

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Direct measurement of mechanical susceptibility in single-molecule proteins** ERIC CORWIN, MAXIME CLUSEL, JASNA BRUJIC, New York University — A protein acquires its function through the specific structure of its polypeptide chain. A mechanical force of only a few tens of picoNewtons is sufficient to disrupt this structure and cause the protein to unfold. Conventional rheology of complex fluids seeks to understand a materials internal structures, energy landscape, and time scales of relaxation by measuring its bulk mechanical response to applied stress and strain as a function of frequency. By analogy, we propose a nano-rheological study of single-molecule proteins. To this end we report on a new AFM design, targeted at high speed force and position controlled measurements of single-molecule proteins. Using this new tool we are able to measure previously inaccessible properties of mechanically stable proteins. Using a broad spectrum force excitation technique we have measured the frequency dependent mechanical susceptibility of both folded and unfolded proteins as a function of applied force. Using these measurements we can begin to characterize the sources of dissipation or “friction” present in the protein.

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Date submitted: 07 Dec 2009

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