Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Investigating Possible Quantum Metastable States in Graphene-based Josephson Junctions JOSEPH LAMBERT, STEVEN CARABELLO, ZECHARIAH THRAILKILL, THILANKA GALWADUGE, ROBERTO RAMOS, Drexel University — Recently, superconducting tunneling currents have been measured in graphene devices consisting of two parallel superconducting leads contacted by single- and few-layer graphene flakes. The current-voltage characteristic curves of these devices are hysteretic and Shapiro steps appear when the device is irradiated with microwaves. Thus, there is evidence of both the d.c. and a.c. Josephson effects. The graphene devices have shown to have strong quantum coherence as indicated by a Fraunhofer-like pattern in the current versus external magnetic field plot. These effects motivate us to investigate the presence of quantum metastable states similar to those found in conventional current-bias Josephson junctions. We present work investigating the nature of these metastable states and the implications of ballistic versus diffusive graphene Josephson junctions. We also present experimental progress studying the nature of switching from the superconducting to the normal state in these devices.

Joseph Lambert
Drexel University

Date submitted: 20 Nov 2009 Electronic form version 1.4