

Calculation Of Energy Gap Of (Ga,Mn)As Diluted Magnetic Semiconductor From The Eight-Band k.p Model

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Abstract : Now a days (Ga, Mn) is one of the most extensively studied and best understood diluted magnetic semiconductors. Also, the study of (Ga, Mn)As is a fervent research area since it allows to explore of a variety of novel functionalities and spintronics concepts that could be implemented in the future. In this work, we will calculate the energy gap of (Ga, Mn)As using the eight-band model. In the Hamiltonian, the effects of spin-orbit, spin-splitting, and strain will be considered. The dependence of the energy gap on Mn content, and the effect of the strain, which is varied continuously from tensile to compressive, will be studied. Finally, analytical expressions for the (Ga, Mn)As energy band gap, taking into account both parameters (Mn concentration and strain), will be provided.

Keywords : energy gap, diluted magnetic semiconductors, k.p method, strain

Conference Title : ICIPC 2022 : International Conference on Information, Physics and Computation

Conference Location : Bali, Indonesia

Conference Dates : October 20-21, 2022