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Tunable resistance anomaly in graphene-superconductor hybrid structure[1] ATIKUR RAHMAN, JANICE WYNN GUIKEMA, NINA MARKOVIC, Johns Hopkins University — Junctions between superconductors and normal metals often exhibit a resistance anomaly: near the superconducting transition temperature, the resistance increases above the normal-state value. The magnitude of the excess resistance varies over a wide range, decreases in a magnetic field and can depend on the driving current and the history of thermal cycling. Several physical mechanisms have been proposed to explain the origin of the excess resistance, including the fluctuation-induced resistive state, nonequilibrium quasiparticle charge imbalance around NS boundary or phase-slip centers. Here we present an electronic transport study of superconductor-graphene hybrid structures that show a large resistance anomaly which survives even in presence of a relatively large magnetic field. We will show that, by changing the graphene resistance, we can tune the magnitude and position of the resistance peak and will examine the applicability of existing models to explain our results.

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