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Optical helicity control of surface current in SmB_6 SANJAY ADHIKARI, West Virginia University, YANJUN MA, CHANG-BEOM EOM, University of Wisconsin-Madison, CHENG CEN, West Virginia University, CHENG CEN TEAM, CHANG-BEOM EOM TEAM — SmB_6 is a promising candidate for topological Kondo insulator. Transport measurements and spin resolved ARPES measurements have indicated signatures of topologically protected surface states. One hallmark signature of such states is the helical Dirac dispersion with perfect momentum-spin lockage. Here, we report current injection in SmB6 thin film with circularly polarized light at oblique incidence. A polarization-independent photovoltage was also detected. Both signals exhibited strong temperature dependences. While the polarization-independent photovoltage is likely due to thermoelectric or photovoltaic effects, the circular photogalvanic effect also has two possible origins: topological surface states or regular surface states with strong Rashba type spin-orbit coupling. To shed more light onto the nature of the surface states observed in SmB6, experiments were performed on thin films with different capping layers. This research enhances our knowledge in controlling the spin and orbital degrees of freedom at SmB_6 surface, and can lead to exciting spintronic applications using optical tools.

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