
S E M I N A R
on
Semiconductor Physics and Nanotechnology

DEFENSIO:

Fr, 21.11.2025, 14:00 Uhr,

in person in the Physics lecture hall or via Zoom

**“Two-dimensional Phyllosilicates as an Air-stable Platform for
Layered Magnetic Materials”**

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Since the discovery of graphene, intrinsic magnetic ordering in two-dimensional (2D) materials remained challenging, prompting approaches such as proximity effects, defect engineering, and doping. Intrinsic 2D ferromagnetism was first observed in chromium-based compounds, but their poor ambient stability and cryogenic ordering temperatures limit practical use.

Phyllosilicates offer a promising alternative as naturally occurring, ambient-stable layered materials that host magnetic ions via Mg substitution in the octahedral site. Studies of iron-rich phyllosilicates show that the presence of mixed $\text{Fe}^{2+}/\text{Fe}^{3+}$ states enhance magnetic ordering. The visualization of magnetic domains and layer-dependent ordering in 2D phyllosilicates using scanning SQUID microscopy, reveal intrinsic A-type in-plane anti-ferromagnetic ordering.

The work also focus on the developing scalable approach to induce room-temperature ferromagnetism in phyllosilicates through broad-beam ion implantation, enabling new pathways to fabricate ambiently stable 2D magnetic insulators with tunable magnetic properties.

Zoom – Link:

<https://zoom.us/j/96375934537?pwd=RTIKTWhSdzRHU211YTY1bGFxTUtpZz09>

Meeting-ID: 963 7593 4537

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