Abstract Submitted
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**Spatial Imaging and Mechanical Control of Spin Coherence in Strained GaAs Epilayers**[1] HADRIAN KNOTZ, VANESSA SIH, JASON STEPHENS, DAVID AWSCHALOM, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, CA 93106 — Recent work has shown that electron spins in GaAs and related compounds respond to strain dramatically. In particular, the manipulation of the spin-orbit coupling in GaAs via strain may be used for the development of all-electrical spintronic devices. Here we have developed a mechanical vise to controllably and reproducibly tune the tensile strain in-situ over a typical range for strain engineered heterostructures, from 0.0 - 0.2%[2]. The effect of uniaxial tensile strain on spin coherence and transport phenomena in n-type GaAs epilayers is probed using time-resolved Kerr rotation, photoluminescence, and optically-detected nuclear magnetic resonance spectroscopies. The bandgap, electron spin lifetime, electron g-factor, and nuclear quadrupole splitting are imaged over millimeter scale areas of the epilayers for continuously varying values of strain. Simple non-destructive techniques for characterizing strain dependent phenomena in semiconductor heterostructures will facilitate the development of strain engineered spintronic devices.

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[2]H. Knotz, A Holleitner, J. Stephens, R. C. Myers, and D. D. Awschalom, submitted (2005)

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