



e-conversion



Seminarankündigung

Dienstag, 16. Juli 2019

13:15 Uhr

WSI, Seminarraum S 101

“Atomic defects-induced magnetism in PtSe₂-based devices”

Defects are ubiquitous in solids and their reduction is crucial for realizing materials' full electronic and optical potential [1]. However, there is a widespread assumption that the presence of defects is always detrimental for material properties. Indeed, defect engineering could be a key approach to enriching their functionalities. One of the opportunities offered by these crystal imperfections is the extrinsically induced long-range magnetic ordering, a long-time subject of theoretical investigations [2]. In this talk, I will first present magneto-transport properties of ultrathin PtSe₂ crystals and demonstrate unexpected magnetism [3]. Electrical measurements show the existence of either ferromagnetic or anti-ferromagnetic ground state orderings depending on the number of layers in this ultra-thin material. Such competition between ferro- and antiferro-magnetic ground states stems from the RKKY exchange couplings between magnetic Pt vacancies located at the surface of metallic films of PtSe₂. Finally, I will provide an outlook on the integration of such ultra-thin magnets together with appealing non-magnetic spin conducting channel materials (e.g. black phosphorus [4]) into the next generation spin-transfer torque magnetic random-access memory device applications towards achieving low power operations.

[1] D. Rhodes et al., Nat. Mater., **18**, 541-549 (2019)

[2] P. O. Lehtinen et al., Phys. Rev. Lett., **93**, 187202 (2004)

[3] A. Avsar et al., Nat. Nanotechnol., DOI 10.1038/s41565-019-0467-1 (2019)

[4] A. Avsar et al., Nat. Phys., **13**, 888-894 (2017)

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