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Frustrated Metals

I would like to talk about the exotic metals and "insulators" which are realized on an anisotropic triangular lattice.

In our study, spin degrees of freedom is basically neglected in order to examine the intrinsic role of geometrical frustration on charges; the "t-V model" we adopt is the simplest model including only the nearest neighbor hopping and Coulomb interaction terms.

Our starting point is a strong coupling limit, $V/t \rightarrow \infty$, of the t-V model which corresponds to a classical Ising model, which is known to have disorder throughout the whole temperature region.

We find particular rule to classify the ground state and excited states of the classical Hilbert space into several manifolds.

By introducing quantum ("t" in t-V model) or thermal fluctuation to these manifolds, we find that several exotic states appear due to order-by-disorder mechanism.

For reference see:

C. Hotta, N. Furukawa, Phys. Rev. B 74 (2006) 193107.

C. Hotta, F. Pollmann, Phys. Rev. Lett. 100 (2008) 186404.

C. Hotta, T. Kiyota, N. Furukawa, arXiv/0912.0671/.



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