Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

A 3-D Finite Element Method Analysis for Microwave Imaging of Complex Permittivity[1] SHUOGANG HUANG, MARK REEVES, George Washington University — We develop a new technique to estimate the complex permittivity of dielectric material in microwave frequency by using 3-D Finite Element Method software. Starting with the Perturbation theory, we calculate the electric field pattern in near-field zone of the Scanning Microwave Microscope probe and the post-processing integration converts the field energy to frequency shift. The FEM computation is carried out several times while tip-sample separation varies. We compare numerical simulation results with experimental values both in bulk and thin-film cases. Finally, the sensitivity analysis of the model is discussed.

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Date submitted: 06 Dec 2004 Electronic form version 1.4