FIB nano-fabrication of the Pt/Co/Pt magnonic crystals

M. Jakubowski,[1] Z. Kurant,[2] N. Tachir,[2] P. Mazalski,[2] I. Sveklo,[2]
T. Wojciechowski,[1] L.T. Baczewski,[1] A. Maziewski,[2] and A. Wawro[1]

[1] *Institute of Physics, Polish Academy of Sciences, Warsaw, Poland*

[2] *Faculty of Physics, University of Białystok, Białystok, Poland*

We present our approach aiming to explore nano-structuring potential of focused ion beam (FIB) lithography in fabrication of magnonic crystals. Magnetic ultrathin Pt/Co/Pt film with naturally in-plane magnetisation and periodically modulated out-of-plane magnetisation induced by ion irradiation is expected to modify substantially spin wave propagation. Spin reorientation transition (SRT) in such a system is a result of an interplay between interface degradation and nano-alloying process which forms ordered intermetallic compounds with strong perpendicular anisotropy (PMA).

Our recent results show negligible surface damage effects during modulated spin waveguides fabrication by low-dose Ga^+ FIB technique. Experimental results are supported by computational modelling of the ion beam interaction with ultrathin film multilayers material (in-depth chemical profiles and ion erosion depth).

This work is done under SYMPHONY project operated within the Foundation for Polish Science Team Program co-financed by the EU European Regional Development Fund, No. OPIE 2007-2013.