ERBIUM DOPED FIBER LASER

Project Report is presented in partial fulfillment for the award of the Bachelor of Electrical Engineering (Hons.)

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ABSTRACT

Fiber optic is widely used in communication because of their high speed, flexibility and capability. Fiber lasers are waveguiding structures. It can be use as an amplifier and to produce Laser in the communication systems. Its have major impact on the topology of optical communication systems and allows information technology to be accessed by a greater portion of population.

This project concentrates on the use of fiber optic (Erbium doped) as an *active medium to produce laser* using the fiber. The component for amplification is Erbium Doped Fiber Amplifier (EDFA) while the latter is known as Erbium Doped Fiber Laser (EDFL) or in other word is "fiber laser".

This project concentrate on the basic concept of laser principles and optical fiber laser technology. The main objective of this project is to determine the effect of the output power characteristic against *pump power, Erbium doped fiber (EDF) length and tap percentage (coupler ratio)* of EDFL. The project was carried out using *EDFA_design software*. EDFA_Design software is produce by Optiwave Corporation.

TABLE OF CONTENTS

CONTENTS		PAGE
TITLE		i
DIDICATION		ii
DECLARATION		iii
ACKNOWLEDGEMENT		iv
ABSTRACT		v
TABLE OF CONTENTS		vi
LIST OF FIGURES		viii
LIST OF TABLE		xi
ABBREVIATION		xii
CHAPTER 1	INTRODUCTION	
1.1	The Modern Telecommunication System	1
1.1.1	History of Optical Communication	2
1.1.2	Basic Optical Communication	3
1.1.3	The Fundamental of Fiber Optic	5
1.1.4	Light Transmission In Fiber Optic	6
1.1.5	Erbium Doped Fiber Laser (EDFL)	7
1.2	Objective of The Project	9
1.3	Comparisons Between Fiber Laser and Other Optical Source	10
CHAPTER 2	THEORY	
2.1	Introduction	12
2.2	The Properties of Laser Light	13
2.3	Energy Level	14
2.4	Laser Principles	16
2.5	Principle of Laser In Erbium Doped Fiber Laser (EDFL)	19
2.6	Characteristic of Fiber Lasers	21
2.7	EDFL Design Configuration and Operation	22

CHAPTER 1

INTRODUCTION

1.1 The Modern Telecommunication System

The simplest form of basic communications system can be describe as in Figure 1.1. It is consists of transmitter, receiver and connected by information channel. At the transmitter, the information signal is transferred into electrical form through modulation process. Then, the signal travels from the transmitter to the receiver over the information channel.

The information channel can be divided into two categories; firstly unguided channel and secondly guided channel. The atmosphere is an example of an unguided channel over which waves can propagate. Examples of systems using atmospheric channels are radio and television broadcast, microwave relay links and satellite communication system. The examples of guided channels are coaxial cables (conductor/metallic) and fiber optic cables. The Guided channels have the advantages of privacy, signal not effected by weather, and the ability to convey messages within, under and around physical structures.

The third component of the modern telecommunication system is the receiver. At the receiver, information signal was amplified. Then the signal is converted to the original information signal through the demodulation process at the end of the receiver.

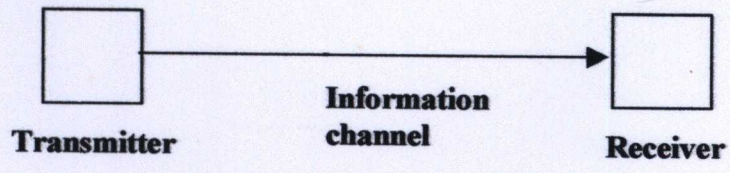


Figure 1.1: The basic communications system