THEORIEKOLLOQUIUM &
Sonderkolloquium SFB/TRR80

Freitag, den 04.05.18 um 12:00 in **MB 143**(!!)

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Spin-orbital interplay in j=3/2 Mott Insulators

In d^1 Mott insulators, the spin-orbit coupling (SOC) stabilizes j=3/2 quartet of an effective total angular momentum thus allowing for the emergence of multi-orbital physics and related spin-orbital frustration. Considering molybdenum, and osmium double perovskites as examples, I discuss how resulting spin-orbital interplay can give rise to a host of novel quantum phases that includes multipolar order, non-collinear spin patterns, and nonmagnetic disordered valence bond states [1]. Finally, I present an example of the honeycomb lattice d^1 compound, such as zirconium trichloride, in which, paradoxically, the strong SOC enhances the symmetry of spin-orbital space to emergent SU(4) symmetric couplings [2] that in turn may lead to a spin-orbital liquid state.

[1] F.J. Romhányi, L. Balents, G. Jackeli, Phys. Rev. Lett. **118**, 217202 (2017).
[2] A.M.G. Yamada, M. Oshikawa, G. Jackeli, arXiv:1709.05252 (2017).

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