

Contents

CHAPTER ONE

PHYSICAL CONCEPTES

1-1 Introduction.....	1
1-2 Nature of light.....	2
1-3 Light polarization.....	3
1-3-1 Linear polarization.....	3
1-3-2 Circular polarization.....	4
1-3-3 Elliptical polarization.....	6
1-3-4 Production of polarized light.....	7
1-3-4-1 Polarization by selective absorption.....	7
1-3-4-2 Polarization by reflection.....	8
1-3-4-3 Polarization by scattering.....	10
1-3-4-4 Polarization with two refractive indices.....	11
1- 4 Optical modulation.....	11
1-5 Modulation parameters.....	11
1-5-1 Phase modulation.....	12
1-5-2 Polarization modulation.....	13
1-5-3 Amplitude modulation.....	14

1-5-4 Frequency modulation.....	14
1-6 Modulator.....	15
1-7 Kerr effect.....	16
1-8 Laser physics.....	17
1-9 Types of laser.....	19
A\ Gas laser.....	19
B\ Solid state laser.....	19
C\ Semiconductor laser.....	20
D\ Dye laser.....	20
1-10 Laser properties.....	21
1-10-1 Monochromaticity.....	21
1-10-2 Collimation.....	21
1-10-3 Coherence.....	22
A\ Temporal coherence.....	22
B\ Spatial coherence.....	22
1-10-4 Power.....	23
1-11 Laser in communications.....	23
1-11-1 Laser attenuation.....	24
1-11-2 Atmospheric absorption.....	24
1-11-3 Atmospheric scattering.....	25
1-11-4 Raleigh scattering	25
1-11-5 Non selective scattering.....	25

1-12 Principal of detection.....	26
1-13 Photodetector.....	28
1-13-1 The PIN photodiode.....	29
1-13-2 Avalanche Photodiode (APD).....	30
1-13-3 MSM photodetector.....	30
1-14 Aim of the work.....	31

CHAPTER TWO

EXPERIMENTAL PART

2-1 Introduction.....	32
2-2 Experimental setup.....	32
2-2-1 Laser source.....	33
2-2-2 Kerr cell.....	33
2-2-3 Modulated laser receiver.....	34
2-2-4 Lenses.....	35
2-2-5 Power supply.....	36
2-2-6 Multimeter.....	36
2-2-7 Polarizer.....	36
2-2-8 Signal generator.....	37
2-3 Experimental procedure.....	37

CHAPTER THREE

RESULTS AND DISCUSSION

3-1 Introduction.....	40
3-2 The divergence of the He-Ne laser.....	40
3-3 Signal to noise ratio.....	42
3-4 Transmission of the beam.....	45
3-5 The attenuation of the beam.....	48
3-6 Modulation index.....	51
3-7 Future work.....	52
References.....	53