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

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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).

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