



SEMINARIO

THEORETICAL INVESTIGATION OF SPIN ORBIT PHYSICS AND CORRELATION EFFECTS IN COMPLEX OXIDES AND HETEROSTRUCTURES

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Relativistic spin-orbit coupling (SOC) is one of the important ingredients to generate novel phenomena in a solid, such as topological insulators. In complex oxides, the SOC and Coulomb repulsive interactions coexist. In order to understand or predict useful functionalities of complex oxides, it is crucial to consider the competition or cooperation between these effects in a realistic manner. In this talk, I will present our theoretical work on complex oxides based on density functional theory type calculations mainly focusing on iridium-based oxides. Considering iridium oxide heterostructures, I will first discuss possible topological insulating states [1] and unusual charge transfer effects [2]. For the latter, the detailed comparison with experimental results [3] will be presented, as well as recent developments in anomalous transport phenomena. I will then discuss the electronic structure of a bulk iridium oxide, which appears to have unmixed $J_{\text{eff}}=1/2$ states [4], and related compounds.

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REFERENCES:

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3. J. Nichols *et al.* Nat. Commun. 7, 12721 (2016)
4. S. Calder *et al.* Phys. Rev. B 89, 081104(R) (2014); Phys. Rev. B 92, 180413(R) (2015).