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Physics Colloquium

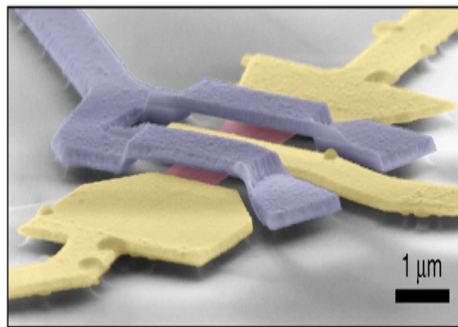
Tuesday, January 23, 2024 at 16:30

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Quantum phases in flat-band van-der-Waals systems: making, controlling and measuring by quantum transport

One exciting endeavor of condensed matter research is to understand how electrons in a solid interact with one another and the underlying atoms. Depending on this intricate interplay, the system can have drastically different properties, for example be either insulating or superconducting. Due to the many electrons and atoms involved, developing a general understanding of this interplay is very complex. In this sense, finding experimental systems that allow to systematically control charge carrier density and their mutual interaction is highly desirable. The novel class of van-der-Waals materials offers such tunability.



This talk will focus on one specific van-der-Waals material, the naturally occurring Bernal bilayer graphene (BBG). It has shown to host electric-field tunable van-Hove singularities. Indeed, correlated states and even superconductivity was found close to these regions of diverging density of states. Here, I will show how we systematically identify and explore such phases by controlling not only the density of states, the charge carrier density but also the interaction between charge carriers. Most intriguingly we identified anomalous quantum Hall and Wigner crystal phases in BBG.

Venue: Universität Leipzig, Faculty of Physics and Earth Sciences

04103 Leipzig, Linnéstraße 5, **Room: small lecture hall**

Everyone is welcome to a reception with coffee, drinks and cookies in the Aula following the talk.

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