Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Electronic and thermoelectric transport in graphene double layer structures with boron nitride spacers JIUNING HU, TAILUNG WU, JIFA TIAN, YONG CHEN, Purdue University — Recently, much attention has been devoted to electrically isolated graphene-graphene double layers in which interaction-driven novel physics such as exciton condensation are predicted. We have used polyvinyl alcohol (PVA) based carrier films and a micro-manipulator to transfer mechanically exfoliated flakes onto desired locations with accuracy of $\sim$1 μm. We have fabricated graphene/boron nitride (BN)/graphene stacking structures on BN substrates to study their electronic and thermoelectric transport properties. We observed the low temperature mobility of graphene as high as 75000 cm^2/V-s. We have performed Coulomb drag measurements and observed the sign and magnitude dependence of the drag resistivity on the carrier types and densities of both graphene layers, consistent with the previous reports. We also performed thermoelectric transport measurements in such graphene double layer structures, especially in the complementary doped regime (so called excitonic regime) with one layer of electrons and the other layer of holes. Our approach may be useful to probe exciton condensation and other novel physics driven by electron-electron interactions in graphene double layers.

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Date submitted: 09 Nov 2012 Electronic form version 1.4