

# SEMINARIUM Z MAGNETYZMU I NADPRZEWODNICTWA

Uprzejmie zawiadamiamy, że w **PONIEDZIAŁEK**

**29 lutego 2016 r.**, o godz. **13:00**

**w sali D** (bud. 1) odbędzie się seminarium, na którym

**Dr Subhankar Bedanta**

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wyłosi referat na temat:

## **„Magnetization reversal in dots and antidot lattices”**

Magnetic nanoparticles (MNPs) and nanostructures have drawn attention because of their various application potentials and fundamental research point of view. In this talk I will review our recent results on magnetic nanoparticles or dots and in magnetic antidot lattice (MAL) arrays.

(i) **Magnetic dots:** In nanoparticle systems or magnetic dot assemblies with strong concentration but still below physical percolation, the strong interactions between the NPs can lead to a ferromagnetic (FM) like state which is called as “superferromagnetic” (SFM). [1] A SFM domain is defined like a FM domain, the only difference being that the atomic moments are replaced by the supermoments of the individual nanoparticles. I will present the SFM behavior obtained from soft ferromagnetic  $\text{Co}_{80}\text{Fe}_{20}$  nanoparticles discontinuously embedded in an insulating matrix  $\text{Al}_2\text{O}_3$  in the form of discontinuous metal-insulator multilayers (DMIMs)  $[\text{Co}_{80}\text{Fe}_{20}(1.3 \text{ nm})/\text{Al}_2\text{O}_3(3\text{nm})]_{10}$ . [2, 3] Angle dependent magnetization reversal study reveals that the size and relaxation dynamics can be controlled by changing the angle between the easy axis and the magnetic field. [4] I will also show our recent results in  $L1_0$  ordered FePt nanodot arrays which shows SFM behavior. [5]

(ii) **Magnetic antidot arrays (MALs):** MALs are periodic array of defects in a continuous thin film. They introduce perturbation in the thin film and hence their magnetization reversal mechanism is quite different from that of a continuous thin film. MALs are receiving intense research interest because of their potential advantages, such as lack of superparamagnetic limit to the bit size (as compared to dot arrays). We will show how the magnetization reversal process occurs in a Co MAL system studied by Kerr microscopy. [6,7]

References:

S. Bedanta and W. Kleemann, J. Phys. D : Appl. Phys. **42**, 013001 (2009) ; [2] S. Bedanta *et al.*, Phys. Rev. B **72**, 024419 (2005); [3] S. Bedanta *et al.*, Phys. Rev. Lett. **89**, 176601 (2007); [4] N. Chowdhury *et al.*, J. Appl. Phys. **117**, 153907 (2015). [5] S. Bedanta *et al.*, Appl. Rev. Lett. **107**, 152410 (2015); [6] S. Mallick, and S. Bedanta J. Magn. Magn. Mat. **382**, 158-164 (2015); [7] S. Mallick *et al.*, J. Appl. Phys. **118**, 083904 (2015).

Serdecznie zapraszamy

Roman Puźniak  
Henryk Szymczak  
Andrzej Wiśniewski