

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Magneto-optical properties of complex oxides¹ PENG CHEN, BRIAN HOLINSWORTH, KENNETH O'NEAL, TANEA BRINZARI, JANICE MUSFELDT, University of Tennessee, NARA LEE, LUO XUAN, SANG CHEONG, Rutgers University, NYRISSA ROGADO, ROBERT CAVA, Princeton University, YAQI WANG, BERND LORENZ, University of Houston, STEVE MCGILL, National High Magnetic Field Laboratory — We investigated the magneto-optical properties of α -Fe₂O₃, frustrated system Ni₃V₂O₈, and rare earth indium oxides like DyInO₃ in order to understand the interplay between charge and magnetism. We discovered that hematite appears more red in applied magnetic field than in zero field conditions, an effect that is amplified by the presence of the spin flop transition. Furthermore, magnetic field aligns the spins into fully polarized state and induces optical band gap change in Ni₃V₂O₈. As a consequence, Ni₃V₂O₈ appears more green in 35 T. *f* electron excitations in DyInO₃ changes dramatically in applied magnetic field because of enormous spin-orbit coupling effect in the rare earth elements. These findings advance our understanding of spin-charge coupling and motivate spectroscopic work on other functional materials under extreme conditions.

¹This work is supported by the U.S. Department of Energy.

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Date submitted: 11 Dec 2012

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