Analysis of Effect of Number of Quantum Dot Layers on Static Characteristics InAs/InP Quantum Dot Laser

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In this paper the behavior of InAs/InP quantum dot semiconductor lasers in 1.55µm by considering excited and ground state and effects gain homogeneous broadening and inhomogeneous broadening will be simulate by implementing rate equations. The simulation results indicates increasing in injected current when direct relaxation channel between wetting state and ground state is considered, there is no effect of ground state saturation. In addition, the excited state lasing will appear in 1.42µm. in the following, by examining the number of quantum dot layers, the quantum efficiency will enhance by increase in quantum dot layers but the threshold current will increase too.

Keywords: Gain optical .Inhomogeneous broadening .Quantum dot laser .Rate equations

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InAs/InP

In this paper, the behavior of InAs/InP quantum dot semiconductor lasers in 1.55 µm is considered. The simulation results indicate that increasing the number of quantum dot layers enhances the quantum efficiency, but the threshold current also increases. In addition, the excited state lasing appears at 1.42 µm. By examining the number of quantum dot layers, the quantum efficiency increases with an increase in the number of quantum dot layers. However, the threshold current also increases.