Seminář odd. 26
Tenkých vrstev a nanostruktur

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TÉMA

Quantitative Atomic Force Microscopy of Organic Molecules

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Atomic force microscopy (AFM) finds increasing use in the field of chemistry. This development started with the demonstration of imaging the chemical structure of organic molecules with atomic resolution.[1] Current research focusses on extracting quantitative information from AFM experiments. For example, it has recently been shown that bond-order discrimination is possible on flat molecules.[2] However, the large majority of molecules is not flat. In addition, the flexibility of the molecule terminated tips needed for atomic resolution imaging needs to be considered.[3,4] Both these effects raise questions as to what the limits of extracting quantitative information are (How accurately can we measure bond lengths?, Is it possible to visualize inter-molecular bonds?). In my presentation, I will try to answer these questions [5,6]. Finally, I will talk about some of our recent work to expand the scanning probe toolkit with a functionality that is critical for applications in chemistry: the ability to chemically identify atoms in molecules.

[1] L. Gross et al. Science, 325, 1110 (2009).

[2] L. Gross et al. Science, 337, 1326 (2012).

[3] Z. Sun et al. Phys. Rev. Lett, 106, 046104 (2011).

[4] P. Hapala et al. Phys. Rev. B, 90, 085421 (2014).

[5] M.P. Boneschanscher et al. ACS Nano, 8, 3006 (2014).

[6] S.K. Hämäläinen et al. Phys. Rev. Lett., in press (2014)

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