Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Coulomb scattering of Weyl fermions through a potential barrier MAHTAB KHAN, MICHAEL LEUENBERGER, University of Central Florida, NANO SCIENCE TEAM — We investigate the effects of the Coulomb interaction on the two-dimensional relativistic quantum-mechanical scattering of two Weyl fermions, injected on the opposite sides of a potential barrier. We consider the Coulomb interaction in the standard two-body problem and evaluate the corresponding scattering amplitude. We apply our formalism to describe the scattering of Weyl fermions in two-dimensional materials exhibiting Dirac cones, such as graphene and the surface of 3d topological insulators. We obtain a complex shape for the scattering amplitude due to the angle-dependent Klein tunneling through a potential barrier. We show that the Coulomb interaction leads to shifts and broadenings of the transmission peaks. .

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Date submitted: 14 Nov 2013 Electronic form version 1.4