Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Polar Kerr effect in high temperature cuprate superconductors[1]
SUMANTA TEWARI, GIRISH SHARMA, Department of Physics and Astronomy, Clemson University, Clemson, SC, PALLAB GOSWAMI, VICTOR YAKOVENKO, Condensed Matter Theory Center, University of Maryland, College Park, MD, SUDIP CHAKRAVARTY, Department of Physics and Astronomy, University of California Los Angeles, Los Angeles, CA — A mechanism is proposed for the tantalizing evidence of polar Kerr effect in a class of high temperature superconductorsthe signs of the Kerr angle from two opposite faces of the same sample are identical and magnetic field training is non-existent. The mechanism does not break global time reversal symmetry, as in an antiferromagnet, and results in zero Faraday effect. It is best understood in a phenomenological model of bilayer cuprates, such as YBCO, in which intra-bilayer tunneling nucleates a chiral d-density wave such that the individual layers have opposite chirality. Although the presentation is specific to the chiral d-density wave, the mechanism may be more general to any quasi-two-dimensional orbital antiferromagnet in which time reversal symmetry is broken in each plane, but not when averaged macroscopically.

[1]ST and GS supported by AFOSR (FA9550-13-1-0045), PG supported by JQI-NSF-PFC, SC supported by NSF-DMR-1004520

Sumanta Tewari
Physics and Astronomy, Clemson University

Date submitted: 04 Nov 2015 Electronic form version 1.4