Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Circular polarization of electroluminescence from InAs-based Spin-LED's C.J. MEINING, B.D. MCCOMBE, University at Buffalo, SUNY, Buffalo, NY 14260, USA, P. GRABS, I. CHADO, G. SCHMIDT, L.W. MOLENKAMP, Universität Würzburg, 97074 Würzburg, Germany — We have investigated circular polarized electroluminescence (EL) from InAs-based spin-LED's utilizing CdMnSe to spin-polarize electrons, which are injected into an InAs quantum well. For comparison, non- magnetic structures with CdSe replacing the CdMnSe were also investigated to elucidate the inherent band structure and strong spin-orbit interaction effects in this system. Both magnetic and non-magnetic structures show qualitatively similar dependences of the circular polarization as a function of magnetic field. This behavior will be discussed in terms of a rate equation model that includes the band-structure of electrons and holes in a magnetic field, a finite ratio of recombination time and spin-lifetime, as well as the polarization efficiency of the CdMnSe spin-aligner as a function of injection current, which is determined by in-situ circular polarized photoluminescence measurements. The similarity of the magnetic and non-magnetic aligner results is partially due to the low polarization of the CdMnSe resulting from a low effective Mn concentration.
Work supported by DARPA ONR# N00014-00-1-0951

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Date submitted: 22 Dec 2004 Electronic form version 1.4