Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Superconducting Quantum Interference Devices incorporating an InSb-Superconductor Proximity Effect Junction YUVARAJ DHAYALAN, CHRISTOPER CHECKLEY, London Centre for Nanotechnology, University College London, HUIYUN LIU, Electronic and Electrical Engineering, University College London, ED ROMANS, London Centre for Nanotechnology, University College London, ED ROMANS GROUP TEAM, H LIU GROUP TEAM — There have been several recent proposals for devices to detect Majorana fermions at the interfaces between conventional superconductors and semiconductors with particular types of spin-orbit coupling. One very recent proposal (Wang et al., arXiv:1204.5616 [cond-mat.supr-con]) has suggested using a novel dc superconducting quantum interference device (SQUID) comprising a conventional Josephson junction in parallel with a Majorana-carrying superconductor-semiconductor (S-Sc-S) junction. We have realised such a device using a niobium nanobridge (Dayem bridge) and an InSb-based S-Sc-S junction. The S-Sc-S junction was formed by structuring an InSb film (45 nm thick) grown by Molecular Beam Epitaxy (MBE) into a nanowire (150 nm wide) by electron beam lithography and reactive ion etching. The electrical characteristics and magnetic flux response of the device were measured at low temperature. We discuss the fabrication of the device, and the evidence for the presence of Majorana fermions in the InSb nanowire, based on the observed magnetic flux response of the SQUID.

Yuvaraj Dhayalan
London Centre for Nanotechnology, University College London

Date submitted: 14 Dec 2012 Electronic form version 1.4