"Spin-orbital frustration in Mott insulators"

George Jackeli (MPI and Uni. Stuttgart)

In Mott insulators, unquenched orbital degrees of freedom often frustrate the magnetic interactions
and lead to a plethora of interesting phases with unusual spin patterns or non-magnetic states without
long-range order. I will re- view from this perspective the theoretical concepts and experimental data
on late transition metal compounds, mostly focusing on iridates. In the second part, I will present our
recent theoretical study of interplay of spin and orbital degrees in double-perovskite compounds with
spin one-half ions occupying the fcc sub-sublattice, such as molybdenum and osmium oxides. I will argue
that this interplay might lead to a rich variety of the phases that include non-collinear ordered patterns
with or without net moment, and, most remarkably, non-magnetic disordered spin-orbit dimer state.