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Spin Texture and Mirror Chern number in Hg-Based Chalcogenides[1] QING-ZE WANG, The Pennsylvania State University, SHU-CHUN WU, CLAUDIA FELSER, Max Planck Institute for Chemical Physics of Solids, BINGHAI YAN, Max Planck Institute for Chemical Physics of Solids, & Max Planck Institute for Physics of Complex Systems, CHAO-XING LIU, The Pennsylvania State University — One special feature of surface states in topological insulators is the so-called spin-momentum locking, which means that electron spin is oriented along a fixed direction for a given momentum and forms a texture in the momentum space. In this work, we study spin textures of two typical topological insulators in Hg-Based Chalcogenides, namely HgTe and HgS, based on both the first principle calculation and the eight band Kane model. We find opposite helicities of spin textures between these two materials, originating from the opposite signs of spin-orbit couplings. Furthermore, we reveal that different mirror Chern numbers between HgTe and HgS characterize different topological natures of the systems with opposite spin textures and guarantee the existence of gapless interface states.

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