Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Direct measurement of photomechanical switching cross-sections of single-molecules on a surface JONGWEON CHO, MATTHEW J. COMSTOCK, NIV LEVY, LUIS BERBIL-BAUTISTA, FRANK LAUTERWASSER, JEAN M. J. FRECHET, MICHAEL F. CROMMIE, University of California at Berkeley — The photomechanical switching of photoactive molecules in solution strongly depends on the wavelength of light. This dependence is crucial to reliably control the photomechanical state of target molecules. Recently, reversible photomechanical switching of individual azobenzene molecular derivatives on the Au(111) surface has been reported for one particular wavelength of UV illumination [1]. To further understand this process and its possible applications in future nanotechnologies, we have investigated photomechanical switching rates and saturation behavior for azobenzene molecular derivatives at a surface under optical stimulation at different wavelengths. Using single-molecule-resolved scanning tunneling microscopy, we have determined both the forward and reverse photomechanical molecular switching cross-sections at different wavelengths. In a dramatic departure from solution-based environments, visible light does not efficiently reverse the photoreaction. [1] Matthew J. Comstock, Niv Levy, Armen Kirakosian, Jongweon Cho, Frank Lauterwasser, Jessica H. Harvey, David A. Strubbe, Jean M. J. Fréchet, Dirk Trauner, Steven G. Louie, and Michael F. Crommie, Phys. Rev. Lett. 99, 038301 (2007)

Jongweon Cho
University of California at Berkeley

Date submitted: 14 Dec 2007 Electronic form version 1.4