

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Edge state engineering on graphene nano ribbons via local potential field** SUNGJONG WOO, YOUNG-WOO SON, KIAS (Korea Institute for Advanced Study) — Charge accumulation on the edge of doped graphene nanoribbons (GNR) has been studied by Silvestrov *et.al.* We have investigated the electronic band structures and transport properties of doped GNRs especially with zigzag edge structure. For a doped GNR, the shift of Dirac point from the Fermi level is almost constant except the ribbon edge where charge is seriously accumulated. From our analysis, it is found that the energy of well-known localized edge states of zigzag GNRs follows the shifted Dirac point on the edge, bending the corresponding single flat band line. Based on this, we have further uncovered that one can achieve conductance enhancement exactly by the amount of a single conducting channel by applying transversely localized external potential field on one of the two edges so that the type of doping on that edge changes from electron(hole)-doping to hole(electron)-doping. More importantly, such conductance enhancement has turned out to be quite independent of the edge structure except the case of perfect armchair structure. The effect of a local potential in the presence of electron hole puddle on a GNR will also be discussed.

Sungjong Woo  
KIAS (Korea Institute for Advanced Study)

Date submitted: 20 Nov 2009

Electronic form version 1.4