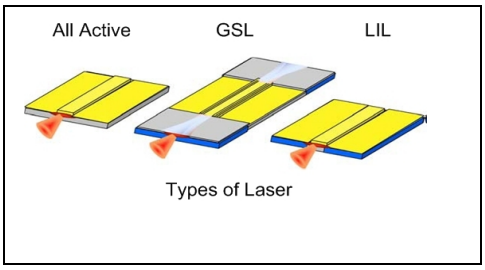
Ultra Fast and High Energy Semi Conductor Lasers

Introduction

Short and/or intensive laser pulses are useful in a number of applications including:

- Rangefinding.
- 3D imaging
- Optical communications technologies.
- Printing technologies.
- Optical clock distribution



Types of Laser

Numerical Modelling

Numerical modelling in optoelectronics is becoming very important as a cheaper and more reliable alternative to costly product development by trial and error, which became particularly relevant after the burst of the telecomms bubble at the start of this decade.

Within the physical layer group at the Department of Electronics, University of York, we perform extensive numerical modelling of specialist semiconductor laser sources and amplifiers, which heavily rely on the use of the White Rose Grid. The main thrust of the work is design and optimisation of high-power and/or ultrashort pulse sources; examples involved:

- Optimisation of a short-pulse laser source for applications in commercial LLDARs (Laser radars) (Ryvkin, Avrutin, and Kostamovaara 2009).
- Design of advanced high-power, high-brightness laser constructions using the semiconductor intermixing technology for use in laser printers, amplifier pumping in communications, etc. (Russell, Avrutin, Yanson 2008)
- Detailed analysis and mapping of complex dynamics of mode-locked semiconductor lasers under external optical feedback and methods of feedback elimination (Avrutin and Russell 2009, Avrutin, Song and Russell 2008), a topic that is expected to become extremely relevant for the future high-frequency optoelectronic clock generators.
- Analysis and construction and operating regime optimisation of linear optical amplifiers for use in future metropolitan area optical communications (Song and Avrutin 2007).

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Further Information

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