High-Bias Electronic Transport in Graphene Ribbon Devices
MELINDA HAN, İNANC MERİC, KIN FAI MAK, STÉPHANE BERCIAUD, TONY HEINZ, KEN SHEPARD, PHILIP KIM, Columbia University — We present experimental studies of electronic transport in graphene under high electric fields. Graphene ribbon devices with varying widths and lengths are fabricated from mechanically exfoliated single-layer graphene sheets using electron beam lithography followed by oxygen plasma etching. Conductance measurements show a tendency of current saturation under high source-drain bias. In addition, we employ micro-Raman spectroscopy simultaneously with transport measurement on the current carrying device in vacuum. We observe an enhancement of the G-band anti-Stokes/Stokes intensity ratio, where the optical phonon temperature is estimated to be over ~500K before device failure.