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HOW PEEM HELPS IN THE STUDY OF ANTIFERROMAGNETS?

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Antiferromagnetic (AFM) films are components of spintronic devices due to robustness against magnetic field perturbations, fast spin dynamics, and lack of stray fields. Here, we use an ultrathin ferromagnetic (FM) epitaxial Co layer to control the antiferromagnetic state of a hematite film on Pt(111), similarly as previously presented for the CoO/Fe system [1].

The XMCD-PEEM (Co edge) and XMLD-PEEM (Fe edge) measurements were performed at the SOLARIS synchrotron [2]. PEEM images of FM Co domains in 1 nm Co/α-Fe_2O_3 and AFM domains in 10 nm α-Fe2O3 in the as-grown sample are shown in the left column in Fig. 1. By using permanent magnets (140 mT), we were able to remagnetize the sample in the PEEM microscope. Noteworthy, while the bare hematite film resisted the magnetic field, the AFM α-Fe_2O_3 domains beneath the Co layer followed the remagnetization process of the cobalt film, as shown in the middle and right columns, for the magnetic field perpendicular and parallel to the direction of the X-ray beam, respectively. This observation confirms the expectation that the Pt/hematite/FM system is very promising from the perspective of spintronic applications [3].

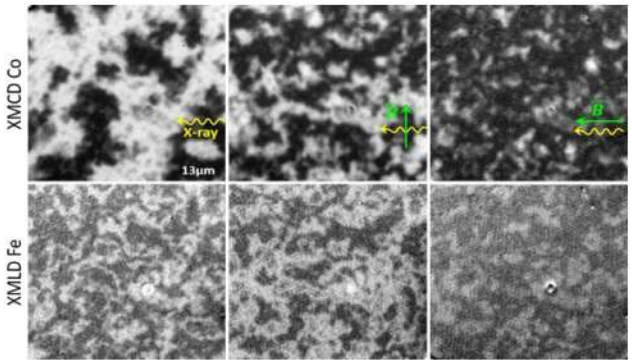

Fig 1. PEEM images of FM Co domains (top) and AFM α-Fe_2O_3 domains (bottom row) in Co/α-Fe_2O_3 system. Arrows show orientations of the X-ray beam and external magnetic field.

Research funded by National Science Centre, Poland, grant number 2020/39/B/ST5/01838.

[1] M. Ślęzak et al., Sci. Rep. Vol 9, 2019, 8188-8193
[2] J. Szlachetko et al., Poland, Eur. Phys. J. Plus. Vol 138, 2023, 1-10
[3] A. Kozioł-Rachwał et al., Phys. Rev B. Vol 106, 2022, 104419