

Abstract Submitted
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High Resolution Polar Kerr Effect Measurements of High-Temperature Superconductors: Evidence for Broken Time Reversal Symmetry Below the Pseudogap temperature¹ ELIZABETH SCHEMM, JING XIA, WOLTER SIEMONS, GERTJAN KOSTER, MARTIN M. FEJER, AHARON KAPITULNIK, Stanford University — High resolution Polar Kerr Effect (PKE) measurements were performed on $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ as a function of temperature for variety of doping levels. In order to be able to measure effects beyond our old search for anyon superconductivity, we devised a new technique based on a fiber Sagnac interferometer with a zero-area Sagnac loop. With this technique we show a shotnoise-limited sensitivity of $100 \text{ nanorad}/\sqrt{Hz}$ with incident photon power of $\sim 10 \mu\text{-Watt}$, in a wide temperature range from 0.3 K to room temperature. Our results indicate that a Time Reversal Symmetry Breaking (TRSB) signal appears in all underdoped $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ samples below the doping dependent pseudogap temperature. The effect increases with decreasing temperature and seems to saturate at a lower temperature close to T_c . The saturated size of the effect increases with increasing δ . We will discuss possible origins of this effect and its presence in other high-Tc superconductors.

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