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Time Resolved Kerr Rotation Studies on Sub-monolayer Type-II ZnTe/ZnSe Quantum Dots[1] VASILIOS DELIGIANNAKIS, Department of Physics City College of New York, CUNY, NY 10031, SIDDHARTH DHOMKAR, HAOJIE JI, BIDISHA ROY, Department of Physics Queens College, CUNY, NY 11367, DANIELA PAGLIERO, Department of Physics City College of New York, CUNY, NY 10031, IGOR L. KUSKOVSKY, Department of Physics Queens College, CUNY, NY 11367, MARIA C. TAMARGO, Department of Chemistry City College of New York, CUNY, NY 10031, CARLOS A. MERILES, Department of Physics City College of New York, CUNY, NY 10031 — Semiconductor quantum dot (QD) systems have been proposed as possible candidates to store and transport quantum information. Systems with a type-II band alignment are of particular interest due to the spatial separation of electrons and holes. Yet, there is very little work that has been reported on the spin dynamics of type-II QDs. Here we report time resolved Kerr rotation (TRKR) measurements on sub-monolayer type-II ZnTe/ZnSe QDs. The TRKR results for three samples indicate that there is an increase spin lifetime with higher QD density. The spin relaxation rates increased with decreasing temperature. This behavior has been reported for undoped II-VI materials. In the low carrier density region, electron-hole exchange interaction is dominant at low temperatures. However, this enhanced relaxation rate with decreasing temperature is suppressed in samples with the highest quantum dot density, suggesting that the presence of type-II nanoislands modify the spin relaxation behavior in these materials.

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