Faculty of Electrical Engineering & Computer Science
Master Degree Course Electronics Engineering, MSc EE

HSB
Hochschule Bremen
City University of Applied Sciences

Master 2016

Ms. Neelima Priyadarsini Mekala

Investigation on Semiconductor Optical Sources.

ABSTRACT - Masterthesis

Light is abundant in nature. Sun is the most important light source which can be available in nature. Some of the approaches to generate light are combustion, incandescent (most popular is incandescent bulb), luminescence, electroluminescence (where light is generated when an electric field is applied to a material), bioluminescence.

An important example is injection electroluminescence which occurs when electric current is injected into a forward biased semiconductor junction such as in Light emitting diode (LED). Other approach is Photo luminescence in which light is emitted by a sample following the absorption of optical photons (glow emitted when certain materials is exposed to ultraviolet light).

Optical sources for fiber communication should be such a way that they should have narrow spectral width, could switch on/off in a rapid rate so that they can modulate and send information in optical form with more efficient way. Important features of optical sources which are used in fiber communication are emission with in low loss window of the fiber, narrow spectral width, capability to couple adequate power to the fiber, linearity of modulation, High modulation speed and High reliability ruggedness.

In order to make the optical sources compatible to optical transmission system and in optical sensor technology semiconductor optical sources are used. These semiconductor optical sources integrate with electronic modulation circuits to satisfy the above features used in fiber communication.

Here in this thesis semiconductor optical sources are investigated. The optical sources chosen for investigation are FP laser (FP)-Lasertron QLM 1300, Distributed Feedback (DFB)-Philips CQF 62, Superluminescent diode (SLD)-Superlum SLD.

The optical components are implemented by using the specifications given in the data sheets. It also includes fiber splicing through Arc fusion, soldering of measurement kits with the three optical sources. Comparisons of three optical components by taking the power current characteristics and frequency spectrum with different temperature and injection currents are observed.