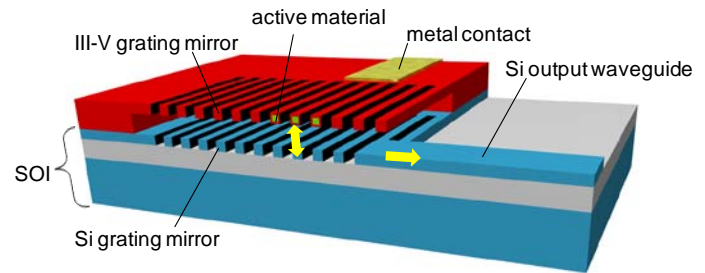


B.Sc. Thesis Project

Modeling of nano/micro lasers

Coherent light generation (stimulated emission) in semiconductor laser diodes involves interaction of three physical systems: photonic, electronic, and thermal systems. As the size of laser structures gets smaller, e.g., to a size comparable to the emission wavelength of the lasers, the three systems influence each other in a much closer way and this

interaction determines the performance of lasers such as energy consumption, output power, and high speed operation. The approximation and simplification used for the modeling of relatively large laser diode structures may not be accurate any longer in these small lasers. The main motivation of this project is that we would like to model this nano/micro lasers by including all photonic, electronic, and thermal systems. Then, we can better understand and investigate interesting physical properties of various types of nano/micro lasers.



Specifically, this project involves:

- Deep study of laser physics: You will study and learn fundamentals of laser physics including all photonic, electronic, and thermal aspects. What you will do is an art of combining these three systems in a beautiful way.
- Numerical simulation: Based on the study, you will do the modeling by using numerical simulation. MATLAB will be mainly used for this.
- Concrete application: The nano/micro lasers are a key device for near future applications such as next-generation computer chips with optical buses; and photonic chips. At DTU Fotonik, we have a big NATEC center and two FTP project in relation to this field.

The scope and content of the project can be tailored, depending on the interest and background of a student. For further information or any question, don't hesitate to contact supervisors.

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