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Polarization-Dependent Scanning Photocurrent Microscopy of Bi2Se3[1] BEHNOOD GHAMSARI, DOHUN KIM, MICHAEL FUHRER, STEVEN ANLAGE, Center for Nanophysics and Advanced Materials, Department of Physics, University of Maryland, College Park, MD, 20742, USA — We measured the spatially-resolved response of Bi2Se3 topological insulator to polarized light by means of scanning photocurrent microscopy. A polarized laser spot of 1 um diameter is raster scanned over a gate-controlled Bi2Se3 two-contact device oriented at 45 degrees to the plane of incidence, and the photo-generated current is measured at each point for varying light polarization states from linearly polarized to right-handed circularly polarized to left-handed circularly polarized. The data is, in turn, used to differentiate the contributions from helicity-dependent spin-orbit coupling effects and helicity-independent photovoltaic and photothermoelectric effects, as well as map their spatial distributions over the device. The experiment is repeated for different carrier densities, through varying the voltage of the back gate, to investigate the dependence of the photoresponse on the carrier density.

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