

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Construction of a Low Temperature Capable Frequency-Modulation Magnetic Resonance Force Microscope¹ SANGGAP LEE, SUN HO WON, SEUNG-BO SAUN, SOONCHIL LEE, Department of Physics, Korea Advanced Institute of Science and Technology — We constructed a low temperature capable frequency-modulation magnetic resonance force microscope (FM-MRFM) and applied to detecting electron spin resonance signals from tiny DPPH particles with ease in control and thereby improved signal-to-noise ratio. The electronics was composed of a spin-polarization modulator, a cantilever-oscillation feedback gain controller, and a phase-locked loop (PLL) FM demodulator. The controller kept the cantilever oscillating at its resonance frequency by positively feeding back to a piezo-actuator the gain-controlled drive signal phase shifted by 90 degrees with respect to the cantilever oscillation in the PLL circuit. The modulator generated waveforms to modulate the strength or frequency of radio-frequency field in phase with the drive signal. The whole setup enabled to sense as readily as spins resonate by tracking the cantilever resonance frequency without breakdown in fastidious conditions. We will discuss the details and features of our microscope and furthermore ongoing MRFM results.

¹This work was supported in part by KIMM in Korea.

SangGap Lee
Department of Physics, Korea Advanced Institute of Science and Technology

Date submitted: 20 Nov 2006

Electronic form version 1.4