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Quantification of tip-sample forces on and below resonance in tapping mode atomic force microscopy ORSOLYA KARACSONY, TOMASZ KOWALEWSKI, Carnegie Mellon University, BRIAN CUSICK, Westinghouse Electric Company — There has been a recent resurgence of interest in multi-frequency tapping mode AFM techniques, in which quantifying the tip-sample force is crucial. In particular, knowledge of the magnitude of tip-sample force may be essential in understanding the nature of contrast in imaging soft materials such as block copolymers or novel complex macromolecular architectures. This presentation will focus on the quantitative understanding of the dependence of average tip-sample forces on imaging conditions such as set-point ratio and operating frequency. First, the derivation of an analytical expression for the average tip-sample force will be presented. Its predictions will be then shown to be in excellent agreement with the results of numerical simulations using a single degree of freedom, driven damped harmonic oscillator model of tapping mode AFM.

Orsolya Karacsony
Carnegie Mellon University

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