Opportunities for High-frequency Resonance Experiments at the APS SPX Facility

Darío A. Arena

National Synchrotron Light Source, Brookhaven National Laboratory, Upton, NY

The combination of time-resolved x-ray magnetic circular dichroism (tr-XMCD) and ferromagnetic resonance (FMR) results in a powerful tool for examining the spin dynamics of heterogeneous magnetic materials. The combined technique expands the utility of FMR by exploiting the contrast mechanisms of XMCD: element-specicity, sensitivity to oxidation state and crystal-field symmetry, and separation of spin and orbital moments. The technique is well suited to storage ring sources as the high energy stability and stable bunch clock are requisites for implementation. However, currently tr-XMCD+FMR is limited by the standard bunch length available at third-generation storage rings to an upper frequency of ~5 GHz. We will present an overview of tr-XMCD+FMR and discuss how it can be used to examine heterogeneous magnetization dynamics. We will also explore the applications of the higher frequency space accessible at the SPX facility, as well as some of the challenges that may arise.