

Abstract Submitted
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Anomalous Magneto-Optical Behavior of Rare Earth Doped Gallium Nitride¹ ANDREW HELBERS, Department of Physics, Lehigh University, BRANDON MITCHELL, Department of Physics and Astronomy, University of Mt. Union, NATHANIEL WOODWARD, U.S. Army Research Laboratory, VOLKMAR DIEROLF, Department of Physics, Lehigh University — We have observed unusual magneto-optical properties in rare earth doped gallium nitride. Specifically, the reversal of a magnetic field applied parallel to the *c*-axis produces unexpected, marked differences in luminescence spectra in several of our samples. Notably, relative emission strengths of Zeeman-split lines from the rare earth ions appear to change when the field is reversed. These effects were not observed in rare earth doped lithium niobate and lithium tantalate, which are also hexagonal and polar. Measurements for erbium doped gallium nitride suggest that these asymmetries seem to be linked to the degree of ferromagnetism of the samples. Results are presented showing these differences. The symmetry of the observed effects requires a perturbation of the RE states with a screw like symmetry. We explore whether this may be accomplished by defects such as threading dislocations.

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