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Low temperature TE properties of BiSb with magnetic field SHENG GAO, JOESPH POON, University of Virginia, UVA PHYS POON'S LAB TEAM — Thermoelectric (TE) technology plays an important role in converting the currently under-utilized thermal energy directly into electrical power from renewable and waste heat sources in an environmentally friendly manner. Recently, the study on high efficiency TE materials draws attentions of many research groups. Among different TE materials, solid solution alloy of BiSb, as known as the first topological insulator, has one of the best TE performance at low temperature range (20K˜220K). Starting from adding 7% Sb, the semi-metallic bismuth will lose its overlapping between valence band and conduction band and becomes a narrow gap semi-conductor up to 22% Sb. What's more, large enhancement in thermal power of BiSb in magnetic fields was observed, which can be explained based on the transverse-transverse thermo-galvanomagnetic effects. In our research, we studied the segregation effect which strongly affects the sample homogeneity and also built models to describe magneto-Seebeck and magneto-resistivity of BiSb, which could be a hopeful way to pursue higher TE performance.

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