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Study of Magneto-transport in Niobium Nitride (NbN) - Graphene Josephson weak links PIRANAVAN KUMARAVADIVEL, XU DU, Stony Brook University — Proximity induced superconductivity in graphene - superconductor (SC) hybrid devices has revived interest in the study of electronic transport of Andreev bound states in the Quantum Hall (QH) regime. This is mainly due to the ability to fabricate ballistic superconducting weak links with type II SC where the interplay of proximity effect and QH effect can be studied at low magnetic fields ($\sim$ 0.5T) and extended up to the upper critical field (Hc_2) [1]. In our work we use sputtered NbN which has an upper critical field of 16T. Below the SC transition temperature of NbN (approx. 12K) we observe Andreev reflection and super-current which are indicative of transparent superconductor-normal interface. We study magneto- transport measurements at different fields applied perpendicular to the graphene channel. Our results suggest that the diamagnetic current and Abrikosov vortices which are formed in the NbN leads influence the SC-proximity effect in graphene.

[1] Mizuno, N. et al. Ballistic-like supercurrent in suspended graphene Josephson weak links. Nat. Commun. 4:2716 doi: 10.1038/ncomms3716 (2013)

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