Universität Münster

Fachbereich Physik

Allgemeines Physikalisches Kolloquium

Donnerstag, 10.10.2024 - 16 Uhr c.t.

Jun.-Prof. Dr. Iris Niehues
Prof. Dr. Anika Schlenhoff
Prof. Dr. Hubert Krenner

Antrittsvorlesungen - Physikalisches Institut, Universität Münster

The ability to control and sense the properties of solid-state materials on the nanoscale lays the foundation for both groundbreaking fundamental discoveries and technological applications. By employing advanced measurement techniques, we are pushing the limits of spatial resolution and investigate the intrinsic properties of solid-state nanosystems. These encompass 2D materials and surface spin textures in thin-film systems, as well as single quantum emitters for quantum technologies and integrated circuits controlled by nano-earthquakes. We aim for a profound understanding of the interactions between light, spin, charge, and matter, with the ultimate goal of attaining comprehensive control over nanomaterials in the quantum domain.

wissen.leben

Kolloquiums-Kaffee ab 16 Uhr vor dem Hörsaal

Institutsgruppe 1 – HS 2
Wilhelm-Klemm-Str. 10

Universität Münster

Fachbereich Physik

Allgemeines Physikalisches Kolloquium

Optical near-field spectroscopy of 2D materials

Jun.-Prof. Dr. Iris Niehues


© Iris Niehues

In this talk, I will discuss the application of near-field techniques to achieve optical nanoscale resolution that surpass the diffraction limit and detect both elastically and inelastically scattered light. This approach enables us to develop and explore novel functionalities in 2D materials, enhancing their potential for quantum technology applications.

Sensing and manipulating atomic-scale spin textures: from direct tunneling to electron interferometry

Prof. Dr. Anika Schlenhoff


© N. Grenningloh

This lecture explores the use of localized spin-polarized tunneling currents for atomic-scale mapping of surface topography and spin textures, as well as for probing and manipulating magnetization dynamics. Resonant electron tunneling via image potential states enables high-resolution, spin-sensitive imaging at nm distances, thus overcoming the limitations of conventional scanning tunneling microscopy. Additionally, these states offer new current-induced manipulation capabilities and promote atomic-scale electron interferometry, providing access to hitherto unobtainable local surface properties.

Phonons, the unsung heroes – or – the search for the perfect wave

Prof. Dr. Hubert Krenner


© L. Walbaum

Phonons are in addition to photons or electrons a fundamental excitation in condensed matter. Over the past decades, innovation for radically new devices was mostly driven by controlling electrons and photons. I will present our unified on-chip phononic platform to achieve control of the interactions between light, sound, and matter, ultimately in the limit of single quanta.

wissen.leben

Institutsgruppe 1 – HS 2
Wilhelm-Klemm-Str. 10