

Many-Body Effect on Optical Gain of n+ Doping Tensile-Strained Ge/GeSiSn Quantum Wells

Authors : W. J. Fan, B. S. Ma

Abstract : The many-body effect on band structure and optical gain of n+ doping tensile-strained Ge/GeSiSn quantum wells are investigated by using an 8-band $k \cdot p$ method. Phase diagram of Ge/GeSiSn quantum well is obtained. The E-k dispersion curves, band gap renormalization and optical gain spectra including many-body effect will be calculated and discussed. We find that the $k \cdot p$ method without many-body effect will overestimate the optical gain and transition energy.

Keywords : Si photonics, many-body effect, optical gain, Ge-on-Si, Quantum well

Conference Title : ICOP 2014 : International Conference on Optics and Photonics

Conference Location : Kyoto, Japan

Conference Dates : November 13-14, 2014