

SEMINARIUM Z MAGNETYZMU I NADPRZEWODNICTWA

Uprzejmie zawiadamiamy, że w **środę**

05 października 2022 r., o godz.10:00

odbędzie się seminarium **on-line (link podany jest na stronie IF PAN),**

na którym

dr hab. inż. Witold Skowroński, prof. AGH

(AGH University of Science and Technology, Institute of Electronics, Kraków, Poland
CIC nanoGUNE, San Sebastian, Basque Country, Spain)

wyłosi referat na temat:

“Zjawiska związane z oddziaływaniem spinowo-orbitalnym w strukturach cienkowarstwowych”

Efficient generation, control and detection of the spin currents is essential in a new class of spintronic devices that can serve as energy efficient replacement of conventional electronic memories and computing platforms [1]. Strong spin-orbit coupling existing in a range of materials such as heavy metals, 2D van der Waals structures or topological insulators enables generation and detection of the spin-polarized current with different symmetries. Such spin current can be used to control the magnetization state of thin film heterostructures leading to the magnetization switching or oscillations by spin-orbit torques (SOT). In this talk, I will present current trends and challenges in SOT hybrid heterostructures. I will address SOT magnetization switching and SOT-induced magnetization precession. Various engineering methods of the thin films structure will be presented to obtain external magnetic field-free magnetization switching, for example by using antiferromagnets, combination of spin transfer torque and SOT and by utilizing interlayer coupling between ferromagnets [2-3]. In addition, I will focus on the unconventional torque symmetries observed in van der Waals heterostructures [4] and low symmetry crystals [5]. Finally, I will discuss the combination of SOT and the multiferroic properties of LSMO/BTO-based [6] magnetic tunnel junction and the possible pathways towards the electric-field control of spin currents.

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[1] – B. Dieny et al. *Nature Electronics* 3, 446 (2020)

[2] – S. Łazarski et al. *Phys. Rev. Applied* 12, 014006 (2019)

[3] – S. Łazarski et al. *Phys. Rev. B* 103, 134421 (2021)

[4] – D. MacNeill et al. *Nature Physics* 13, 300 (2016)

[5] – L. Liu et al. *Nature Materials* 16, 277 (2021)

[6] – J. Pawlak et al. *Adv. Electron. Materials* 8, 2100574 (2022)

The lecture will be given in Polish and the slides will be in English.

Serdecznie zapraszamy

**Roman Puźniak
Andrzej Szewczyk
Henryk Szymczak**