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Two-Dimensional Band Structure Study of Bi_{1-x}**Sbx Thin Films** SHUANG TANG, MILDRED DRESSELHAUS, Massachusetts Institute of Technology, DRESSELHAUS GROUP TEAM — Alloys of Bi_{1-x}Sb_x, are considered as one of the best thermoelectric materials for low temperature applications below 200 K. The band structure of Bi_{1-x}Sb_x varies as a function of stoichiometry. At a temperature below 77 K, it does not change with temperature. At a certain Sb composition (x=0.04), the conduction band and the valence band touch each other at the L point, and the band-crossing occurs. The electronic dispersion relation becomes linear at the L point, which implies that a Dirac cone is formed at each of the three L points. By making the alloys of Bi_{1-x}Sb_x into thin films, we have two more parameters to vary the band structure, namely film thickness and growth orientation. In our present work, the rich variety of band structure configurations, as well as various phases, of Bi_{1-x}Sb_x thin films has been revealed.

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