Seminář odd. 26
Tenkých vrstev a nanostruktur

Fyzikální ústav AVČR, Cukrovarnická 10, Praha 6

datum: 12. 1. 2016 úterý
čas: 10:00
místnost: knihovna, budova A, 1.p.

TÉMA

Defects and molecules at silicon surfaces

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Scanning tunnelling microscopy (STM) can be used to introduce atomic-scale defects in semiconductors and to characterise their structural and electronic properties at the atomic-scale [1,2]. Similarly, STM can be used to manipulate and characterise small molecules attached to semiconductor surfaces [3,4] and when combined with complimentary techniques and density functional theory calculations detailed insights into the structural and chemical properties can be obtained. These capabilities allow us to explore the fundamental physics and chemistry of semiconductor surfaces at the atomic scale, which may facilitate the future fabrication of atomic and molecular scale devices. Here I will present recent work exploring atomic-scale defects in silicon: isolated dopant atoms and interacting dangling bonds on chemically passivated silicon surfaces, as well as work exploring the behaviour of small organic molecules on Si(001).

[1] Schofield et al., Nature Commun. 4, 1649 (2013).
[2] Sinthiptharakoon et al., J. Phys.: Condens. Matter 26 , 012001 (2014).
[3] Schofield et al., J. Phys. Chem. C 117, 5736 (2013); O'Donnell et al., J. Phys. Condens. Matter 27, 054002 (2015).
[4] Schofield and Brázdová, J. Phys.: Condens. Matter 27, 050301 (2015)

odborný garant: *Ing. Pavel Jelínek, PhD.*