O 76: Invited Talk (Carsten Busse)

Time: Thursday 15:00–15:45 Location: TRE Ma

Invited Talk O 76.1 Thu 15:00 TRE Ma

Quasi free-standing graphene — •Carsten Busse — II. Physikalisches Institut, Universität zu Köln, Germany

Following its successful isolation from graphite in 2004, graphene has risen to one of the most researched topics in solid state physics with e.g. whole sessions at this conference devoted to this material only. A widespread method to produce graphene is epitaxial growth on metal surfaces. Here, Ir(111) sticks out as it allows the growth of extended layers with a high degree of structural perfection where the interaction between the carbon sheet and its substrate is comparably weak. However, the close proximity of the metal surface modifies the behavior of charge carriers (opening of minigaps), quenches the characteristic phonon modes, decreases the lifetime of plasmons, and precludes mechanical exfoliation of graphene.

Intercalation of an additional species as alkali metals or oxygen reduces the graphene-substrate interaction and renders graphene quasi free-standing. I will highlight the structure of the resulting graphene intercalation compounds measured using scanning tunneling microscopy (STM) with superior lateral resolution and x-ray standing waves (XSW) with high vertical resolution. The electronic structure as determined by Fourier transform scanning tunneling spectroscopy and angular resolved photoemission spectroscopy (ARPES) shows unperturbed graphene bands, often strongly shifted in energy due to significant charge transfer (doping) from the intercalant to the carbon layer. I will show that graphene nanoflakes can act as quantum dots and confine image potential states as well as Dirac states.