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Electrostatic gating and single-molecule Raman spectroscopy YAJING LI, JOSEPH HERZOG, DOUGLAS NATELSON, Rice University — SERS(surface enhanced raman spectroscopy) is a useful tool for single molecule spectroscopic investigations. We fabricated nanoscale Au bowtie structures to function as SERS substrates. Following electromigration, these metal nanostructures possess nanometer-scale interelectrode gaps that support highly localized surface plasmon resonances, resulting in SERS electromagnetic enhancements sufficient for single-molecule studies. These structures have also proven suitable for single-molecule electronic transport experiments, in which the underlying substrate can function as a gate electrode to shift molecular electronic levels relative to the metal source and drain. We will present preliminary results of the effect of gate modulation on the SERS and electrical properties of molecules in such junctions.

Yajing Li
Rice University

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