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Dichroism in the pseudogap phase observed through high precision Sagnac interferometry¹

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Polar Kerr effect in the high- T_c superconductor $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$ ² was measured at zero magnetic field with high precision using a cryogenic Sagnac fiber interferometer. We observed non-zero Kerr rotations on the order of $\sim 1 \mu\text{rad}$ appearing near the pseudogap temperature T^* , and marking what appears to be a true phase transition. Anomalous magnetic behavior in magnetic-field training of the effect suggests that time reversal symmetry is already broken above room temperature. We will show results from single crystals and oriented films. Preliminary results on other high-temperature superconductors will also be discussed.

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²Jing Xia, Elizabeth Schemm, G. Deutscher, S. A. Kivelson, D. A. Bonn, W. N. Hardy, R. Liang, W. Siemons, G. Koster, M. M. Fejer, and A. Kapitulnik, arXiv:0711.2494 (2007).