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Dissipation and heating in C₆₀ molecular junctions PAVLO ZOLOTAVIN, CHARLOTTE EVANS, DOUGLAS NATELSON, Department of Physics & Astronomy, Rice University — We present a novel experimental approach to study energy dissipation during electron transport through the molecular scale junction containing a C₆₀ molecule. One of the pathways for a tunneling electron to dissipate energy in the junction is to excite vibrations of the molecule. Previously, such vibrational heating had been observed by measuring the intensity of anti-Stokes modes in the surface enhanced Raman spectra (SERS). A complementary electron-focused approach is to use inelastic electron tunneling spectroscopy (IETS) to study the electron-vibronic interactions by tracking the effects of vibrations upon the electronic current. A combination of these two techniques should allow for a quantitative study of the energy dissipation in molecular junctions. The preliminary results of simultaneous IETS and SERS measurements in C₆₀ molecular junctions will be presented. We discuss the vibrational heating of C₆₀ molecule and future expansion of this work to junctions containing semiconductor nanocrystals. (ARO award W911 NF-13-1-0476)

Pavlo Zolotavin
Rice University

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