

Dienstag, 19.07.2016

Hörsaal D, Chemiezentralgebäude, 17:15 Uhr

Sprecher: Alexey Chernikov
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Titel: Excitons in atomically-thin materials

Abstract:

Since the discovery of graphene, a single sheet of carbon atoms, research focused on two-dimensional (2D) materials evolved rapidly due to the availability of atomically thin, thermally stable crystals with intriguing physical properties. The 2D materials naturally inherit major traits associated with systems of reduced dimensionality: strongly enhanced Coulomb interactions, efficient light-matter coupling, sensitivity to the environment, and possibility to fabricate custom-made heterostructures. In particular, the considerable strength of the Coulomb forces between the charge carriers introduces a rich variety of many-body phenomena. In the class of 2D semiconductors it leads to the emergence of atom-like electron-hole states, such as excitons, trions, and biexcitons, with unusually high binding energies of many 100's of meV and efficient light absorption.

In this talk, I will focus on the consequences of strong Coulomb interaction in atomically-thin materials and address both fundamental physics of the excitonic particles and the resulting optical properties. I will further describe how non-equilibrium conditions such as strong photo-excitation and electrical doping can profoundly alter the many-body interactions in these systems, providing means to manipulate and control optical response of atomically-thin materials.

Organisation: T. Hertel

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