

Abstract Submitted
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High Optical Polarization from Electrical Spin Injection into an InGaAs QW C.H. LI, G. KIOSEOGLU, M. HOLUB, O.M.J. VAN 'T ERVE, B.T. JONKER, Naval Research Lab, T. ALI, I. KHAN, M. YASAR, A. PETROU, SUNY Buffalo — We have fabricated spin light emitting diodes (LEDs) with Fe as the spin injector and 100Å In_{0.1}Ga_{0.9}As/GaAs QWs as the detector. The emission efficiency from the InGaAs QW is extremely high, with a narrow linewidth of 4meV at 5K. The free exciton exhibits 25% optical polarization due to the injection of spin polarized carriers from the reverse-biased Fe Schottky contact. At low biases, a feature 10meV below the free exciton appears which exhibits a much larger polarization with a peculiar magnetic field dependence. Similar to that of the free exciton, the circular polarization of this lower energy feature first increases with magnetic field, and reaches a maximum of 67% at 2.5T, indicating injection from Fe. However, this behavior is superposed on a large diamagnetic background of 21%/T which dominates above 2.5T. The intensity and polarization of this feature is strongly bias dependent, and the feature disappears above 15K, suggesting that it originates from a weakly bound complex. The origin of this feature and its dependence on the magnetic field will be discussed at the meeting. Supported by ONR, NRL core funds, and NSF.

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