

The Bihole in Quantum Well Structures

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Abstract

In GaAs–Ga_{1-x}Al_xAs many quantum well structures or superlattices the top valence subband VB1 of size quantization is heavy-hole-like HH1 and the effective mass m_1 is positive. The second valence subband VB2 has a heavy-hole – HH2 or light-hole – LH1 character in dependence on the barrier and well layer thicknesses and the composition x . The effective mass m_2 in VB2 is negative and the condition for bihole formation $m_1 > ||m_2||$ is fulfilled. The binding energy of the bihole is calculated. The bihole formation due to light absorption is studied. The oscillator strengths in the cases of inter- and intrasubband transitions of holes succeeded by bihole formation are obtained.