UNIVERSITÄT DUISBURG ESSEN

PHYSIK E=

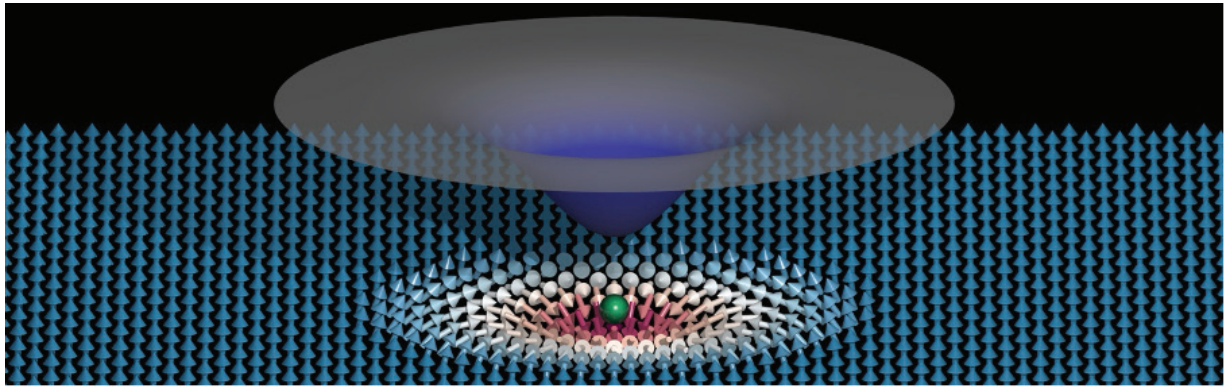
Physikalisches Kolloquium

Mittwoch, 17.06.2026
13:00 Uhr
MC 122 und Zoom

https://uni-due.zoom-x.de/j/64228670246?pwd=RjVQeFNIUkRKRkpiNVpKYXhJaFNLdz09 (gilt für alle Vorträge)

Spin-orbitronics across dimensions

Prof. Dr. Samir Lounis, Universität Halle-Wittenberg



Spin, charge, and orbital interactions, enriched by topology and chirality, generate diverse phenomena central to spin-orbitronics, which is a dynamic field giving rise to a wealth of intriguing phenomena, while targeting faster, denser, and more energy-efficient information technologies. Realizing this potential requires a microscopic, materials-specific understanding of nanoscale magnetic textures.
In this talk, I will present new magnetotransport effects associated to complex magnetic textures, including ferromagnetic and antiferromagnetic skyrmions, which enable their detection via various experimental techniques. I will also discuss proximity effects in van der Waals heterostructures enabling the creation and all-electric switching of non-trivial magnetic states, such as the new class of solitons: frustrated multi-meronic textures. Finally, I will introduce kagomerization: the formation of a two-dimensional kagome lattice in transition-metal monolayers induced by hexagonal boron nitride, which strongly reshapes magnetism, gives rise to spin-glass-like states and stabilizes topological solitons.