Coupled-Cavity Bottom-Emitting VCSELs

Presentation for the Master of Science in Engineering Degree
by M.Sc.Eng. Student Morten Stilling

Abstract

The theory behind the optical field in rotationally symmetric semiconductor structures has been examined.

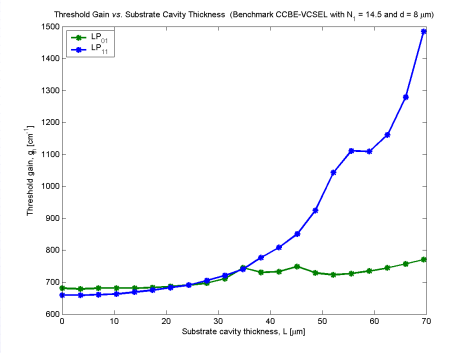
A 1-dimensional and a 3-dimensional optical field model have been developed and implemented in MATLAB. The models do not consider electrical or thermal effects. The 3-dimensional model is capable of describing diffraction effects in *coupled-cavity bottom-emitting vertical-cavity surface-emitting lasers* (CCBE-VCSELs). The model has been tested, and it has been concluded that it provides reasonable predictions for the resonance wavelengths and threshold gains of oxide-confined CCBE-VCSELs.

The optical properties of such CCBE-VCSELs have been examined using the two optical field models. It has been concluded, that single-longitudinal-, single-transverse-mode operation is possible for oxide-confined CCBE-VCSELs operating under continuous wave (CW) conditions at high output powers.

The presentation will provide an overview of these subjects, and the conclusions reached during the project will be discussed.

About the Project

The master of science in engineering project has been performed in cooperation with Odense University College of Engineering, Research Center COM at the Technical University of Denmark and Alight Technologies from February 2003 to January 2004. The thesis was handed in on January 30th 2004.



The presentation will take place at Odense University College of Engineering, Room D116
Friday the 20th of February 2004 at 13:00 (Duration: 45 minutes)