Possibility of Dirac spin liquids in Ce- and Yb-based triangular-lattice antiferromagnets

The quest for quantum spin liquids has recently been fuelled by the discovery of a new family of Ce- and Yb-based triangular lattice antiferromagnets. In this talk, we first discuss evidence for a Dirac Spin liquid state in the paradigmatic J1-J2 model. We demonstrate that its low-lying spectrum in the paramagnetic regime is captured entirely by elementary excitations out of a Dirac spin liquid ground state. As such, the Dirac spin liquid and its associated quantum electrodynamics in 2+1 dimensions can be understood as an organizing principle of neighboring phases. We then explore phase diagrams of recent delafossite triangular antiferromagnets, where first-principles calculations yield predictions on coupling constants. We discuss in which regions of the corresponding phase diagram, Dirac spin liquid behavior could be expected, and where certain materials can be found in this phase diagram.

References:

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