

Abstract Submitted  
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**Intrinsic noise measurement of an ultra-sensitive radio-frequency single electron transistor**<sup>1</sup> W.W. XUE, Dartmouth College, Z. JI, Rice University, FENG PAN, A.J. RIMBERG, Dartmouth College — The radio-frequency single electron transistor (rf-SET) has been the focus of intense interest since its invention in 1998[1]. Using cryogenic ultra-thin film evaporation techniques [2] and an improved on-chip superconducting matching network [3], we have consistently fabricated rf-SETs with charge sensitivity of  $1.7\text{--}5\mu e/\sqrt{\text{Hz}}$  and uncoupled energy sensitivity  $1.1\text{--}5\hbar$ . Using our 1GHz resonant circuit, intrinsic noise in the SET arising from a dc voltage bias was measured in the white noise limit. We measured the offset charge dependence of the intrinsic noise in the vicinity of the Josephson-quasiparticle and double Josephson-quasiparticle transport cycles. In regions for which the offset charge and resistance noise are strongly suppressed, we can determine the SET shot noise in the sup-gap regime. We discuss the effects of correlations between charge carriers on the measured Fano factor. [1] R.J.Schoelkopf et al., Science 280,1238 (1998); [2] N.A.Court et al., Cond-mat 0706.4150 (2007); [3] W.W.Xue et al., Appl.Phys.Lett. 91, 093511 (2007).

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