2007 Condensed Matter Theory Group Joint Seminar with Neutron Scattering Science Division

"Combining Magnets and Dielectrics: New Materials for Wireless Communications"

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Friday, February 2, 2007 at 11:00 a.m.
SNS - Iran Thomas Auditorium
Host: Stephen Nagler

Abstract: Ceramic magnetic oxides are important components in a wide variety of electronic applications, including wireless communications. Circulators and isolators contain ceramic magnets that provide a static magnetic field to interact with the propagating microwave signal, thus steering and conditioning the signal. There is great interest in developing new ceramics exhibiting the desired simultaneous properties of large saturation magnetization, low dielectric loss, and high dielectric constant. I report here on recent progress on the ternary system Ba-Fe-Ti-O. Studies of phase equilibria have revealed the existence of a number of new compounds that form between the high-dielectric-constant polytitanates (e.g. Ba2Ti9O19 and BaTi4O9) and magnetic barium hexaferrite (BaFe12O19). Several of these compounds exhibit new structure-types, as well as crystal chemistries that combine structural features from both the barium polytitanates and hexaferrites.

*Light refreshments will be served in the lobby following the seminar.