chemisch
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gesellschaft

Gegründet im Jahre 1869 von H. Hlasiwetz, J. Loschmidt, J. Petzval und J. Stefan

EINLADUNG

zum Vortrag von

Prof. Dr. Marta Gibert

Institute of Solid State Physics, Technische Universität Wien

Tuning Magnetism with Atomic Precision: Structure-Property Coupling in Oxides Heterostructures

am Dienstag, 13. Mai 2025, um 17:30 Uhr

Ort: Lise-Meitner-Hörsaal, Fakultät für Physik, Universität Wien,
1090 Wien, Strudlhofgasse 4 / Boltzmanngasse 5, 1. Stock

Barrierefreier Zugang: Boltzmanngasse 5, Lift, 1. Stock rechts über den Gang zum Hintereingang des Hörsaals

Abstract:
The wide variety of properties exhibited by transition metal oxides places them as highly attractive materials, both from a fundamental and an applied point of view. Modern deposition techniques allow us to assemble oxides into epitaxial heterostructures with atomic precision. As a result, one can achieve minute control over the electronic, magnetic, and structural properties, allowing further tuning of oxides' properties and even access to novel electronic behaviors not exhibited by the parent compounds.
Here we will study the structure-property relationship of ferromagnetic double perovskite La_2NiMnO_6 thin films as their thickness is reduced to a few unit cells [1]. We will also use atomically-controlled La_2NiMnO_6/Re_2NiMnO_6 (RE=Nd, Sm) superlattices to explore the length scale of the interfacial coupling between ferromagnetic and paramagnetic phases and show that the magnetic transition temperature can be tuned [2]. Finally, we will also demonstrate how these superlattices enable the rational design of different antipolar distortions, paving the way to the emergency of multiferroicity in these artificially layered systems.
A comprehensive characterization of the structural and electronic properties of the heterostructures will be performed using a variety of techniques (SQUID magnetometry, TEM, XAS, XMCD, low-energy muons, etc.). Landau theory and first-principles calculations will also be presented.

[1] G. De Luca *et al.*, *Advanced Materials* 34, 2203071 (2022).
[2] J. Spring *et al., ACS Nano* (in press - arXiv:2406.09937).

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