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Investigations on Superluminescent Light Emitting Diodes

ABSTRACT - Masterthesis

Superluminescent diodes (SLD's) became the preferred candidate for specific applications such as optical coherence tomography (OCT's), sources wavelength division multiplexers (WDM), surface imaging technology, fiber optics gyroscopes.

We have investigated the SLD 76 MP 1 fundamental parameters. We found that the SLD's principal properties are high output power, a broad optical spectrum with a low coherence length, a relatively small degree of polarisation, that it could be easily coupled to a single mode fiber and modulated up to 200 Mbit/s without major difficulties. We have compared the SLD with other semiconductor sources of light and found that the influence of carrier density changes during operation in the SLD performance is dominating. The SLD output power could reach comparable levels to laser diodes in the future [1] when powerful index guided SLD inherent spectral modulation of gain will be overcome.

The SLD's applications will increase in future, boosted by the increasing demands (medical, civil engineering, industrial metrology, optical communication systems i.e. spectrum slicing in WDM) by improving SLD's fundamental characteristics implementing new structures.

[1] Mitsuru Sugo and Yasuo Shibata; "High-power and Wide-band 1.3- μ m Super Luminescent Diode for Optical Coherence Tomography" Vol. 3 No. 8 Aug. 2005 NTT Technical Review