SFB/TRR 21 - Colloquium

24. Januar 2014, Ulm

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Intrinsic magnetism in grapheme

Graphene – a sheet of carbon atoms densely packed in a honeycomb lattice – has been dubbed a miracle material due to a unique combination of superior properties. This strictly two-dimensional material exhibits an exceptionally high crystal and electronic quality and already revealed a cornucopia of new physical phenomena. Among them is the possibility to induce and control a magnetic response – a subject of long-standing interest in a pure carbon-based system, in the absence of d- or f- electrons normally associated with magnetic behavior. I will review recent experiments on inducing and controlling magnetic response in graphene via introduction of point defects such as vacancies and adatoms. Graphene is hailed as potentially an ideal material for spintronics due to its weak spin-orbit interaction and the ability to control its electronic properties by the electric field effect. As the defect magnetism in graphene is itinerant (i.e. due to localisation of conduction electrons), it can be easily controlled by doping, so that the induced magnetic moments can be switched on and off. This adds unique functionality to potential graphene devices and has important implications for spin transport.

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