

Abstract for an Invited Paper  
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**Probing Magnetic Materials Using Synchrotron Radiation and Phase Retarding Optics**

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Synchrotron radiation has become an essential tool in the study of magnetic materials. The utility of x-ray measurements arises from the fact that the resonant and polarization properties observed near core-level resonances probe the valence-electron spin and orbital properties in an element specific manner. Critical to enabling such studies, however, has been the ability to easily manipulate the polarization of the x-ray beam. Circularly polarized x-rays play a particularly important role, due to their coupling to the net ferromagnetic moment in a material. This talk will focus on how phase retarding optical elements can be used to tailor the focus on how phase retarding optical elements can be used to tailor the x-ray beam polarization in order to enable various types of magnetic measurements. Examples of magnetic spectroscopy, scattering, and imaging measurements employing such optics will be presented.