

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Quantitative surface parameter maps using Intermodulation Atomic Force Microscopy DANIEL FORCHHEIMER, DANIEL PLATZ, ERIK THOLÉN, CARSTEN HUTTER, DAVID HAVILAND, Royal Institute of Technology (KTH), Stockholm, Sweden — It is well known that the phase image in amplitude modulation atomic force microscopy (AM-AFM) is sensitive to material properties of the surface. However that information is not enough to fully quantify the tip-surface interaction. We have developed Intermodulation AFM, based on a spectral analysis of the cantilever's *nonlinear* dynamics, which increases the amount of information obtained without increasing scan time.¹ We show how it is possible to extract quantitative material properties of the surface from this additional information. The method works under the assumption of a tip-surface force model, such as the DMT model, fitting the model parameters to the measured spectral data. The parameters are obtained at each pixel of the AFM image and form surface property maps which can be displayed together with topography. We demonstrate this on different surfaces such as polymer blends, extracting stiffness and adhesive properties.

¹D. Platz, E. A. Tholen, D. Pesen, and D. B. Haviland, Appl. Phys. Lett., 92, 153106 (2008)

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Date submitted: 23 Dec 2010

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