

Condensed Matter Seminar

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Title: Search for Broken Time Reversal Symmetry State in Unconventional Superconductors

Abstract: Polar Kerr Effect (PKE) is sensitive to time-reversal symmetry breaking (TRSB) since it measures the existence of an antisymmetric contribution to the real and imaginary parts of the frequency-dependent dielectric tensor, and such a contribution is necessarily absent if TRS is not broken in the material. In order to measure the very small static TRSB effect in superconductors, we have developed a new PKE technique based on a fiber Sagnac interferometer with a zero-area Sagnac loop. Initially the technique has been used to discover TRSB in Sr_2RuO_4 , thus strongly suggesting a $p+ip$ symmetry for its order parameter. In the talk we will describe the technique and the detailed studies on Sr_2RuO_4 as well as subsequent studies of high- T_c superconductors and selected heavy fermion materials. In particular we will show PKE results on high quality $\text{Ba}_2\text{Cu}_3\text{O}_{6+x}$ shedding new light on the origin of the pseudogap in this system.

Thursday November 15, 2007
4:10 to 6PM - Rm 416 PHY/GEO