

Abstract Submitted  
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**Real-Space Imaging of Molecular Structure by Single-Molecule Inelastic Tunneling Probe** ZHUMIN HAN, CHI-LUN CHIANG, CHEN XU, Department of Physics and Astronomy, University of California, Irvine, WILSON HO, Department of Physics and Astronomy and Department of Chemistry, University of California, Irvine — The scanning tunneling microscope is one of the most powerful tools to perform real space imaging of the electronic, magnetic, optical, and vibrational signatures of a single molecule. However, the spatial distributions of these signatures do not always relate directly to the geometric structures of the molecules. In this study, a CO molecule is transferred from the surface to a STM tip. The energy and intensity of the hindered translational mode of the CO vary when the tip is scanned across an adsorbed molecule (such as cobalt phthalocyanine). By monitoring these variations in space, we are able to resolve the geometric structure of the molecule and even subtle intramolecular and intermolecular interactions.

Zhumin Han  
Department of Physics and Astronomy, University of California, Irvine

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