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Nichtgleichgewichtsdynamik kondensierter
Materie in der Zeitdomäne

UNIVERSITÄT
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ESSEN

Open-Minded

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Campus Duisburg**

Probing and Engineering Quantum States in Bilayer Graphene: GHz Spectroscopy and Spin-Orbit Proximity Effects

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ETH Zürich

Solid-state physics is currently experiencing a revival of its foundational concepts - semiconductors, magnetism, correlated electron systems, and superconductivity - within the rich field of two-dimensional (2D) materials. In this realm, such phenomena can now be engineered with remarkable precision and control. This presentation will begin with a brief overview of our group's contributions to this rapidly evolving field, followed by a closer look at two recent advances.

First, I will show how we use a superconducting on-chip GHz resonator as an ultrasensitive spectroscopic probe, enabling us to resolve the electronic states and their occupation in bilayer graphene quantum dot systems with an energy resolution that surpasses conventional tunneling spectroscopy.

Second, I will highlight how the intrinsically weak spin-orbit interaction in bilayer graphene can be enhanced by more than an order of magnitude - up to a factor of twenty - via proximity coupling to a transition metal dichalcogenide (TMD) layer. Remarkably, this enhanced spin-orbit coupling is electrically tunable, offering new possibilities for the coherent control of quantum states in graphene-based devices.

Für diese Zeit steht eine Kinderbetreuung nach vorheriger Anmeldung zur Verfügung.

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