GOETHE UNIVERSITÄT FRANKFURT AM MAIN

Fachbereich Physik
Institut für Theoretische Physik

CONDENSED MATTER THEORY SEMINAR

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

Speaker: **Dr. George Jackeli (University of Stuttgart and MPI-FKF, Stuttgart)**

Date & time: **Friday, May 18th, 2018 at 3.15 p.m.**

Venue: **Seminar room 1.114**

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 oxides 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.

References

[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)