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Single Dot Optically Detected Resonance Spectroscopy of Interface Fluctuation Quantum Dots[1] V.R. WHITESIDE, C.J. MEINING, A.V. STIER, B.D. MCCOMBE, SUNY at Buffalo, J.G. TISCHLER, A.S. BRACKER, D. GAMMON, Naval Research Laboratory — We report magnetic field (0 – 10T) single dot photoluminescence (PL) and optically detected resonance (ODR) experiments of interface fluctuation quantum dots (IFQDs) for a 2.8nm GaAs/AlGaAs quantum well (QW) that has been doped with Si donors (in the barriers) to allow creation of both neutral excitons and negatively charged excitons, a.k.a. trions. Each dot has a signature ODR line shape throughout the magnetic field range studied. Three different line shapes are observed; the interpretation of these line shapes will be discussed. Upon comparison of the single dot ODR to the ensemble ODR, we find the single dots' relative ODR signal follows the ensemble's but is three times larger. Combining the single dot ODR measurements with the diamagnetic shift and Zeeman splitting results, it is possible to assign an observed spectral line to either a charged or neutral exciton. Our results indicate that the diamagnetic shift of the trion is smaller than that of the neutral exciton. This is attributed to the larger spatial extent of the trion wavefunction.

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