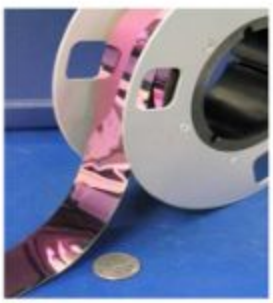
Revolutionary Advances in Energy Technologies
High-Temperature Superconductors

NEUTRON SCIENCES

- Superconductors can revolutionize the electrical energy grid
- New energy technologies require extension of superconductor materials
- Research focuses on understanding phenomena that underpin superconductivity

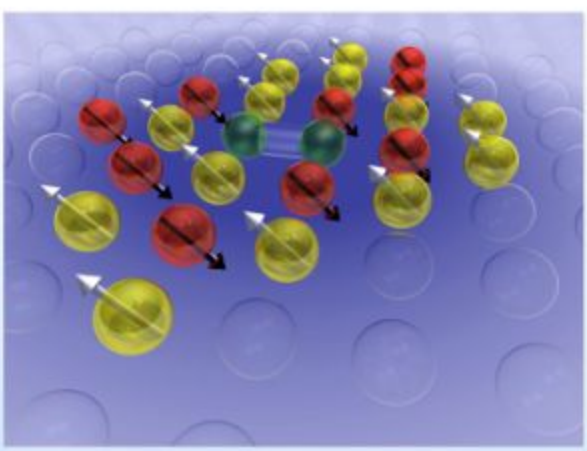
Science to energy technology



2nd Generation HTS wire: Single crystal-like, epitaxial HTS wire on RABITS™

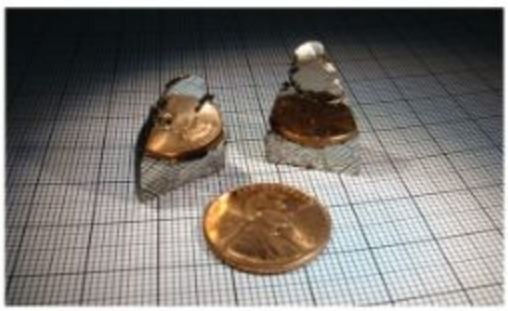
2G HTS wire developed at ORNL is now used in large-scale applications

ORNL computing capabilities enable quantum cluster simulations of 2D Hubbard model

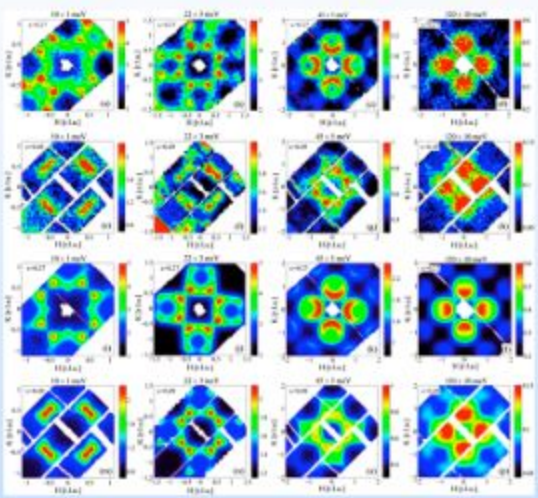


- Pairing mechanism leading to superconductivity
- Phenomenological model pairing mechanism based on spin fluctuations

Evolution of spin excitations into the superconducting state in Fe(Te,Se)



- Spin excitations disperse strongly to 300 meV
  - Excitations exhibit four fold symmetry about same point as the high TC cuprates
  - Commensurate spin excitations at (0.5 0.5) appear to occur universally in Fe-based superconductors



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