



中心系列讲座 ICQM Weekly Seminar Series

Symmetric spin-orbital-Hubbard model on honeycomb lattice: An origin of Kitaev model and beyond



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Venue: Room 607, Conference Room A, Science Building 5

地点: 理科五号楼607会议室

Abstract

We present a single band Hubbard model on honeycomb lattice with link-symmetric spin-orbital interaction. In the large U limit, this model is mapped to a conventional antiferromagnetic (AFM) Heisenberg model combining with a 'zig-zag' AFM Heisenberg one. The latter AFM order was favored by a recent experiment for $A_2\text{IrO}_3$ ($A=\text{Na}, \text{Li}$). Competition between two different AFM orders leads to a spin liquid phase characterized by Kitaev model that happens if the spin-orbital coupling has the same strength as the hopping amplitude. This deepens our understanding of the origin of the Kitaev coupling: It comes from the balance between the hopping and spin-orbital couplings but to get rid of the hopping. In a moderate U , this model has a charge-spin gapped phase with two different spinon excitations. In a weak interaction, the original gapless Dirac fermion is gapped by the spin-orbital coupling while a new gapless Dirac fermion appears at the same Dirac points.

About the Speaker

虞跃, 中国科学院理论物理研究所研究员,凝聚态理论组成员。1982年毕业于浙江大学物理系, 1987年在浙江大学物理系获博士学位。1992年中国科学院理论物理研究所副研究员。1998年任该所研究员至今