

Abstract Submitted  
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**Measurements of Molecular Dynamics in Atomically Engineered Molecular Nanostructures**<sup>1</sup> JOSEPH A. STROSCIO, ROBERT J. CELOTTA, Electron Physics Group, National Institute of Standards and Technology, Gaithersburg, MD 20899-8412 — The quantum yield for exciting the motion of a single atom within a molecular nanostructure was measured with atomic spatial resolution. The molecular nanostructures consisted of a series of  $\text{CoCu}_n$  and  $\text{CoCu}_n\text{Co}$  linear molecules fabricated on a  $\text{Cu}(111)$  surface. The Co atoms at the end of the molecules were induced to switch between two lattice positions using electron excitation in a scanning tunneling microscope (STM). The electron excitation and quantum yield were found to be spatially localized on an atomic scale. Above an electron energy threshold, the Co atom motion resulted from a predominantly single electron process. By systematically varying the molecular structure, atom motion within the molecule was shown to be dependent on molecular length and composition.

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