Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Promising topological surface states with persistent high spin polarization across Dirac point in Bi_2Te_2Se and Bi_2TeSe_2 KOJI MIYAMOTO, AKIO KIMURA, TAICHI OKUDA, HIROKAZU MIYAHARA, HIROFUMI NAMATAME, MASAKI TANIGUCHI, Hiroshima University, SERGEY EREMEEV, Tomsk State University, EVGUENI CHULKOV, Donostia International Physics Center, OLEG TERESHCHENKO, Novosibirsk State University — Topological insulators (TIs) have attracted a great deal of atteion as key materials for spintronics technology. Among the established TIs, Bi_2X_3 (X=Se, Te) has been mostly studied because of their relatively large energy gap and the simplest topological surface state (TSS) with helical spin texture. However, an absence of the topological natures of TSS below Dirac point (E_D) has been shown by spin- and angle-resolved photoemission spectroscopy (SARPES) and scanning tunneling spectroscopy under perpendicular magnetic field. It could be a disadvantage for extending its spintronic applications. Recently, one of the ternary tetradymite compounds, Bi_2Te_2Se was shown to be a TI by the ARPES measurement. Importantly, a highly bulk resistive feature in this compound has successfully led to the observation of its surface-derived quantum oscillations in the magnetotransport experiment. We have unambiguously clarified the spin feature of TSS in Bi_2Te_2Se and Bi_2Se_2Te for the first time by our novel SARPES. The markedly high spin polarization of topological surface states has been found to be 77% and is persistent in the wide energy range across E_D in those compounds. The finding promises to extend the variety of spintoronic applications.

Koji Miyamoto
Hiroshima University

Date submitted: 14 Nov 2012 Electronic form version 1.4