

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Diamagnetic Levitation Cantilever System for the Calibration of Normal Force Atomic Force Microscopy Measurements**<sup>1</sup> JAHN TORRES, Brown University/ Naval Undersea Warfare Center, JIN-WOO YI, Korean Institute of Science and Technology, COLIN MURPHY, Naval Undersea Warfare Center, KYUNG-SUK KIM, Brown University — In this presentation we report a novel technique for normal force calibration for Atomic Force Microscopy (AFM) adhesion measurements known as the diamagnetic normal force calibration (D-NFC) system. The levitation produced by the repulsion between a diamagnetic graphite sheet and a set of rare-earth magnets is used in order to produce an oscillation due to an unstable mechanical moment produced by a silicon cantilever supported on the graphite. The measurement of the natural frequency of this oscillation allows for the calculation of the stiffness of the system to three-digit accuracy. The D-NFC response was proven to have a high sensitivity for the structure of water molecules collected on its surface. This in turns allows for the study of the effects of coatings on the structure of surface water.

<sup>1</sup>This work was supported by the Coatings/Biofouling Program and the Maritime Sensing Program of the Office of Naval Research as well as the ILIR Program of the Naval Undersea Warfare Center DIVNPT.

Jahn Torres  
Brown University/ Naval Undersea Warfare Center

Date submitted: 30 Nov 2010

Electronic form version 1.4