HL 25: C/diamond II

Time: Tuesday 16:00–16:30 Location: POT 51

HL 25.1 Tue 16:00 POT 51

Functionalizing graphene by embedded boron clusters — Alexander Quandt[1], Cem Özdogan[2], •Jens Kunstmann[3,4], and Holger Fehske[1] — [1]Institut für Physik der Universität Greifswald, Felix–Hausdorff-Str. 6, 17489 Greifswald, Germany — [2]Department of Computer Engineering, Çankaya University, Balgat, 06530 Ankara, Turkey — [3]Max-Planck-Institut für Festkörperforschung, Heisenbergstr. 1, 70569 Stuttgart, Germany — [4]Institute for Materials Science, Dresden University of Technology, 01062 Dresden, Germany

We present results from an ab initio study of B_7 clusters implanted into graphene [1,2]. Our model system consists of an alternating chain of quasiplanar B_7 clusters. We show that graphene easily accepts these alternating B_7-C_6 chains and that the implanted boron components may dramatically modify the electronic properties. This suggests that our model system might serve as a blueprint for the controlled layout of graphene based nanodevices, where the semiconducting properties are supplemented by parts of the graphene matrix itself, and the basic metallic wiring is provided by alternating chains of implanted boron clusters. [1] A. Quandt, C. Özdoğan, J. Kunstmann, and H. Fehske, Nanotechnology **19**, 335707 (2008). [2] A. Quandt, C. Özdoğan, J. Kunstmann, and H. Fehske, phys. stat. solidi (b) **245**, 2077 (2008).

HL 25.2 Tue 16:15 POT 51

Theoretical studies of electronic transport and giant magnetoresistance in ferromagnetically contacted graphene nanoribbons — •Stefan Krompiewski — Institute of Molecular Physics, PAS, Poznan, Poland

Graphene − a monolayer of graphite − is believed to be even more promising for the emerging molecular electronics than carbon nanotubes. This contribution reports on a possible application potential of graphene nanoribbons also in magnetoelectronics (spintronics). The present methodology is based on the tight-binding model combined with the Green function recursive technique, within the ballistic transport regime. In contrast to hitherto existing theories, external magnetic contacts are here 3-dimensional and semi-infinite in the transport direction. The basic transport characteristics: conductance, shot noise and giant magnetoresistance (GMR) are studied for different aspect (width/length) ratios and the most common chiralities, i.e. zigzag and armchair ones. It turns out that typically the GMR effect at elevated gate voltages can exceed 10-20%, morover interestingly enough its value in armchair-edge ribbons is clearly higher than in those with zigzag edges.