

Weak and strong coupling topological phases in Hyperhoneycomb Iridates

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Quantum spin liquids and Topological insulators are prototypes of phases whose properties are not captured within the framework of spontaneous symmetry breaking. Understanding of such phases and their realization in material systems is one of the central questions of condensed matter physics. Recent parallel developments in material sciences and theory have led to exciting possibilities of realizing these phases in a class of Iridium based compounds. In this talk, I shall discuss the weak and strong coupling phases in a three dimensional “hyperhoneycomb” Iridate system. In particular, I shall focus on the a Topological Band insulator and a three dimensional Z_2 spin liquid obtained in this system. I shall also discuss the implications of the results in context of recent experiments.

[1] E.-K. Lee, R. Schaffer, S. Bhattacharjee, Y. B. Kim, *Heisenberg Kitaev model on the hyperhoneycomb lattice*, PRB 89, 045117 (2014).

[2] E.-K. Lee, S. Bhattacharjee, K. Hwang, H.-S. Kim, H. Jin, Y. B. Kim, *Topological and magnetic phases with strong spin-orbit coupling on the hyperhoneycomb lattice*, arXiv:1402.2654 (2014).