40 |
| 600 | -0.22 |
| 800 | -0.10 |
| 1000 | 0.00 |
| 1200 | +0.08 |
| 1400 | +0.15 |
| 1600 | +0.20 |

*$c_o$ in g/cm$^3$

| Flocculation Time ($t_f$) | $\log t_f^*$ |
|---|---|
| 0.5 day | 4.64 |
| 1 day | 4.94 |
| 2 days | 5.24 |
| 4 days | 5.54 |
| 1 week | 5.78 |
| 2 weeks | 6.08 |
| 1 month | 6.41 |
| 2 months | 6.71 |
| 4 months | 7.02 |
| 8 months | 7.32 |
| 1 year | 7.50 |

*$t_f$ in sec

## Table A5. Values of $e^x$

| x | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1.00-00 | 1.11-00 | 1.22-00 | 1.35-00 | 1.49-00 | 1.65-00 | 1.82-00 | 2.01-00 | 2.23-00 | 2.46-00 |
| 1 | 2.72-00 | 3.00-00 | 3.32-00 | 3.67-00 | 4.06-00 | 4.48-00 | 4.95-00 | 5.47-00 | 6.05-00 | 6.69-00 |
| 2 | 7.39-00 | 8.17-00 | 9.02-00 | 9.97-00 | 1.10-01 | 1.22-01 | 1.35-01 | 1.49-01 | 1.64-01 | 1.82-01 |
| 3 | 2.01-01 | 2.22-01 | 2.45-01 | 2.71-01 | 3.00-01 | 3.31-01 | 3.66-01 | 4.04-01 | 4.47-01 | 4.94-01 |
| 4 | 5.46-01 | 6.03-01 | 6.67-01 | 7.37-01 | 8.15-01 | 9.00-01 | 9.95-01 | 1.10-02 | 1.22-02 | 1.34-02 |
| 5 | 1.48-02 | 1.64-02 | 1.81-02 | 2.00-02 | 2.21-02 | 2.45-02 | 2.70-02 | 2.99-02 | 3.30-02 | 3.65-02 |
| 6 | 4.03-02 | 4.46-02 | 4.93-02 | 5.45-02 | 6.02-02 | 6.65-02 | 7.35-02 | 8.12-02 | 8.98-02 | 9.92-02 |
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