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Fermi level tuning and weak localization/weak antilocalization competition of bulk single crystalline $Bi_{2-x}Sb_xSe_2Te$ compounds WONHYUK SHON, JONGSOO RHYEE, Kyung Hee Univ — In the investigation of the electrical transport properties of single crystalline $Bi_{2-x}Sb_xSe_2Te$ (x = 0.0, 0.6, 0.8, 1.0, 1.2, and 1.4) compounds, we observed a systematic change of the Fermi level from n-type metallic (x = 0.0, 0.6) or small-gap semiconducting (x = 0.8) to p-type semiconducting (x = 1.0) and metallic (x = 1.2, 1.4), respectively, with increasing Sb-substitution concentration from the temperature-dependent electrical resistivity $\rho(T)$ and Hall resistivity $\rho_{xy}(T)$ measurements, respectively. The parent compound Bi_2Se_2Te exhibits linear negative magnetoresistance measurements at low temperatures. From the Hikamii-Larkin-Nagaoka analysis of the compounds (x = 0.8 and 1.0), we found that there is a competing behavior between WL and WAL in terms of Sb-doping and magnetic field strength.

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