

Deposition of Pt/Co/Ir multilayer films with interfacial Dzyaloshinskii-Moriya interactions

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Multilayered thin films with interfacial Dzyaloshinskii-Moriya interactions (iDMI) can enable the formation of stable magnetic skyrmions at room temperature, which have potential for storage, logic, and neuromorphic computing applications [1-5]. Understanding of iDMI is key to designing optimized multilayer structure for device applications. Here we report deposition of Pt/Co/Ir multilayer films with perpendicular magnetic anisotropy (PMA) for investigating iDMI by Brillouin light scattering (BLS). We deposited Pt(1.5nm)/Co(1.0nm)/Ir(1.0nm) trilayer thin films with a Ta buffer layer and SiO₂ capping layer on thermally oxidized Si wafer by DC magnetron sputtering with deposition rates for each layer previously calibrated by small angle x-ray reflectivity. Comparison of magnetic hysteresis loops obtained with in-plane and out-of-plane magnetic fields confirmed PMA in the deposited Pt/Co/Ir multilayer films. We have used BLS to quantify the iDMI in the deposited Pt/Co/Ir multilayers through measurement of the frequencies of counter-propagating surface spin waves as a function of the wavevector, and we find that the additional Ir layer leads to measurable changes in the iDMI as compared to [Pt/Co] bilayers.

Ref:

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Session Classification: Poster Session + Grad/Career Fair