MAR17-2016-005289
E

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

Magnetic field induced 4π periodic Josephson effect in InAs nanowires

DOMINIQUE LAROCHE, DANIËL BOUMAN, DAVID VAN WOERKOM, ALEX PROUTSKI, RUBEN VAN GULIK, MICHAŁ NOWAK, QuTech and Kavli Institute of Nanoscience, Delft University of Technology, DMITRY PIKULIN, Kavli Institute for Theoretical Physics, University of California Santa Barbara, JESPER NYGÅRD, PETER KROGSTRUP, CHARLES MARCUS, Center for Quantum Devices and Station Q Copenhagen, Niels Bohr Institute, University of Copenhagen, LEO KOUWENHOVEN, ATTILA GERESDI, QuTech and Kavli Institute of Nanoscience, Delft University of Technology

Majorana zero modes (MZM) are leading candidates to implement *topological* quantum computing, owing to their predicted non-Abelian properties and their non-local protection against decoherence. While the observation of a zero-bias conductance peak in tunneling spectroscopy of nanowires strongly suggests the onset of these zero-energy states, additional proof of their existence has remained elusive. Here, we report measurements of Josephson radiation in Josephson junctions formed in a proximity-induced superconducting InAs nanowire with an epitaxially-grown Al shell. The emitted radiation is directly measured *on-chip*, using photon-assisted tunneling across nearby capacitively-coupled superconducting tunnel junctions. The frequency of the detected signal evolves from a 2π to a 4π periodicity as the magnetic field is increased. The evolution of this transition is studied as a function of chemical potential and of transmission across the nanowire junctions. These results are interpreted using both topological and non-topological models.