

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Near-field scanning microwave microscope with separated excitation and sensing probes KEJI LAI, M.B. JI, N. LEINDECKER, M. KELLY, Z.X. SHEN, Stanford Univ. — We present here the design and experimental results of a near-field scanning microwave microscope (NSMM), currently working at a frequency of 1GHz. The coplanar waveguides were patterned onto the silicon nitride cantilever interchangeable with AFM tips, which are robust for high speed scanning. Our microscope is unique in that the sensing probe is separated from the excitation electrode to significantly suppress the common mode signal. The reflected signal, at the same time, can be used for the feedback of height control in a non-contact mode. In the contact mode which we are currently using, the contrast comes from both the sample topography and the difference of the complex dielectric constant. Our NSMM shows the ability to achieve high resolution microwave images on nanoparticles, nano-wires, and biological samples with mostly topographical contrast, as well as buried structures with mostly electrical contrast. Numerical analysis of the tip-sample interaction was also performed and will be discussed in detail.

Keji Lai
Stanford Univ.

Date submitted: 17 Nov 2006

Electronic form version 1.4