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Internal transitions of singlet and triplet charged excitons in quantum dots[1] A. DZYUBENKO, California State University Bakersfield, A. SIVACHENKO, Ariadne Genomics Inc. — We theoretically studied the spectra of internal transitions of spin-singlet and spin-triplet charged excitons X^- in quantum dots in finite magnetic fields. The lateral confinement in quantum dots was modeled by a parabolic potential. Both equal and different oscillator lengths for electrons and holes were considered. The states of charged excitons were found using the expansion in Fock-Darwin in-plane states and in size-quantization levels in quantum wells of different widths. We performed systematic studies of the spectra dependencies on the quantum well width, on the regime of lateral confinement, and on the magnetic field strength. In the absence of lateral confinement, the spectra of internal transitions are governed by an exact optical selection rule that follows from the rotational symmetry and magnetic translations. The selection rule prohibits, in particular, a triplet bound-to-bound inter-Landau level transition with energies below the electron cyclotron resonance. When the magnetic translational symmetry is broken by the lateral confinement, the previously prohibited transitions become allowed and acquire finite oscillator strengths. We compare our theoretical results with the existing experimental data on internal excitonic transitions in interface fluctuation quantum dots in GaAs QWs.

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