Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

**Magnetomechanical Dissipation in (Ga,Mn)As Nanoelectromechanical Resonators** E.B. MYERS, S. MASMANIDIS, H.X. TANG, M. LI, M.L. ROUKES, California Institute of Technology, Pasadena, CA, K. DE GREVE, GEERT VERMEULEN, W. VAN ROY, IMEC, Leuven, Belgium — When the magnetization of a ferromagnet is changed (e.g., by applying a magnetic field), a stress develops in the material that can change its shape; this is the well-known magnetostriction effect. The magnetoelastic coupling that governs this effect operates conversely as well, in that an applied stress can alter the magnetization state of the material (the magnetomechanical effect). We have studied this coupling in MHz-range nanoelectromechanical resonators fabricated out of the dilute magnetic semiconductor (Ga,Mn)As. We find that the resonator quality factor and piezoresistive signal amplitude vary strongly with both the magnitude and direction of an applied magnetic field. The data can be interpreted in terms of local AC strain in the resonator driving the Mn moments into heavily damped motion at the resonator frequency; comparisons to magnetoelastic theory will be presented.

E.B. Myers
California Institute of Technology

Date submitted: 22 Dec 2004 Electronic form version 1.4