

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Fine Structure of PbSe Colloidal Nanostructures J.G. TISCHLER, T.A. KENNEDY, E.R. GLASER, E.E. FOOS, T.J. ZEGA, R.M. STROUD, AL.L. EFROS, S.C. ERWIN — Although much work has been done on PbSe nanocrystals in order to understand excited states, little is known of the ground state fine structure. Bulk PbSe is an unusual semiconductor material with a direct band gap at the L point. The band structure at this symmetry point is four-fold degenerate for both electrons and light holes, and conduction and valence bands possess similar effective masses and g-factors. In this work, we synthesized high quality PbSe nanocrystals and characterized them using transmission electron microscopy and optical methods. We probed the g-factors and fine structure of excitons in undoped PbSe quantum dots using optically detected magnetic resonance (ODMR) at 24 GHz and polarized photoluminescence in a magnetic field. The results show that the dark states in this system are active even in the absence of external magnetic fields mainly due to thermal population.

Joseph Tischler
Naval Research Laboratory

Date submitted: 21 Nov 2008

Electronic form version 1.4