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Graphene-Based Superconducting Weak Links in Low Magnetic Field SCOTT MILLS, Stony Brook University , PIRANAVAN KUMARAVADIVEL , Yale University, XU DU, Stony Brook University — The impact of magnetic field on Andreev reflection is studied in graphene-based superconducting weak links. We found, through studying weak links with different adhesion layers and superconducting leads (including Graphene-Ti/Au-Nb, Graphene-Ti/Pd-Nb, Graphene-V-Nb, Graphene-Ti-Nb, Graphene-Ti/Pd-NbN), that in low field ($B \ll B_{c2}$) Andreev reflection is strongly suppressed by the magnetic field. Magnetic field suppression of Andreev reflection is found to be dependent on both the effective gap of the weak link and on Abrikosov vortex dynamics at the graphene-superconductor interface. As the effective gap of the weak link approaches the intrinsic gap of the superconducting leads, a remnant of Andreev reflection can survive into the quantum Hall regime, allowing study of the interplay between the quantum Hall effect and Andreev reflection in high quality suspended graphene-superconductor weak links.

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