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Introduction of a DC Bias into a High-Q Microwave Cavity[1] WEIWEI XUE, FEI CHEN, IAN HAYES, M.P. BLENCOWE, A.J. RIMBERG — The circuit quantum electrodynamics (QED) architecture has been demonstrated to allow study cavity QED physics in a high-Q on- chip microwave cavity[1]. Here we develop a technique to apply a DC current or voltage bias to nanostructures embedded in the microwave cavity without significantly disturbing the cavity modes or degrading the Q at high frequencies. The DC biasing scheme will be discussed. Experimental results show good agreement with theoretical predictions. New highly nonlinear fully quantum mechanical devices can be developed by embedding Josephson junction devices such as Superconducting Quantum Interference Devices (SQUIDs) or single electron transistors (SETs) in the high-Q microwave cavity. Furthermore, by integrating a nanomechanical resonator, such cavities may also be used to investigate the quantum to classical transition. [1] A. Wallraff et al, Nature, 431, 162 (2004).

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