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Electrical Transport Properties of Bi_2Te_3 Nanotubes and Nanowires RENZHONG DU, JIAN WANG, QI LI, Department of Physics, The Pennsylvania State University, University Park, PA, USA, YUEWEI YIN, SINING DONG, XIAOGUANG LI, Hefei National Laboratory for Physical Sciences at Microscale, Department of Physics, University of Science and Technology of China, Hefei, China — Electrical transport properties of promising topological insulator, Bi_2Te_3 nanowires and nanotubes are measured at different temperatures and magnetic field and the results are compared with the Bi_2Se_3 thin films. The nanotube and nanowire samples are synthesized by galvanostatic electrodepositon and solution phase methods, with diameters of 70nm (ex) and 50nm (in) for nanotubes and 80∼100nm for nanowires, respectively. The contact leads (Pt) are fabricated by using Focusing Ion Beam (FIB). The magnetoresistance of Bi_2Te_3 nanotubes shows linear dependence as a function of magnetic field, with a notable peak around zero field. This is different from Bi_2Se_3 thin films which show quadratic behavior, with a significant dip near zero field. The results will be discussed based on the possible weak localization effect in the nanotubes in comparison with the weak anti-localization effect in the films.

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