Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Micron scale ballistic Josephson junctions in edge-contacted graphene SRIJIT GOSWAMI, VICTOR CALADO, GAURAV NANDA, Delft University of Technology, MATHIAS DIEZ, Leiden University, ANTON AKHMEROV, Delft University of Technology, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute of Materials Science, LIEVEN VANDERSYPEN, Delft University of Technology — Despite recent improvements in the electronic quality of graphene, it has remained challenging to make superconducting contacts to it while preserving its high quality. Here, we integrate monolayer graphene encapsulated in hexagonal Boron Nitride with a type-II superconductor (Molybdenum Rhenium - MoRe) via one-dimensional contacts along the edge of the graphene. We observe gate-tunable supercurrents over distances as long as 1.5 μm. Ballistic, phase coherent transport in these devices causes the switching current to oscillate periodically with the Fermi wave number, thus providing clear evidence of a ballistic Josephson junction. Furthermore, the large critical field of MoRe allows us to resolve several broken symmetry states in the quantum Hall regime, while the MoRe remains superconducting.

Srijit Goswami
Delft University of Technology

Date submitted: 12 Nov 2014 Electronic form version 1.4