



EINLADUNG zum IFP-SEMINAR

Thema: **Double exchange in double perovskites: novel kinetic energy driven antiferromagnetism**

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Host: Karsten Held

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Ort: TU Wien, Institut für Festkörperphysik
Freihaus Seminarraum 138B, Turm C, 7. OG (rote Leitfarbe)
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Abstract:

Double perovskite materials have come into the limelight in recent years owing to their half-metallic behaviour, and large novel magnetoresistance. Like their manganite counterparts, the double exchange mechanism is supposed to play the major role in causing their strong ferromagnetism, and high T_c . We however, show that this same double exchange can give rise to an exotic variety of antiferromagnetism, specifically in the double perovskite materials. This gives rise to a novel Antiferromagnetic Metal (AFM) phase, which is extremely rare in nature. We show this by deriving an effective spin model for these materials, as well as extensive numerical simulations. We thereby obtain a full magnetic phase diagram for metallic double perovskites. Finally, we discovered a realization of this AFM phase in an actual double perovskite series $\text{Sr}_{2-x}\text{La}_x\text{FeMoO}_6$, with $x > 1$. This new material promises of many exotic properties, and is a subject of future investigation. We also attempt a generalization of this mechanism to other classes of double perovskites, and also to other magnetic materials.