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Mid-infrared Verdet coefficient studies in GaAs, BaF_2, and $LaSrGaO_4$, and ZnSe MYOUNG-HWAN KIM, Physics Dept., University at Buffalo, SUNY, VOLKER KURZ, Physics Dept., Universitaet Wuerzburg, GHEORGHE ACBAS, CHASE ELLIS, JOHN CERNE, Physics Dept., University at Buffalo, SUNY — We measure the mid-infrared (wavelength λ=11 - 0.8 μm; 0.1 - 1.5 eV) Faraday rotation and ellipticity in GaAs, BaF_2, $LaSrGaO_4$, and ZnSe. Since these materials are commonly used as substrates and windows in the mid-infrared, it is important to measure the Faraday signals for background subtraction and to test the accuracy of our measurement techniques. The light sources are lasers and a new custom-modified double-pass prism monochromator with a Xe lamp, which allowed continuous broadband measurements in the 0.31-1.5 eV energy range. Surprisingly, we find reproducible ellipticity signals, even though the radiation is well below the absorption edge of these materials and therefore no circular dichroism is expected. We suggest that the Faraday ellipticity is produced by the static retardance (R_s) of the ZnSe photoelastic modulator (PEM), which converts rotation signals into ellipticity. We determine R_s experimentally from the Faraday rotation and ellipticity ratio, produced by either applying a magnetic field or rotating the polarization of light incident on the PEM. Work supported by the Research Corp. Cottrell Scholar Award, NSF-CAREER-DMR0449899, and an instrumentation award from the CAS.

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