**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 18\(^{th}\), 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**
