

Abstract Submitted
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Emission spectra from InAs quantum dots as a function of carrier spin polarization; experiment and theory.¹ I. KHAN, T. ALI, M. YASAR, A. PETROU, SUNY at Buffalo, G. KIOSEOGLOU, C.H. LI, A.T. HANBICKI, B.T. JONKER, Naval Research Laboratory, Washington DC, M. KORKUSINSKI, P. HAWRYLAK, Institute for Microstructural Sciences NRC, Ottawa — We have studied the emission spectra from InAs quantum dots (QDs) under the following conditions: a) recombination of spin-polarized electrons with unpolarized holes; b) recombination of spin-polarized electrons with spin-polarized holes. In the first experiment (a), we recorded the electroluminescence from Fe/GaAs n-i-p spin-LEDs which incorporate a single layer of InAs QDs at the center of the intrinsic region of the device. In the second experiment (b), we studied the photoluminescence spectra from a similar undoped heterostructure using optical pumping. In both experiments, in addition to the typical shell structure of the emission spectra, new polarization maxima are observed on the high and low energy sides of the shell emission features as a result of the imbalance between the two spin populations of the carriers. These results are compared with a calculation for the case of two and six electron-hole occupancy of the QDs.

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