

**LINEAR CAVITY ERBIUM DOPED TUNABLE FIBER LASER**

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## **ABSTRACT**

### **LINEAR CAVITY ERBIUM DOPED TUNABLE FIBER LASER**

A 4-meter length of erbium doped fiber (EDF), which pumped from 980nm laser diode, was used as a gain medium in the construction of a fiber laser using linear cavity configuration in different position of coupler and tunable bandpass filter (TBF). A mechanical tunable bandpass filter with 3dB bandwidth of about 1.0nm and tuning resolution of 0.01nm was inserted in the cavity for tuning ability and the determination of the central wavelength of the laser output [2]. The characteristics of the output power with laser diode pump power are discussed. The output signal wavelength of the erbium doped fiber laser was broadly tuned over 35nm across the 1550nm optical C-band. The fiber laser performance and the quality of the signal generated were measured by using optical spectrum analyzer (OSA). The output characteristics of the laser were determined in term of threshold level, slope efficiency and signal-to-noise ratio.

## CHAPTER 1

### INTRODUCTION

The modern photonics industry began in earnest in 1960, with the invention of the laser, followed in the late 1970's by the perfection of optical fibers as an effective means of transmitting information using these intense laser beams [1]. One of the component or important application in Photonics field is the fundamental of optical fiber that are basic thing for telecommunication system. The relationship between light and fiber optic can be simply explained by comparing electronic communication technology where the cable used is a copper, which transmit a signal or information by electric charges. But in photonic industry a copper is replaced by a fiber optic as a carrier medium transmitting signal or information by light. In other words, photonic industry is a technology which based on light (photon) meanwhile electronically technology by using electric current.

Although, manipulation of light also applied in other fields such as communication, industry, sensor, medical, and cosmetic surgery, but the most area which obtain more benefit is usable in telecommunication system [1]. Fiber optic is a carrier medium of light. Optical fibers are mostly very thin and usually made from glass and silica that about eight micrometer or  $10^{-6}$  meter. It have many advantage by using light cause it can