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The International Debate on Magneto-Stark effect on Exciton in Parabolic bandGaAs/ Ga0.7Al0.3 As Quantum well Hetrostructure

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The effects applied crossed electric and magnetic fields on the heterostructure semiconductor is used as scientific investigation on electronic and optical exciton properties. The aim of this work is to study the magneto-Stark effect for confined excitons in single GaAs-Ga0.7Al0.3 As QWs. The magnetic field B is taken as perpendicular to the z-growth direction of the heterostructure, whereas the applied electric field E is along the z-growth direction. The data we used intrinsic parameters of the systems and manipulated external magnetic and electric fields. The model equation we used variational non degenerate parabolic band approximations using 1s hydrogen like ion ground state to calculate the position at which spatial distance b/n electron and hole(Δ=0) i.e overlap e-h occurred where $B\rightarrow\infty$ and $E\rightarrow 0$ and we used Matlab version R2017a simulate our result as it depicted in graphs. As electric field (E) increases along growth z-direction the spatial distance(Δ) increases due to a reduction of Coulomb interaction b/n e–h. While increasing the magnetic field (B) perpendicular to the growth z-direction has the reverse effect and shrinks the wave function in the QW plane. This shrinkage enhances the e–h interaction which, in turn, leads to a more likely localize the electron within the same QW as the whole and thus the ground state kept in a direct exciton which is efficient in photonics.

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