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Diffraction magneto-optical Kerr effect of a natural ferromagnetic grating, MnAs/GaAs(001) EVERETT FRASER, JAESUK KWON, SHRIDHAR HEGDE, HONG LUO, SUNY, University at Buffalo — Diffracted optical magnetometry (DMOKE) technique was applied to the material system MnAs/GaAs(001), which forms a self-organized ferromagnetic array at room temperature. Because of the strain in MnAs when grown on GaAs(001), two structural (and magnetic) phases coexist in a range of temperatures around the T_C in bulk MnAs. The two faces form of a periodic array of strain stabilized stripes running parallel to the MnAs(0001) direction. The stripe array consists of alternating ferromagnetic α-MnAs and paramagnetic β-MnAs. The period and width are highly dependent on both the film thickness and the temperature. Light diffracted from the array has shown anomalous magneto-optical polarization changes, different from the standard magneto-optical Kerr effect, which in our case is measured from the specular reflection. The hysteresis anomalies are discussed in terms of the magnetic form factors extracted from domain structure simulations.

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