Electronic complexity on the Border of Magnetism
By
Dr. Christos Panagopoulos
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Biography of Speaker:

Dr. Christos Panagopoulos obtained his PhD in physics at Cambridge University. He has served as a visiting professor or scientist at a number of institutions, including the Chinese Academy of Sciences and the Universities of British Columbia, Crete, Tohoku and Kyoto. His research focuses on understanding and controlling the spontaneous tendencies toward complex pattern formation in electronic systems. He is the group leader of a European Excellence laboratory on phase control in advanced materials. Honours accorded Panagopoulos include the European Young Investigators Award and his election as Research Fellow of Trinity College, and University Research Fellow of The Royal Society.

Abstract:

A variety of modern materials whose behaviour cannot be understood with traditional ideas have in common the dominant role played by electron-electron interaction effects. Examples of such systems are transition metal oxides, including high-temperature superconductors, heavy fermion metals, organic charge transfer compounds, and one-and two-dimensional electron gas systems.

In the transition metal oxides for example, the charge, spin, and orbital degrees of freedom, and their coupled dynamics, produce complex phases such as liquid-like, crystal-like, and liquid-crystal-like states of electrons. Understanding and controlling the tendencies toward complexity will open the way to novel functionalities. In some cases, associated slow density fluctuations may even act in favour of superconductivity: New classes of materials may be discovered and even nanoscale room temperature superconducting electronics realised.

The talk will address the physics and implications of electronic complexity in low dimensional systems with rich phase diagrams including insulating, metallic and superconducting ground states.

Date: Thursday, 15 November 2007
Time: 11.00am to 12.00 noon
Venue: PAP Meeting Room (SBSB3n-19)

Hosted by Prof. Alfred Huan