Max-Planck-Institut für Struktur und Dynamik der Materie

Max Planck Institute for the Structure and Dynamics of Matter

December 2nd 2014 – 2:00 pm

CFEL Seminar room IV, 01.111 (Bldg. 99)

George Jackeli

University of Stuttgart & MPI for Solid State Research

Spin-orbit induced novel states Mott insulators

Over the last few years, there has been an upsurge of interest in materials in which exotic states may emerge as the result of relativistic spin-orbit interactions. We will discuss insulating iridium oxides from this perspective. We show that the strong spin-orbit coupling, through the entanglement of spin and orbital spaces, leads to a variety of interesting Hamiltonians ranging from the Heisenberg model to the Kitaev or quantum compass models, for different lattice geometries. Based on these effective Hamiltonians, we present a comprehensive theoretical study of the rich phase behavior and dynamics observed in layered iridium oxides such as tetragonal Sr2IrO4 and Sr3Ir2O7 and hexagonal A2IrO3 (A=Na, Li). We also discuss the layered tetragonal vanadate Sr2VO4 and argue that magnetically-hidden octupolar order, driven by spin-orbit coupling, is realized in this compound.

Host: Alaska Subedi

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