Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Understanding of the giant enhancement of the exchange interaction in Bi2Se3-EuS heterostructure. JEONGWOO KIM, Department of Physics and Astronomy, University of California, Irvine, KYOUNG-WHAN KIM, Institut fr Physik, Johannes Gutenberg Universitt Mainz, HUI WANG, Department of Physics and Astronomy, University of California, Irvine, JAIRO SINOVA, Institut fr Physik, Johannes Gutenberg Universitt Mainz, RUQIAN WU, Department of Physics and Astronomy, University of California, Irvine — We study the unusual magnetic behaviors of EuS-Bi2Se3, such as the enhancement of magnetic ordering, change of magnetic anisotropy and induced magnetic moments, based on the model Hamiltonian and the first-principles calculations. The interplay between topological surfaces states and the magnetic proximity of EuS strengthens the interfacial magnetic ordering and produces large magnetic anisotropy at the interface. Moreover, we find that the magnetic moments at the interfacial EuS and Bi2Se3 layers by the proximity effect are not as dramatically enhanced as reported before. Our results provide the understanding of the unresolved interfacial magnetism and should be useful for the design of novel magnetic materials that involve topological materials. Work was supported as part of the SHINES, an Energy Frontier Research Center funded by the U.S. Department of Energy, Office of Science, Basic Energy Sciences, under Grant No. SC0012670. Calculations were performed on parallel computers at NERSC supercomputer centers.

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Date submitted: 11 Nov 2016 Electronic form version 1.4