Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Electronic Topological Transition in Sliding Bilayer Graphene YOUNG-WOO SON, SEON-MYUNG CHOI, YOON PYO HONG, SUNGJONG WOO, Korea Institute for Advanced Study, Seoul, Korea, SEUNG-HOON JHI, POSTECH, Pohang, Korea — We demonstrate theoretically that the topology of energy bands and Fermi surface in bilayer graphene undergoes a very sensitive transition when an extremely tiny lateral interlayer shift occurs in arbitrary directions. The phenomenon originates from a generation of an effective non-Abelian vector potential in the Dirac Hamiltonian by the sliding motions. The characteristics of the transition such as pair annihilations of massless Dirac fermions are dictated by the sliding direction owing to a unique interplay between the effective non-Abelian gauge fields and Berry's phases associated with massless electrons. The transition manifests itself in various measurable quantities such as anomalous density of states, minimal conductivity, and distinct Landau level spectrum.

Young-Woo Son
Korea Institute for Advanced Study, Seoul, Korea

Date submitted: 01 Dec 2011 Electronic form version 1.4