Abstract Submitted
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Tuning the Fermi level through the Dirac point of giant Rashba semiconductor BiTeI[1] DERRICK VANGENNEP, D.L. MASLOV, J.J. HAMLIN, Dept. of Physics, Univ. of Florida, S. MAITI, Dept. of Physics, Univ. of Florida and NHMFL, Tallahassee, FL, D. GRAF, S.W. TOZER, NHMFL, Tallahassee, FL, C. MARTIN, Dept. of Physics, Univ. of Florida and Ramapo Coll., NJ, H. BERGER, Inst. of Cond. Mat. Physics, École Poly. Féd. de Lausanne — We report measurements of Shubnikov-de Haas oscillations in the giant Rashba semiconductor BiTeI under pressure. We observe one high frequency oscillation at all pressures and one low frequency oscillation that emerges between ∼0.3 - 0.7 GPa indicating the appearance of a second small Fermi surface. BiTeI has a conduction band bottom that is split into two sub-bands due to the strong Rashba coupling, resulting in a "Dirac point." Our results suggest that the chemical potential starts below the Dirac point in the conduction band at ambient pressure and moves upward, crossing it as pressure is increased. We present a simple model that captures this effect and can be used to understand the pressure dependence of our sample parameters. The parameters extracted via our model support the notion that pressure brings the system closer to the predicted topological quantum phase transition.

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