POZVÁNKA

na seminář oddělení 15 Fyzikálního ústavu AV ČR, v.v.i.

Seminář se koná

v úterý 16. srpna 2011 v 10:00

v zasedací místnosti budovy A (1. patro vedle knihovny)
Fyzikálního ústavu, Cukrovarnická 10, Praha 6.

Na programu je přednáška

Fundamentals of MR-RA scaling: TMR and GMR

kterou prosloví

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Abstrakt

The performance of magnetic field sensors depends on such material-specific characteristics as magneto-resistance (MR) and resistance area product (RA). The MR-RA scaling behavior is important for performance of HDD sensor, MRAM and spin torque oscillator devices. We consider fundamental aspects of MR-RA scaling problem for two classes of planar FM/NM/FM hetero-structures: (i) Fe/MgO/Fe tunneling junctions and (ii) all Heusler alloy giant-magneto-resistance (GMR) spin valves. In both cases we focus on the electronic structure contributions to RA(MR) arising from ferromagnet (FM), non-magnet (NM) and FM/NM interface states. We calculate MgO and CaO complex band structure and interface electronic states for (001) Fe/MgO/Fe using recently developed QSGW method [1]. Experimental results for two types of non-magnetic spacers (i) elemental metal [2] and (ii) non-magnetic Heusler alloy spacers [3] deserve careful comparison. We investigate spin dependent interface scattering for (001) CMG/Ag/CMG (Case1) and (110) CMG/RCS/CMG (Case2) on the basis of microscopic transport simulations.

References:

[1] S. V. Faleev, M. van Schilgaarde and T. Kotani, Phys. Rev. Lett. **93** 126406 (2004)
[2] T. M. Nakatani et al., Appl. Phys. Lett., **96**, 212501 (2010)
[3] K. Nikolaev et al., Appl. Phys. Lett., **94**, 222501 (2009)
