

NUSOD 2010 Short Course 102 by Uwe Bandelow

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

Uwe Bandelow is the head of research group “Laserdynamics” at the Weierstrass Institute (WIAS) in Berlin, Germany. He received his Ph.D. in Theoretical Physics from Humboldt University Berlin in 1994.