Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Superconductor-graphene based quantum entangler, a progress report IVAN BORZENETS, YUYA SHIMAZAKI, JUERGEN SAILER, The University of Tokyo, RUSSELL DEACON, Riken, MICHIHISA YAMAMOTO, SEIGO TARUCHA, The University of Tokyo — We report on the progress in fabricating a functioning quantum entangler. The device is based on the cooper-pair splitter "T" junction with either lead (Pb) or niobium (Nb) acting as the superconductor and graphene acting as the normal metal. Unlike the typically used aluminum (Al), lead and niobium have a superconducting transition at much higher temperatures (meaning a higher superconducting gap Δ), thus increasing the extent of the proximity effect. Proper techniques had to be developed in order to create transparent, superconductivity inducing contacts to graphene; and graphene-based Josephson junctions were fabricated and characterized. Meanwhile, graphene features high mobility, and therefore a high coherence length. We have patterned graphene into constrictions resulting in individually gated quantum dots with consistent characteristics. This is required in order to prevent both electrons from the same cooper pair from traveling into a single normal lead.

Ivan Borzenets
The University of Tokyo

Date submitted: 10 Dec 2012 Electronic form version 1.4