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Analysis of Tunneling Spectra in Constant-Current Distance-Voltage Mode DANIEL DOUGHERTY, ALEX PRONSCHINSKE, DANIEL MARDIT, Department of Physics North Carolina State University — A technical challenge associated with the use of traditional constant height tunneling spectroscopy in current-voltage mode is that tunneling current increases very rapidly at even modest voltages. This can result in tip-induced damage or motion for soft or delicate materials like organic molecules. One solution to this problem is to measure tunneling spectra in constant current distance-voltage mode where the STM feedback loop maintains a constant small tunneling current. Using the standard integral expression for tunneling current with a WKB transmission function, it is possible to create a first order differential equation connecting distance-voltage spectra with sample density of electronic states. This can be used to experimentally extract density of states or to theoretically predict distance-voltage tunneling spectra from a known density of states. We illustrate the use of this approach with numerical and experimental examples.

Daniel Dougherty
Department of Physics North Carolina State University

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