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Conductance Fluctuation and Superconducting-to-Normal State Switching Measurements of Superconducting Graphene Devices[1] JOSEPH LAMBERT, STEVEN CARABELLO, Drexel University, ROBERTO RAMOS, Indiana Wesleyan University — We report on gate voltage dependent conductance fluctuations (CF) in superconducting graphene devices and compare measurements in the superconducting versus normal state at temperatures down to 20 mK. The CF arise from the averaged interference of charge carrier wave functions caused by scattering in the graphene. An enhancement in the magnitude of the average CF is expected when in the superconducting state due to Andreev reflections. We fabricate devices by contacting graphene with two parallel superconducting leads that are spaced a few hundred nanometers apart. The leads are a Pd/Al or Ti/Al bilayer with the thin Pd or Ti layer providing high transparency contact to graphene. Additionally, we report on our ongoing superconducting-to-normal state switching measurements in graphene Josephson junctions. The distribution of the stochastic switching current gives insight into the dynamics of the junction such as the phase particle escape mechanisms and dissipation processes. The use of graphene as the weak link allows novel control of the critical current, and thus the dynamics of the junction. By gathering switching data, we can study the modified Josephson washboard potential in these devices (J. G. Lambert, et al., IEEE Trans. in Appl. Supercond. 21, 734 (2011)).

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