Beitrag ID: **91** Typ: **Poster**

Influence of SrIrO3/SrRuO3 Multilayer Interface on Magnetic Skyrmions Formation

Dienstag, 17. September 2024 22:40 (20 Minuten)

The complex interplay in 4d-5d based heterostructure thin films is a prominent topic in contemporary spintronics, particularly for the development of magnetic skyrmions within ultra-thin oxide films. For the stabilization of magnetic skyrmions, heterostructures must exhibit coexisting electron-electron correlations, large perpendicular magnetic anisotropy (PMA), interfacial Dzyaloshinskii-Moriya interaction (DMI), and strong spin-orbit coupling (SOC) (Pham et. al., science, 384, 2024). In such systems, inversion symmetry can be artificially broken using the SOC/ferromagnetic interface (J. Matsuno et.al. Sci. Adv., 2 (7), 2017). Magnetic skyrmions are primarily probed using Magnetic Force Microscopy (MFM) and their electrical detection via the Topological Hall Effect (THE) (Meng et. al. Nano lett., 19(5), 2019). This study focuses on ultra-thin SrIrO3 (SIO) and SrRuO3 (SRO) multilayer interfaces on TiO2-terminated STO (001) substrate.
In epitaxial SRO/SIO multilayers, the strong DMI acts as the driving force for the formation of magnetic skyrmions (J. Matsuno et.al. Sci. Adv., 2 (7), 2017). SRO films are deposited using high oxygen pressure sputtering (HOPS), while SIO is deposited using Molecular Beam Epitaxy (MBE). By varying the deposition time, different thicknesses of SRO thin films are achieved, and their magnetic and transport properties are studied to observe changes in their physical properties. Consequently, the evolution of the Hall effect is studied in SRO thin films with decreasing thickness.
Studies on 4d/5d based multilayer epitaxial thin films, provide an ideal playground for investigating the interplay between ferromagnetism and strong SOC. This research advances our understanding of the fundamental mechanisms driving skyrmion formation and stability, potentially leading to innovations in magnetic memory devices.

Hauptautor: SINGH, Ankita

Co-Autoren: DE OLIVEIRA LIMA, Vitor Alexandre (JCNS-2); BEDNARSKI-MEINKE, Connie (JCNS-2); KENTZINGER, Emmanuel (JCNS-2)

Sitzung Einordnung: Mounting Posters, Beer and light Dinner

Track Klassifizierung: Magnetism & Superconductivity