

## **Semiconductor Laser Instabilities and Dynamics**

**SCOPE:** The course introduces a hierarchy of models for nonlinear dynamical effects in semiconductor lasers and discusses their basic properties and mathematical solutions. These solutions are closely related to prominent effects in real devices, with particular relevance for optical data communication. Among such devices are semiconductor lasers with feedback, multi-section distributed feedback lasers, and coupled lasers. The effects range from modulation response properties, to various dynamical instabilities leading to self pulsations, to synchronization phenomena, e.g., frequency entrainment.

### **BENEFITS AND LEARNING OBJECTIVES**

This course will enable you to:

- understand the basic principles of laser dynamics
- know how to model nonlinear laser effects
- categorize and explain laser instabilities

### **INTENDED AUDIENCE**

Students, device engineers, and researchers who are interested in a deeper understanding of semiconductor lasers

### **COURSE LEVEL**

Advanced

### **INSTRUCTOR**

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