

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Transport Fluctuations in Metal-Molecule Junctions JONATHAN MALEN, KANHAYALAL BAHETI, PETER DOAK, RACHEL SEGALMAN, ARUN MAJUMDAR, UC Berkeley — Thermopower of metal-molecule junctions is an alternative transport characteristic to conductance that can be experimentally measured. A scanning tunneling microscope break junction was used to measure the thermopower of such molecular junctions. Temperature bias applied between gold contacts across the bridging molecules generates a thermoelectric voltage. Hitherto, the statistical analysis of the data from both thermopower and conductance measurements has focused on the histogram peaks rather than the spread of the data. We find that the full width half maximums (FWHM) of the voltage histograms are finite at zero temperature bias and increase in proportion to the temperature bias. Johnson Noise is the most likely cause of the zero bias FWHM, and its magnitude is thereby related to the junction conductance. For 1,4, Benzenedithiol (BDT) the junction conductance associated with the zero bias FWHM is $0.02G_0$, in close agreement with prior conductance measurements of BDT. The dependence of FWHM on temperature bias may provide further insight to the origin of stochastic fluctuations in metal molecule junctions.

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Date submitted: 25 Nov 2007

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