Spin Control of the topological surface states in 3D topological insulators using polarized light\textsuperscript{1} ANNA GURA, JEFF SECOR, MILAN BEGLIARBEKOV, LUKAS ZHAO, HAIMING DENG, LIA KRUSIN-ELBAUM, Physics Department, City College of New York — The topological surface states of 3D topological insulators (TIs) have been shown to interact non-trivially with circularly polarized light. Here we report on the study of spin-polarized currents in several 2\textsuperscript{nd} generation TIs, such as Sb\textsubscript{2}Te\textsubscript{3}, Be\textsubscript{2}Te\textsubscript{3}, and Bi\textsubscript{2}Se\textsubscript{3}. In particular, to probe the robustness of the helical current surface states we will contrast the polarization dependence of the photocurrent in as-grown crystals and crystals with controlled disorder introduced by magnetic and non-magnetic impurities. These result in the development of a gap in the energy spectrum of surface Dirac fermions (DFs), that is DFs acquire mass. The photo-response contrast between massless and massive Dirac fermions studied under electric field gating conditions will be presented.

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