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【116】Spectroscopic perspective on the interplay between electronic and magnetic properties of doped topological insulators

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Recently, the quantum anomalous Hall effect has been observed in Cr and V doped $(Sb,Bi)_2Te_3$ [1]. Its eventual technological applications require a homogeneous magnetization without any contribution from dopant bands to the conduction of the system. We combine low energy muon spin rotation and soft-X-ray angle-resolved photoelectron spectroscopy (SX-ARPES) to study the magnetic and electronic properties of these materials. We observe a gradual magnetic transition with full magnetic volume fraction only at doping levels higher than 8% substitution of (Bi,Sb). In addition, resonant SX-ARPES at the V L_3-edge reveals the presence of a non-dispersing impurity band at the Fermi level.

[1] C.-Z. Chang, et al., Nature Materials **14**, 473 (2015)

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