Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Topological and Transport Properties of Dirac Fermions in Antiferromagnetic Metallic Phase of Iron-Based Superconductors TAKAMI TOHYAMA, TAKAO MORINARI, Yukawa Institute for Theoretical Physics, Kyoto University, EIJI KANESHITA, Sendai National College of Technology, KOUDAI SUGIMOTO, Yukawa Institute for Theoretical Physics, Kyoto University — We investigate Dirac fermions in the antifferomagnetic metallic state of iron-based superconductors [1]. Deriving an effective Hamiltonian for Dirac fermions, we reveal that there exist two Dirac cones carrying the same chirality, contrary to graphene, compensated by a Fermi surface with a quadratic energy dispersion as a consequence of a non-trivial topological property inherent in the band structure. We also find that the presence of the Dirac fermions gives the difference of sign-change temperatures between the Hall coefficient and the thermopower. This is consistent with available experimental data. The Dirac ferimons also contribute to in-plane anisotropy of the optical conductivity [2].

[1] T. Morinari, E. Kaneshita, and T. Tohyama, Phys. Rev. Lett. **105**, 037203 (2010).
[2] K. Sugimoto, E. Kaneshita, and T. Tohyama, submitted to J. Phys. Soc. Jpn.

Takami Tohyama
Yukawa Institute for Theoretical Physics, Kyoto University

Date submitted: 16 Dec 2010 Electronic form version 1.4