

Modeling of exciton exchange interaction in GaAs/AlGaAs quantum wells

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In this work, we study the exchange interactions between two excitons in the GaAs/AlGaAs quantum wells of various widths. We numerically solved the Schrödinger equation for an exciton in a quantum well to find the two-exciton wave functions and to calculate the exchange integral. The results suggest that the strongest interactions between excitons occur in the quantum wells of widths of about 40–50 nm, with the exchange energy being of about of $9 \mu\text{eV}$ for an exciton density of $1/\mu\text{m}^2$.

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