Abstract Submitted
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Towards Electrical Spin Injection into a Single InAs/GaAs Quantum Dot[1] C. H. LI, G. KIOSEOGLOU, A. T. HANBICKI, O. M. J. VAN 'T ERVE, B. T. JONKER, Naval Research Lab — We aim to isolate emission from a single InAs/GaAs self-assembled QD to elucidate the details of electrical spin injection from an Fe Schottky contact and consequent spin polarization in QDs. MBE growth methods have been developed to reduce the dot density to the order of $10^8/\mathrm{cm}^2$, which in turn also increases the uniformity of the dots, allowing us to resolve their atomic-like s, p, d, f... quantum confined states. The aperture sizes of the surface-emitting LEDs are also reduced to the order of a hundred nanometers using ebeam lithography. As the density and aperture size decrease, the initially broad emission spectrum of the dot ensemble [1] breaks into distinct narrow features attributed to single dot emission at low biases. With increasing bias, the number of peaks increases and their linewidth broadens, suggesting contributions from emission from an increasing number of dots and/or from various charge states of the dot. At even higher bias, the sets of peaks merge and approach broad emissions. Progress towards electrical spin injection into a single QD, and details of the electroluminescence spectra as a function of bias and magnetic field will be discussed at the meeting. [1] C. H. Li et al. APL **86**, 132503 (2005).

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