

Surface and Bulk Rashba Splittings In Noncentrosymmetric BiTeI

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In systems lacking bulk inversion symmetry the Kramer's degeneracy can be lifted by spin-orbit interaction giving rise to Dresselhaus or Rashba effects. Materials in the class of layered bismuth tellurohalides, such as BiTeI, have a layered and noncentrosymmetric structure with a giant Rashba-type splitting of the bulk bands. We present direct measurements of the bulk band structure of BiTeI measured with soft x-ray angle-resolved photoemission (ARPES), revealing the three-dimensional Fermi surface. The observed spindle torus shape bears the potential for a topological transition in the bulk by doping. Moreover, the bulk electronic structure is clearly disentangled from the two-dimensional surface electronic structure by means of high-resolution and spin-resolved ARPES measurements in the ultra-violet regime.

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