

Abstract Submitted
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Magneto-optical spectroscopy of single CdSe nanocrystal quantum dots H. HTOON, V. I. KLIMOV, Chemistry Division, Los Alamos National Laboratory, New Mexico, M. FURIS, S. A. CROOKER, National High Magnetic Field Laboratory, Los Alamos, New Mexico — Understanding the spin structure of excitons within nanocrystal quantum dots (NCs) is important on both fundamental grounds and also for technological spintronic applications. While single-NC photoluminescence (PL) studies have become routine, there are no reports of spin-resolved magneto-PL studies with single-NC sensitivity. To this end, we measure low temperature (4 K), polarization resolved, magneto-PL of individual CdSe NCs to 5 Tesla. We clearly observe an energy splitting between left- and right-circularly polarized PL peaks and a strong degree of circular polarization in a subset (<10%) of the studied NCs. We attribute this effect to a Zeeman splitting of spin-up and spin-down excitons in those NCs having wurzite-c axes aligned parallel to the applied magnetic field. Our data reveal that 5T Zeeman splittings vary widely from one NC to another, occasionally reaching values in excess of 2 meV. We compare the results from many single nanocrystals with magneto-PL measurements of NC ensembles.

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