

Band Structure Computation of GaMnAs Using the Multiband k.p Theory

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Abstract : Recently, GaMnAs diluted magnetic semiconductors(DMSs) have received considerable attention because they combine semiconductor and magnetic properties. GaMnAs has been used as a model DMS and as a test bed for many concepts and functionalities of spintronic devices. In this paper, a theoretical study on the band structure of GaMnAs will be presented. The model that we used in this study is the 8-band k.p method where spin-orbit interaction, spin splitting, and strain are considered. The band structure of GaMnAs will be calculated in different directions in the reciprocal space. The effect of manganese content on the GaMnAs band structure will be discussed. Also, the influence of strain, which varied continuously from tensile to compressive, on the different bands will be studied.

Keywords : band structure, diluted magnetic semiconductor, k.p method, strain

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