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Development of an Evanescent Microwave Probe / Scanning Tunneling Microscope to study Localized Electron Spin Resonance CHRISTIAN LONG, University of Maryland, NAOYUKI TAKETOSHI, National Institute of Advanced Industrial Science and Technology, ICHIRO TAKEUCHI, University of Maryland, HAITAO YANG, Intematix orporation, XIAO-DONG XIANG, Intematix Corporation, UNIVERSITY OF MARYLAND TEAM, NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY COLLABORATION, INTEMATIX CORPORATION COLLABORATION — We have constructed a microwave microscope with an integrated scanning tunneling microscope. In addition to the measurement of complex dielectric constant and conductivity we also perform atomic resolution scanning tunneling microscopy (STM). In this work the probe is operated in a magnetic field, which causes unpaired spins in the sample to precess at the Larmor frequency. When the magnetic field is such that the Larmor frequency of the spins in the sample matches the resonant frequency of the resonator, the transmission coefficient of the resonator (S12) is changed. We measure local ESR by measuring the variation in S12 as a function of magnetic field. In this report, we give an outline of the experimental setup and preliminary spin detection data for various spin radical molecules (one unpaired spin each) on an HPOG substrate (no unpaired spins). Supported by the W. M. KECK Foundation and NSF MRSEC (DMR 0520471).

Christian Long
University of Maryland

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