Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Shot noise measurements as a function of bias in STM-style gold junctions[1] RUOYU CHEN, PATRICK WHEELER, DOUGLAS NATELSON, Physics & Astronomy, Rice University — Shot noise measurements provide more detailed information regarding conductance channels than transport alone. Because of nearly fully transmitted modes, shot noise in nanoscale junctions is suppressed strongly near certain conductance values. In this experiment, we use a gold tip in a STM-style geometry to make nanoscale junctions, which function as the noise source when under bias. Peaks of conductance histograms and related mean square, radio frequency shot noise are successfully measured simultaneously at room temperature, at a series of voltage biases. Those peaks and related shot noise suppressions appear near integer multiples of the conductance quantum G0, especially the first three. We are able to measure shot noise at biases as low as tens of millivolts, and make use of even lower biases to estimate the systematical background existing in our measurements. Combined with a radio frequency reflection measurement, we convert the measured signal to current noise across the junction. The relevant noise processes and their evolution with bias across the junctions will be discussed.

[1]This work is supported by NSF award DMR-0855607.

Ruoyu Chen
Physics & Astronomy, Rice University

Date submitted: 16 Nov 2011 Electronic form version 1.4