"Supercurrent in the quantum Hall regime: part I"
for the MAR16 Meeting of
The American Physical Society

Supercurrent in the quantum Hall regime, part II FRANCOIS AMET, Appalachian State University, CHUNG TING KE, Duke University, IVAN BORZENETS, University of Tokyo, JIYINGMEI WANG, Duke University, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Materials Science, RUSSEL DEACON, Center for Emergent Matter Science, RIKEN, MICHIHISA YAMAMOTO, University of Tokyo, YURIY BOMZE, Duke University, SEIGO TARUCHA, University of Tokyo, GLEB FINKELSTEIN, Duke University — A novel promising route for creating topological states and excitations is to combine superconductivity and the quantum Hall effect. Despite this potential, signatures of superconductivity in the quantum Hall regime remain scarce, and a superconducting current through a Landau-quantized two-dimensional electron gas has so far eluded experimental observation. High-mobility graphene/BN heterostructures exhibit the quantum Hall effect at relatively low field and are therefore particularly suitable to study the fate of the Josephson effect in that regime. Here, we report the observation of a superconducting current through graphene at fields as high as 2 Tesla. In that regime, the normal-state resistance is quantized but pockets of superconductivity still persist at small current bias. We will describe their bias and temperature dependence. Magnetic field interference patterns in the supercurrent inform on possible mechanisms mediating this supercurrent.

Francois Amet
Appalachian State University

Date submitted: 24 Nov 2015 Electronic form version 1.4