Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Effects of the environment on the switching current in graphene-based Josephson Junctions. IVAN BORZENETS, The University of Tokyo, CHUNG-TING KE, FRANCOIS AMET, MING TSO WEI, Duke University, MICHIHISA YAMAMOTO, The University of Tokyo, YURIY BOMZE, Duke University, SEIGO TARUCHA, The University of Tokyo, GLEB FINKELSTEIN, Duke University — The nature of the switching current and hysteresis (difference between switching and retrapping currents) in graphene-based Josephson junctions depends greatly on the interaction with the environment. Conventional devices result in underdamped Josephson junctions making the true critical current inaccessible. On the other hand, heavily isolating the Josephson junctions places them in the microscopic quantum tunneling regime even at high temperatures, also masking the critical current. We study the critical current, and the switching statistics in graphene Josephson junctions while varying the effects of the environment. Proper isolation of graphene Josephson junctions is necessary to measure the true critical current, especially so for the cases of small currents around the Dirac point. This is true for the case of conventional diffusive as well as the novel ballistic Josephson junctions.

Ivan Borzenets
The University of Tokyo

Date submitted: 06 Nov 2015 Electronic form version 1.4