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Magneto-transport properties of PbSe single crystals NAWEEN ANAND, University of Florida, CATALIN MARTIN, Ramapo College of NJ, Mahwah, NJ, GENDA GU, Brookhaven National Lab, Upton, NY, DAVID TANNER, University of Florida — PbSe is a low-gap semiconductor with excellent infrared photodetection properties. Here we report our high magnetic field and low temperature electrical properties measurement performed on a moderately doped PbSe single crystals with p-type bulk carrier density of around 110^{18} cm^{-3}. Longitudinal resistance (R_{xx}) and Hall resistance (R_{xy}) were simultaneously measured between 0 T and 18 T, and at temperatures between 0.8 K and 25 K, show quantum oscillations above 6 T. The quantum oscillation frequency is ˜15 T, giving an estimate for the carrier density of each L pocket in the BZ participating in these oscillations. The effective mass of the free carriers is estimated from the temperature dependence of oscillation amplitudes. Measurements as the magnetic fields is rotated reveal the magneto-transport properties of a 3D-like fermi surface. Dingle temperature and free carrier scattering rate has been estimated and compared to optical measurements. Optical measurements also show a low frequency phonon mode around 45 cm^{-1} and bandgap of around 0.2 eV along with other interband electronic transitions.

Naween Anand
University of Florida

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