

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**Low temperature high bias enhanced noise in atomic-scale Au junctions**<sup>1</sup> LOAH STEVENS, PAVLO ZOLOTAVIN, RUOYU CHEN, DOUGLAS NATELSON, Department of Physics and Astronomy, Rice University — We report measurements on STM-style Au break junctions, investigating the bias dependence of current noise at room temperature, 77K, and 4K. Previous experiments at room temperature observed that low bias noise ( $<150\text{mV}$ ) agrees well with predictions for shot noise at fixed electronic temperature, but at high biases, noise was found to have a nonlinear dependence on the scaled bias. Possible sources of this deviation are nonequilibrium electron-phonon effects or local heating of the electronic distribution. In order to expand upon the understanding of the enhanced noise at high bias, we have measured current noise for a range of biases as a function of environmental temperature. This allows for distinction between electron-electron and electron-vibrational contributions to the shot noise. We will discuss differences in the bias dependence of the noise between cryogenic and room temperature conditions.

<sup>1</sup>D.N., P.Z., R.C. and L.S. acknowledge support from NSF award DMR-1305879.

Loah Stevens  
Department of Physics and Astronomy, Rice University

Date submitted: 12 Nov 2014

Electronic form version 1.4