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Operation of Chirp Managed Lasers (CML).

ABSTRACT - Masterthesis

As the communication technology grows, its requirements, such as telephone systems and cable TV systems or internet lines are also increasing. Wired communication has its own significance but as the demand of bandwidth increases it's not any more possible to pass it through coaxial wire because of its huge losses at high frequencies. The best alternative is optical fiber because of its low losses, high speed and compatibility. With fiber optics we can achieve high bandwidth, long distances and low operational power [2].

In recent years, optical communication systems employing external modulation have gained much attention. However, this kind of system usually requires DCMs (Dispersion Compensation Modules) to compensate the dispersion introduced by the fiber as the signal travels through long distances. For this reason a CML (Chirp Managed Laser) which is a new technology based on direct modulation, has captured the attention of the optical communication industry. The CML has several advantages such as compactness, simple design, smaller foot-print, lower power consumption and higher output power etc. over the externally modulated transmitters [3]. In a CML, a DFB (Distributed Feedback Laser) is biased high above threshold and modulated with a small modulation swing. An optical band pass filter known as OSR (Optical Spectrum Reshaper) is used to increase the extinction ratio. In addition proper setting of the adiabatic chirp results in a destructive interference preventing '0' bit from accumulating more power thus preventing intersymbol interference (ISI) [3].

In this thesis, the modulation characteristics of a CML module, the operational parameters, the system limitations and the working principles of a CML module have been investigated.