Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Magnetic edge states in graphene. SUNGHUN PARK, H.-S. SIM, Korea Advanced Institute of Science and Technology — We theoretically study the magnetic edge states of the Dirac fermions in graphene, formed along the boundary between the two domains in a spatially nonuniform magnetic field, B_0 in one domain and B_1 in the other domain, in the quantum Hall regime. The energy spectra of the magnetic edge states depend on whether B_0 is parallel or antiparallel to B_1. For the parallel case, the n=0 magnetic edge states are dispersionless, while they split into electron-like and hole-like levels for the antiparallel case. Here, n is the graphene Landau level index. These features are attributed to the coupling between the pseudo-spin of the magnetic edge states and the direction of the external magnetic field. We also study the modification of the energy spectra when the finite Zeeman spin splitting or an electrostatic step-like potential is considered. An Aharonov-Bohm interferometry, which can identify the existence of the magnetic edge states, is suggested for experimental study.

Heung-Sun Sim
KAIST

Date submitted: 23 Nov 2007 Electronic form version 1.4