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**External strain engineering of the optical response of (Al,Ga)As/GaAs microdisk lasers** X. LI, M. H. MIKKELSEN, S. GHOSH, D. D. AWSCHALOM, N. SAMARTH, Materials Research Institute, Penn State University and Center for Spintronics and Quantum Computation, University of California-Santa Barbara — Recent studies show that semiconductor microcavities provide unexpected ways of controlling electron spin coherence via light-matter interactions in confined geometries [S. Ghosh et al., cond-mat/ 0509500], suggesting new routes towards spin-based quantum information processing. Here, we use optical spectroscopy to study the effects of external strain on lattice-matched (Al,Ga)As/GaAs microdisk lasers. We demonstrate that the encapsulation of such lasers with $SiN_x$ allows systematic strain engineering of steady state optical characteristics, where measurements of spontaneous emission show that GaAs quantum wells in the active region of the microdisks experience strain from both the $SiN_x$ and the free standing disk shape, and measurements of stimulated emission show that the laser threshold decreases with the magnitude of net compressive strain. Further, we also explore related modifications in the electron spin coherence time. Work supported by DARPA/QUIST and NSF.

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