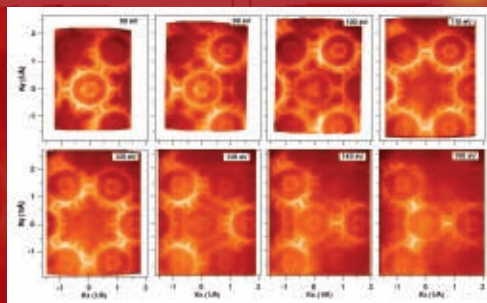


J.W. Allen

“Synchrotron-Based Probes of Emergent Electronic States of Matter in Solids”

J.W. Allen is the Joaquin M. Luttinger Collegiate Professor of Physics at the University of Michigan. His research centers on the electronic structure of solids and its relationship to low-energy, low-temperature properties, with an emphasis on systems that are dominated by many-body effects and therefore cannot be well treated by conventional band theory. Typically these are systems with transition metal, rare earth, or actinide elements; or low-dimensional systems, which display behaviors involving heavy fermions, mixed valence fluctuations, the Kondo effect, Mott-Hubbard insulation, high-temperature superconductivity, quantum critical fluctuations, or other sources of non-Fermi liquid physics such as the electron fractionalization of the Luttinger liquid. His off-campus work is currently conducted at the Wisconsin Synchrotron Radiation Laboratory, the Advanced Light Source, and the SPring-8 synchrotron. Allen is a Fellow of the American Physical Society (APS) and received the 2002 Frank Isakson Prize from the APS.

A major intellectual theme of quantum condensed matter physics concerns properties that are emergent, i.e., characteristic of the ensemble and not simply of the constituent atoms and electrons. Such properties arise from various interactions and include mass renormalization and quenching of spin in the Kondo effect; collective behaviors such as ferromagnetism, charge density waves and superconductivity; and novel quantum ground states such as the Luttinger liquid. Synchrotron-based studies of such phenomena are increasingly essential for driving quantum condensed matter research forward. This talk will describe synchrotron studies directed at electronic emergent phenomena—methods and examples, a look to the past, and prospects for the near future.



Wednesday, April 4, 2007

3:00 p.m.

Bldg. 402, APS Auditorium • Argonne National Laboratory

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