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Circular photon drag effect in a Bi_2Se_3 film probed by terahertz emission spectroscopy SUN YOUNG HAMH, SOON HEE PARK, Department of Physics and Photon Science, Gwangju Institute of Science and Technology, SAHNG-KYOON JERNG, JAE HO JEON, SEUNG-HYUN CHUN, Department of Physics and Graphene Research Institute, Sejong University, JONG SEOK LEE, Department of Physics and Photon Science, Gwangju Institute of Science and Technology — In these days, an optical pumping of topological insulators has been extensively investigated as a route to control the spin-polarized charge current for the spintronic applications. In this work, we address this issue of the spin-polarized photocurrent generation by using terahertz (THz) emission technique. We monitored the THz electric fields emitted from a Bi_2Se_3 film with varying a polarization of incident light and sample azimuth, and observed photon-helicity-dependent THz emission responses which exhibit a clear three-fold periodicity in its sample azimuth dependence. Based on a symmetry analysis related to photocurrent generation processes, we demonstrate that the observed circular anisotropy in the photocurrent originates from the circular photon drag effect, namely, linear and angular momentum transfer from photons to photocarriers.

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