Galvanomagnetic and thermomagnetic properties of thallium doped PbSnTe and PbSeTe\textsuperscript{1} VLADIMIR JOVOVIC, JOSEPH HEREMANS, The Ohio State University — Thallium acts as a resonant level in PbTe, so that PbTe:Tl shows a significant improvement of thermoelectric properties due to an increase in thermopower as compared to that of similarly Na-doped PbTe [2]. Further improvements in $zT$ are expected from a reduction of the thermal conductivity by alloy scattering in $\text{Pb}_{1-x-y}\text{Tl}_y\text{Sn}_x\text{Te}$ and $\text{Pb}_{1-y}\text{Tl}_y\text{Te}_{1-x}\text{Se}_x$ alloys. However, the band structure of PbTe is sensitive to alloying with Sn and Se, and thus the location of the Tl level with respect to the valence band can change with $x$. In this study, we investigate the effects that band structure modifications have on the enhancement of thermopower. Thermoelectric properties of $\text{Pb}_{1-x-y}\text{Tl}_y\text{Sn}_x\text{Te}$ and $\text{Pb}_{1-y}\text{Tl}_y\text{Te}_{1-x}\text{Se}_x$ alloys with $y=0.01-0.04$ and $x=0-0.3$ are measured in directions longitudinal and transverse to magnetic fields in the range of $-1.5$ to $1.5$T. We report zero field values of electrical resistivity, thermopower, Hall coefficient and adiabatic Nernst-Ettinghausen coefficient as measured in temperature range 80-420K. From these we calculate carrier density and mobility and the density of states effective masses and Fermi energies. [2] J.P. Heremans et al., Science 321, 554 (2008)

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