Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Ballistic and diffusive regimes in current-phase relations of graphene SNS heterojunctions PHILIP KRATZ, Stanford University, FRANCOIS AMET, Duke University, CHRISTOPHER WATSON, Stanford University, KATHRYN MOLER, Stanford Institute for Materials and Energy Sciences, SLAC National Accelerator Laboratory, CHUNG KE, Duke University, Durham, IVAN BORZENETS, University of Tokyo, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Materials Science, RUSSELL DEACON, (CEMS), RIKEN, MICHIHISA YAMAMOTO, University of Tokyo, YURIY BOMZE, Duke University, SEIGO TARUCHA, University of Tokyo, GLEB FINKELSTEIN, Duke University — Current-phase relations (CPRs) are an indirect measurement of the energy distribution of phase-coherent modes in Josephson junctions through the spectral supercurrent near equilibrium, probing low-energy excitations not accessible by transport. We report on planned experimental measurements of the CPRs of gated, high-mobility (10^5 cm^2/Vs) single-layer graphene SNS heterojunctions in ring geometries with superconducting MoRe alloy contacts, inductively read out with a scanning superconducting quantum interference device (SQUID) magnetometer. The graphene layers are encapsulated on both sides with hexagonal-BN (h-BN). We will address the CPR dependence on experimentally tunable parameters (temperature, carrier density, and channel length), and possible crossovers between the ballistic and diffusive regimes.

Philip Kratz
Stanford University

Date submitted: 10 Nov 2015 Electronic form version 1.4