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Slow Exciton Spin Relaxation in Single Self-Assembled $In_{1-x}Ga_xAs/GaAs$ Quantum Dots LIXIN HE, HAI WEI, G.-C. GUO, University of Science and Technology of China — We calculate the acoustic phonon-assisted exciton spin relaxation in single self-assembled $In_{1-x}Ga_xAs/GaAs$ quantum dots using an atomic empirical pseudopotential method. We show that the transition from bright to dark exciton states is induced by Coulomb correlation effects. The exciton spin relaxation time obtained from sophisticated configuration interaction calculations is approximately 15–55 μs in pure InAs/GaAs QDs and even longer in alloy dots. These results is more than three orders of magnitudes longer than previous theoretical and experimental results (a few ns), but agree with more recent experiments that suggest that excitons have long spin relaxation times (> 1 μs).

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