Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Observation of quantized Hall plateaus in a bulk antiferromagnet $EuMnBi_2$ with magnetically confined 2D Dirac fermions HIDETOSHI MASUDA, University of Tokyo, HIDEAKI SAKAI, Osaka University and JST PRESTO, MASASHI TOKUNAGA, ISSP, University of Tokyo, YUICHI YAMASAKI, University of Tokyo and RIKEN CEMS, ATSUSHI MIYAKE, ISSP, University of Tokyo, JUNICHI SHIOGAI, SHINTARO NAKAMURA, SATOSHI AWAJI, ATSUSHI TSUKAZAKI, IMR, Tohoku University, HIRONORI NAKAO, YOUICHI MURAKAMI, CMRC/PF, KEK, TAKA-HISA ARIMA, YOSHINORI TOKURA, University of Tokyo and RIKEN CEMS, SHINTARO ISHIWATA, University of Tokyo and JST PRESTO — Dirac fermions in solids have been of current interest for their unique transport properties under magnetic field. To further explore distinct magneto-transport properties, interplay between Dirac fermions and magnetic order is desirable as shown in magnetic topological insulators. In this study, we have focused on a layered bulk antiferromagnet $EuMnBi_2$, where the Bi square nets hosting quasi-2D Dirac fermion and the magnetic insulating layers stack alternatively, and demonstrated that the quantum transport of Dirac fermions is highly enriched by Eu antiferromagnetic(AFM) order. Below the AFM transition temperature, external magnetic field induces spin-flop transition of Eu moments, which suppresses the interlayer coupling between the conducting Bi layers and dramatically enhances interlayer resistivity ρ_{zz}. Furthermore, this high-ρ_{zz} state is accompanied by plateau-like structures in the Hall resistivity and giant SdH oscillations, which signify the quantum Hall effect in a bulk magnet. [H. Masuda *et al.*, Sci. Adv. **2**, e1501117 (2016)]

Hidetoshi Masuda
University of Tokyo

Date submitted: 11 Nov 2016 Electronic form version 1.4