ΣΕΜΙΝΑΡΙΟ ΚΕΝΤΡΟΥ ΚΒΑΝΤΙΚΗΣ ΠΟΛΥΠΛΟΚΟΤΗΤΑΣ & ΝΑΝΟΤΕΧΝΟΛΟΓΙΑΣ/ CCQCN SEMINAR

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11:00-12:00

3rd Floor Seminar Room

Instabilities of topological Kitaev spin liquids

Dr. Ioannis Rousochatzakis
School of Physics and Astronomy
University of Minnesota

Abstract

The search for topological quantum spin liquids (QSLs) has been a central thread of correlated electron material research since the initial proposal of the resonating valence bond (RVB) state several decades ago [1]. Ideally, QSLs evade magnetic order down to zero temperature and harbor a remarkable set of collective phenomena, including topological ground-state degeneracy, long-range entanglement, and fractionalized excitations [2].
While the long activity on frustrated Mott insulators with 3d transition metals has lead to a number of candidate QSLs [2], a certain class of 4d and 5d materials, the so-called Kitaev magnets, with strong spin orbit coupling (SOC) and dominant anisotropic interactions has emerged in recent years as another prominent playground for QSLs [3].
Here I will discuss recent work [4-5] on a series of Kitaev magnets and highlight a number of instabilities of the QSL state, including: i) an instability towards a novel form of a classical spin liquid, and (ii) the nucleation of solitonic, counter-rotating domain walls. The former provides a consistent interpretation of recent XMCD data from the 3D Iridate beta-Li2IrO3 under pressure, while (ii) is consistent with the observation of counter-rotating spirals in several 2D and 3D compounds.

References:

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.[2] L. Balents, Nature 464, 199 (2010).
[3] W. Witczak-Krempa et al, Ann. Rev. Cond. Matt. Phys. 5, 57 (2014).
[4] IR, J. Reuther, R. Thomale, S. Rachel, N. Perkins, Phys. Rev. X 5, 041035 (2015).
[5] IR & N. Perkins, arXiv:1610.08463.