Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

**CVD grown graphene field-effect device arrays with water top gate** BEI WANG, B. KOGER, J. ZHU, Physics Department, The Pennsylvania State University, JUN ZHU TEAM — We synthesize single-layer graphene sheets by chemical vapor deposition (CVD) on copper foil. Large sheets are transferred to $Si/SiO_2$ wafers using poly(methyl methacrylate) (PMMA). Raman spectroscopy of transferred graphene shows the signatures of high-quality graphene with a very small D band. Graphene field-effect device arrays are fabricated using conventional photolithography. A thin $SiO_2$ film is deposited on top of the finished devices as the last step. We employ two methods of field effect gating. Gate sweeps of the $SiO_2$ back gate show large initial hole doping. When a droplet of water is deposited on the device and used as a top gate, the majority of devices show a Dirac point of $\sim$0.3 V and bipolar behavior. The water top gate injects charges much more efficiently than the 290nm $SiO_2$ back gate. The mobility of the devices is estimated to be a few thousand $cm^2/Vs$. We discuss transport properties and potential applications of these device arrays.

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Date submitted: 17 Nov 2010 Electronic form version 1.4