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Diffraction-induced magneto-optical enhancement in gyrotropic gratings YUEHUI LU, MINHYUNG CHO, JINBAE KIM, GEONJOON LEE, YOUNGPAK LEE, q-Psi and BK21 Program Division of Advanced Research and Education in Physics, Hanyang University, Seoul, Korea, JOOYULL RHEE, BK21 Physics Research Division and Institute of Basic Sciences, Sungkyunkwan University, Suwon, Korea — The spectra of diffracted magneto-optical Kerr effect (D-MOKE), for polar magnetization in one- dimensional gyrotropic gratings, were presented by Antos *et al.* [Appl. Phys. Lett. **86**, 231101 (2005)]. It was noted that the magnitude of Kerr rotation in the first-order diffraction was one order higher than that of the zeroth-order diffraction in most of the energy range. In this study, a rigorous coupled-wave approach, implemented as Airy-like internal series, was applied to investigate the diffraction-induced MO enhancement. The simulated spectra of D-MOKE are consistent with their experimental ones. Moreover, it was found that the magnitude ratio of the first-order Kerr rotation to the zeroth-order one was strongly dependent on the grating depth. In other words, D-MOKE can be effectively modulated by the groove depth. This theoretical approach is of great significance in designing and applying the diffracted MO elements.

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