

HARTREE–FOCK PROBLEM OF ELECTRON-HOLE PAIR IN QUANTUM WELL GaN

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S u m m a r y

We present microscopic calculations of the absorption spectra for GaN/Al_xGa_{1-x}N quantum well systems. Whereas the quantum well structures with the parabolic law of dispersion exhibit the usual bleaching of an exciton resonance without shifting a spectral position, the significant red-shift of an exciton peak is found with increasing the electron-hole gas density for a wurtzite quantum well. The energy of the exciton resonance for a wurtzite quantum well is found. The obtained results can be explained by the influence of the valence band structure on quantum confinement effects. The optical gain spectrum in the Hartree–Fock approximation and the Sommerfeld enhancement are calculated. A red shift of the gain spectrum in the Hartree–Fock approximation with respect to the Hartree gain spectrum is found.