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The tunable chirality and circular dichroism of topological Kondo insulator SmB6 with C_{2v} symmetry as a function of Rashba and Dresselhaus parameters PARIJAT SENGUPTA, ENRICO BELLOTTI, Boston University — A manifestation of optical chirality is circular dichroism (CD) due to a differential absorption of left- and right-circularly polarized light. This effect is an enabler for the design of meta-materials used in polarization sensitive imaging devices and display technologies. Concurrently, topological insulators with helical surface states offer an active control over chiral handedness that can be observed through a varying degree of polarization-dependent absorption. We show that in a band gap open topological Kondo insulator SmB_6 with C_{2v} symmetry at the X point of the surface Brillouin zone, CD can be smoothly varied without any microscopic reconfiguration of the surface. We also show that CD, measured by the degree of circular polarization, can assume both positive and negative values. These findings suggest that left- and right- circularly polarized light can be selectively absorbed in the vicinity of the Dirac point by an adjustment of the Rashba- and Dresselhaus-like parameters that describe the Hamiltonian at the X point. The CD is an experimentally measurable quantity and related to Berry curvature which is an outcome of the parameter-dependent Hamiltonian. We calculate the Berry curvature and establish a pathway to alter CD through the Hamiltonian parameters.

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