Abstract Submitted
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Spin-dependent properties of Fe/MgO/GaAs heterostructures Y. LI, Y. CHYE, Y. CHIANG, Department of Physics and Astronomy, UC Riverside, J. STEPHENS, D. AWSCHALOM, Center for Spintronics and Quantum Computation, UC Santa Barbara, R. KAWAKAMI, Department of Physics and Astronomy, UC Riverside — Developing efficient spin injectors and spin detectors is an important goal for semiconductor-based spintronics. Recently Jiang et. al.'s work using CoFe/MgO tunnel spin injectors showed significantly enhanced spin injection efficiency into GaAs due to a spin filtering effect of the MgO layer [a]. Using molecular beam epitaxy (MBE) deposition, we have successfully grown atomically flat MgO films on GaAs(001) epilayers. Below 2 nm thickness, the MgO films are found to be single crystalline. The spin-dependent properties of a Fe/MgO/GaAs heterostructure are investigated by time-resolved Faraday rotation (TRFR) to measure ferromagnetic proximity polarization (FPP) across MgO [b]. It is seen that a very small amount of MgO (less than 0.5 nm thickness) enhances the FPP significantly. We are investigating the FPP dependence on MgO thickness by scanning the optical beams across an MgO wedge. A systematic study on MgO thickness dependence will be presented and the mechanism of indirect FPP across MgO will be discussed. Supported by NSF, ONR, and CNID. (a) X. Jiang, et al., Phys. Rev. Lett. **94,** 056601 (2005). (b) R. J. Epstein, et al., Phys. Rev. B **65,** 121202 (2002)

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