Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Nanomagnetic Planar Magnetic Resonance Microscopy "Lens"
MLADEN BARBIC, California State University, Long Beach, AXEL SCHERER, Caltech — The achievement of three-dimensional atomic resolution magnetic resonance microscopy remains one of the main challenges in visualization of biological molecules. The prospects for single spin microscopy have come tantalizingly close due to the recent developments in sensitive instrumentation. Despite the single spin detection capability in systems of spatially well-isolated spins, the challenge that remains is the creation of conditions in space where only a single spin is resonant and detected in the presence of other spins in its natural dense spin environment. We present a nanomagnetic planar design where a localized Angstrom-scale point in three-dimensional space is created above the nanostructure with a non-zero minimum of the magnetic field magnitude. The design thereby represents a magnetic resonance microscopy "lens" where potentially only a single spin located in the "focus" spot of structure is resonant. Despite the presence of other spins in the Angstrom-scale vicinity of the resonant spin, high gradient magnetic field of the "lens" renders those spins inactive in the detection process.

Mladen Barbic
California State University, Long Beach

Date submitted: 03 Dec 2004 Electronic form version 1.4