MAR17-2016-020587

Abstract for an Invited Paper
for the MAR17 Meeting of
the American Physical Society

Inducing Superconducting Correlation in Quantum Hall Edge States

AMIR YACOBY, Harvard University

The quantum Hall (QH) effect supports a set of chiral edge states at the boundary of a 2-dimensional electron gas (2DEG) system. A superconductor (SC) contacting these states induces correlation of the quasi-particles in the dissipationless 1D chiral QH edge states. If the superconducting electrode is narrower than the superconducting coherence length, the incoming electron are correlated to outgoing hole along the chiral edge state by the Andreev process. In order to realize this crossed Andreev conversion (CAC), it is necessary to fabricate highly transparent and nanometer-scale superconducting junctions to QH system. Here we report the observation of CAC in a graphene QH system contacted with a nanostructured NbN superconducting electrode. The chemical potential of the edge states across the superconducting electrode exhibits a sign reversal, providing direct evidence of CAC. This hybrid SC/QH system is a novel route to create isolated non-Abelian anyonic zero modes, in resonance with the chiral QH edge.