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Proximity Effect at Graphene - High Tc Superconductor Junctions DA WANG, EN-MIN SHIH, GHIDEWON AREFE, YOUNGDUCK KIM, DREW EDELBERG, ERICK ANDRADE, DENNIS WANG, JAMES HONE, CORY DEAN, ABHAY PASUPATHY, Columbia university, DEPARTMENT OF PHYSICS, COLUMBIA UNIVERSITY, NEW YORK, NY 10027, USA COLLABORATION — The proximity effect is a well-known mesoscopic phenomenon where Cooper pairs from a superconductor (S) enter into a normal metal (N) that is well coupled to it. Since graphene was discovered a decade ago, the proximity effect at superconductor-graphene junctions has been extensively studied and interesting phenomena such as specular Andreev reflection and ballistic transport at graphene Josephson junctions have been observed. However, superconductors used in these experiments to date are of conventional low Tc, such as aluminum(Tc=1.2K), NbSe2(Tc=7K), and MoRe(Tc=8K). Understanding how the proximity effect works between high-Tc superconductors (pnictides and cuprates) and the Dirac Fermions of graphene remains largely unexplored. The chief technical challenge here is to create high-quality junctions between high-Tc superconductors and graphene. In this work, we will introduce a home-made setup that allows us to exfoliate, transfer and encapsulate superconductor-graphene junctions in a well controlled inert atmosphere. Transport measurements of the proximity effect at graphene-iron pnictide(FeSe, FeTeSe) and graphene-cuprate(BSCCO) junctions will be described.

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