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Spin injection from Fe into GaAs quantum wells populated by electrons or holes: A comparison[1] A. PETROU, M. YASAR, I. KHAN, M. DIAZ-AVILA, SUNY AT Buffalo, G. KIOSEOGLOU, A.T. HANBICKI, B.T. JONKER, Naval Research Laboratory — We have studied the circular polarization of band-edge electroluminescence (EL) from three types of AlGaAs(n)/GaAs(i)/AlGaAs(p) light emitting diodes (LEDs) in which the electrons are injected from ferromagnetic Fe contacts. In the first (second) group the GaAs quantum well is populated by electrons (holes) due to excess n-type (p-type) doping in the n-AlGaAs (p-AlGaAs) barrier. In the third device type the GaAs quantum wells are empty and these LEDs are used as reference samples. We have compared the magneto-optical characteristics (dependence of the EL circular polarization P as function of magnetic field, current, and photon energy) of these three groups. Significant differences have been identified which must be taken into account in order to determine accurately the spin injection efficiency of these devices.

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