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Tuning the Dispersive Coupling Rate and Suppressing the Photon Shot Noise in a Superconducting Qubit[1] GENGYAN ZHANG, Princeton University, SRIKANTH SRINIVASAN, IBM T. J. Watson Research Center, YANBING LIU, ANDREW HOUCK, Princeton University — We report on measurements of the dispersive coupling between a microwave cavity and a tunable coupling qubit (TCQ). By operating the TCQ in the straddling regime, we can tune χ, the cavity pull of the qubit, from a few MHz to close to zero while maintaining a constant qubit frequency. The vanishing χ leads to the suppression of the photon shot noise, which is one of the sources of qubit decoherence. Readout of the qubit at small χ is achieved by transferring the qubit state to a higher energy level. Experimental results of tunable χ and its impact on qubit coherence will be presented.

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