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Chiral topological insulating phases from three-dimensional nodal loop semimetals LINHU LI, Beijing Computational Science Research Center, CHUANHAO YIN, SHU CHEN, Institute of Physics, Chinese Academy of Science, MIGUEL ARAUJO, Departament of Physics, University of Evora, Evora, Portugal
— We begin with a minimal model of three-dimensional nodal loop semimetals, and study the effect of anticommuting gap terms. The resulting topological insulating phases are protected by a chiral symmetry, and can be characterized by a winding number defined along the nodal loop. We illustrate the geometric relation between the nodal loop and the gap terms, which has a correspondence to the nodal loop winding number. We further investigate a lattice model and study its edge states under open boundary condition. The edge states hold Dirac cones with the same number as the summation of the winding numbers of each nodal loop in the first Brillouin zone.

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