

SEMINARIUM Z MAGNETYZMU I NADPRZEWODNICTWA

Uprzejmie zawiadamiamy, że w **środe**

19 lutego 2020 r., o godz.10:00

w sali 203 (bud. 1) odbędzie się seminarium, na którym

Dr hab. Piotr Kuświk

Instytut Fizyki Molekularnej PAN, Poznań

wygłosi referat na temat:

„Influence of spin-texture and chirality on magnetization reversal processes in thin films with perpendicular magnetic anisotropy”

Currently, ferro-(FM) and ferrimagnetic (FiM) thin films with perpendicular magnetic anisotropy (PMA) are widely investigated because they open new approaches to material engineering with a large diversity of applications (e.g. in high-density information storage, information processing, magnetic field sensors, logic circuits). For such purposes, the spin texture and its influence on the magnetization reversal process are of key importance, because they determine applicability in novel devices.

In ferromagnetic films much attention has been paid to nanometric spin texture with chirality determined by the interfacial Dzyaloshinskii-Moriya interaction (DMI) called skyrmions [1]. Because of their stability and small size, they are a promising medium for processing and recording information on densities that are currently unreachable. An important step towards skyrmion-based applications was showing that, in PMA systems, the presence of the both DMI and exchange bias coupling between the FM and antiferromagnetic (AFM) layers made skyrmions stable at room temperature without an external magnetic field [2]. Therefore in our work we focused in Au/Co(FM)/NiO(AFM) layered systems, where we found that the NiO layer favors PMA in the Co layer due to the exchange bias coupling between Co and NiO spins [3]. Based on the magnetization reversal processes, we also show that NiO induces DMI at the Co/NiO interface, which is responsible for clockwise spin chirality of the domain walls in the Co layer [4, 5].

On the other hand, in PMA-FiM films composed of rare earth and transition metal dominated areas we found another interesting spin texture, in which adjacent magnetic domains with oppositely oriented effective magnetization exist without domain walls in between [6]. This unique spin texture is very stable due to a presence of a deep free energy minimum, which strongly affects the magnetization reversal process of the system.

[1] A. Fert et al., Nature Nanotechnology 8, 152 (2013)

[2] G. Yu et al., Nano Lett. 18, 980 (2018)

[3] P. Kuświk et al., J. Appl. Phys. 119, 215307 (2016)

[4] P. Kuświk et al., Phys. Rev. B 97, 024404 (2018)

[5] P. Kuświk et al., J. Mag. Mag. Mat. 472, 29 (2019)

[6] L. Frąckowiak et al., Phys. Rev. Lett. 124, 047203 (2020)

Serdecznie zapraszamy

Roman Puźniak / Henryk Szymczak / Andrzej Szewczyk