

Abstract Submitted
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Time resolved measurements of single electron tunneling events

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— We have observed time resolved single electron tunneling events in a metallic thin film circuit. Using a radio frequency single electron transistor (RF-SET) capacitively coupled to a single electron trap (a circuit consisting two small metallic islands and two tunnel junctions) we are able to measure tunneling events on the 10 microsecond time scale. In the 400 microsecond average lifetime of the charge state with one excess electron on the trap island, 80 data points with SNR=10 can be obtained. We will present these measurements along with comparisons to cotunneling (quantum tunneling) and Orthodox (thermal tunneling) theories. The dynamics of cotunneling has never before been studied in an experimental system. These time domain measurements also demonstrate the possibility of measuring the higher moments of charge noise in a metallic system.

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