

# **Seminář odd. 26**

## **Tenkých vrstev a nanostruktur**

*Fyzikální ústav AVČR, Cukrovarnická 10, Praha 6*

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*mítnost: knihovna, budova A, 1.p.*

### **TÉMA**

## **Electronic structure and spin manipulation in polar and multiferroic materials**

**Hugo Dil**

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One of the main topics of modern condensed matter physics is the design and verification of novel electronic structures. The toolbox available to alter the electronic properties is very large and ranges from the intrinsic crystal structure and symmetries to external fields. In this talk I will discuss how distortions in the crystal structure or an intrinsic net electric dipole moment influence the electronic structure. Depending on the orientation of the resulting dipole moment this can lead to a Rashba-type spin splitting or to the localisation of states. Both are easily detected by (spin- and) angle-resolved photoemission spectroscopy ((S)ARPES). A further functionality is added when this dipole moment can be manipulated or reversed, thus leading to ferroelectric order. It will be shown how the bulk spin texture of a ferroelectric semiconductor can be changed by applying an external electric field. In multiferroics the ferroelectric property is combined with ferromagnetic order, and in magnetoelectric materials the two order parameters are directly coupled. It will be shown how the spin texture is changed in such materials and how either magnetic or electric fields can be used to manipulate the electronic structure. The investigated systems include transition metal oxides and (magnetically doped) ferroelectric semiconductors.

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