

Exploring Nanomagnetism with Photons, Neutrons and Electrons

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Research in ultra-thin magnetic structures in the last 15 years has led to several exciting discoveries such as the giant magnetoresistance

(GMR) effect and RKKY-like exchange coupling due to quantum well states. Continual advances in fabricating and probing magnetic nanostructures are further enriching the field of nanomagnetism. One example is the experimental study of the spin-momentum transfer (SMT) effects unique to magnetic nanostructures. In this talk, I will first show you the magnetic nanofabrication capability we developed in-house over the last two years. Then I will briefly review some key techniques involving photons, neutrons and electrons used for investigating nanomagnetism, such as magneto-optic Kerr effect (MOKE), X-ray magnetic circular dichroism (XMCD) spectroscopy and XMCD-based photo-emission electron microscopy (PEEM), scanning electron microscopy with polarization analysis (SEMPA), polarized neutron reflectivity (PNR), and magneto-transport. I will also present the recent progress in our ongoing experiments employing these techniques.