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Paper on Measurement of the Nanomechanical Properties of Thin Films Using AFAM Receives Recognition

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PAPER ON MEASUREMENT OF THE NANOMECHANICAL PROPERTIES OF THIN FILMS USING AFAM RECEIVES RECOGNITION

NIST researchers are developing atomic force acoustic microscopy (AFAM) methods to quantitatively determine the elastic properties of thin films. The AFAM technique measures the frequencies of an atomic force microscope (AFM) cantilever's first two flexural resonances while in contact with a material. The indentation modulus, *M,* of an unknown or test material can then be obtained by comparing the resonant spectra of the test material to those of a reference material. To examine metrology issues for this emerging technique, AFAM results have been compared with those obtained by other methods, such as instrumented indentation. The results show that better agreement may be achieved by averaging results from two different reference materials, providing better insight into using AFAM methods to attain reliable, accurate measurements of elastic properties on the nanoscale.

A conference paper on this subject, entitled "Quantitative Elastic-Property Information with Acoustic AFM: Measurements and Modeling," by NIST's Donna Hurley and Paul Rice, Joseph Turner (University of Nebraska-Lincoln) and Joshua Wiehn (former Nebraska graduate student), was recently awarded Second Best Paper for the SPIE 2002 Symposium on NDE and Health Monitoring. The topic was also the subject of an invited colloquium at the Fraunhofer Institute for Nondestructive Testing (Saarbruecken, Germany) last autumn.

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