Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Transport properties of polar semiconductor BiTeI under pressure TOSHIYA IDEUE, JOSEPH CHECKELSKY, Univ. of Tokyo, HIROSHI MURAKAWA, Osaka Univ., SAEED BAHRAMY, Univ. of Tokyo, YOSHIO KANEKO, NAOTO NAGAOSA, YOSHINORI TOKURA, RIKEN Center for Emergent Matter Science, UNIV. OF TOKYO TEAM, OSAKA UNIV. COLLABORATION, RIKEN CENTER FOR EMERGENT MATTER SCIENCE TEAM — BiTeI is a polar semiconductor in which a atrong Rashba type spin orbit interaction causes spin splitting of the electronic band. Recently, emergent transport properties arising from this band structure have been theoretically predicted and experimentally explored. We have studied transport properties of BiTeI under the application of hydrostatic pressure. Magnetoresistivity shows Shubnikov-de Haas oscillations with two different periods, reflecting the inner Fermi surface and outer Fermi surface of the Rashba type band structure. With the application of pressure, both oscillation periods change, while the Hall effect and associated carrier number remain unchanged. As the period of SdH oscillations corresponds to the area of Fermi surface, we interpret this in terms of a pressure induced band deformation that alters the relative position of Fermi level and Dirac point of the Rashba type band structure. We will also report a comparative study of the Hall and Nernst effect in BiTeI. The Nernst effect exhibits a sign change around the Dirac point and is extremely sensitive to the Fermi level, whereas the Hall effect is electron-like and linear in magnetic field in all samples. We discuss possible mechanisms of the anomalous behavior of the Nernst effect.

Toshiya Ideue
Univ. of Tokyo

Date submitted: 14 Nov 2013 Electronic form version 1.4