Abstract Submitted
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Tunable carrier spin polarization in PbMnS throught quantum confinement[1] GEN LONG, HONGWANG ZHANG, HUI XING, BIPLOB BARMAN, YUTSUNG TSAI, ATHOS PETROU, HAO ZENG, Department of Physics, University at Buffalo-SUNY — We report magneto-photoluminescence studies on manganese-doped lead sulfide ($Pb_{1-x}Mn_xS$, x = 0 to 5%) quantum dot system synthesized by solution-phase chemical method. The size (3 to 15nm), temperature (7K to 100K), magnetic field (0 to 7T), and laser power dependence (1mW to 20mW) of photoluminescence were systematically investigated, with a focus on carrier spin polarization. Depending on the sizes and growth conditions, the spin polarization can be tuned from being positive to negative. Core/shell structured quantum dots with Mn^{2+}ions doped in the core or shell were also studied. The sign change in the spin polarization suggests tunable exchange interactions caused by quantum confinement effect and wave function engineering through heterostructure design.

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