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**Variable temperature shot noise measurements in mechanically controlled gold break junctions** RUOYU CHEN, LELAND RICHARDSON, DOUGLAS NATELSON, Rice University — Shot noise originates from the discreteness of charge carriers when a finite bias is applied. The noise spectral density reflects the effective charge and the Fano factor. The former may be modified by electron-electron interactions, while the latter can be affected by both interactions and the microscopic nature of transport. The temperature dependence of shot noise is interesting due to the fact that both interactions and the microscopic dynamics and geometries can vary with temperature, as well as length scales associated with scattering. Previous excess noise measurements demonstrate the existence of shot noise in ballistic atomic-scale contacts at room temperature, indicating that the quantum coherence length is at least larger than atomic scale even at 300 K. A detailed temperature dependent study from cryogenic conditions to room temperature is still absent. Here we will present progress on using lithographically patterned gold bowtie junctions on mechanically-bended substrates to study the broadband rf excess noise over different conductance values, electric biases and temperatures.

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