

Strong correlations from Hund's rule coupling

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The proximity of a Mott insulating state ("Mottness") is responsible for strong correlations in a number of materials, especially oxides of 3d transition metals. In this talk, I will emphasize that the Hund's rule coupling induces strong correlation effects in materials which are not close to a Mott insulator. This is especially relevant for oxides of 4d transition metals such as ruthenates, and also for iron-based superconductors. The Hund's rule coupling will be shown to have antagonistic ("Janus-faced") effects on the Mott gap and on the quasiparticle coherence scale. For Hund's correlated materials, the self-consistent embedded-atom construction at the heart of Dynamical Mean-Field Theory proves to be especially meaningful.

References:

L.de' Medici, J.Mravlje and A.Georges Phys. Rev. Lett. 107, 256401 (2011);

A.Georges, L. de'Medici and J. Mravlje. Annual Reviews of Condensed Matter Physics, Vol.4 (2013) arXiv:1207.3033