

Seminář odd. 26

Tenkých vrstev a nanostruktur

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TÉMA

Germanene: graphene's little sister

Harold J.W. Zandvliet

Physics of Interfaces and Nanomaterials and MESA+ Institute for Nanotechnology,
University of Twente, P.O. Box 217, 7500AE Enschede, The Netherlands

Recently, a few research groups have reported the growth of germanene, a new member of the graphene family [1]. Germanene is in many aspects very similar to graphene, but in contrast to the planar graphene lattice, the germanene honeycomb lattice is slightly buckled and composed of two vertically displaced sub-lattices. First principles total energy calculations have revealed that free-standing germanene is a two-dimensional Dirac fermion system, i.e. the electrons behave as massless relativistic particles that are described by the Dirac equation, i.e. the relativistic variant of the Schrödinger equation. We will give a brief update of the growth and electronic properties of germanene on Ge₂Pt nanocrystals [2,3] as well as molybdenum disulfide (MoS₂) [4]. The density of states of the germanene layers synthesized on the Ge₂Pt nanocrystals and MoS₂ substrates exhibits a V-shape, which is one of the hallmarks of a two-dimensional Dirac system.

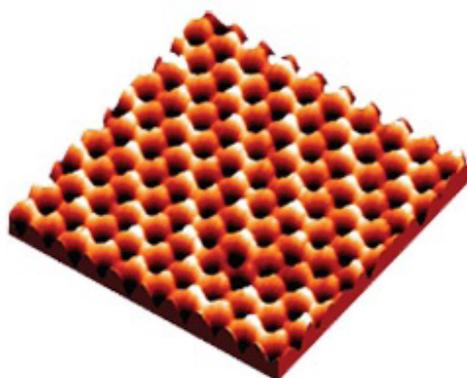


Figure caption Scanning tunneling microscopy image (4.5 nm by 4.5 nm) of buckled honeycomb lattice of germanene. Sample bias -0.5 V, tunnel current 0.2 nA.

References

- [1] A. Acun et al. J. Phys. Cond. Mat. 27, 443002 (2015) and references therein.
- [2] P. Bampoulis et al. J. Phys. Cond. Mat., 26, 442001 (2014).
- [3] L. Zhang et al., Appl. Phys. Lett. 107, 111605 (2015).
- [4] L. Zhang et al. Phys. Rev. Lett. 116, 256804 (2016).

odborný garant: Ing. Pavel Jelínek, Ph.D.