Special Guest Lectures

Composite and Hidden Order in F-Electron Materials and the Lessons We Are Learning

Piers Coleman, Rutgers University

Johnston Hall 338
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Abstract:
Part of the challenge of condensed matter and material physics is to find and seek out new novel forms of order and materials properties. In this talk I will discuss some of the new insights into electron condensation and order that derive from the study of f-electron materials, where "composite order" between magnetic moments and itinerant electrons appears to play a central role in the development of new quantum states, including "hidden order" and superconductivity. I'll particular try to bring out the importance of a creative tension between experiment, numerics and model-based approaches, telling the story of how new numerical results prompted the rediscovery of a forgotten piece of physics developed by Bob Schrieffer 40 years ago, relevant to both f- and d- electron materials.

Speaker's Bio:
Piers Coleman is a Professor in the Center for Materials Theory at Rutgers, The State University of New Jersey. He studied at Cambridge and Princeton Universities, has previously held positions at Trinity College, Cambridge, the Kavli Institute for Theoretical Physics, UCSB Santa Barbara. Professor Coleman's reseach involves understanding the role of quantum mechanics in the emergent many body physics of matter, and developing new ideas and new math for their description. He has a long-standing interest in highly correlated d- and f-electron materials, in novel forms of superconductivity and the deep unsolved mystery of quantum criticality in metals. He is also interested in science outreach and co-produced "Music of the Quantum" with his musician brother, Jaz Coleman.

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2003 Digital Media Center • Telephone: +1 225/578-5890 • Fax: +1 225/578-8957