## **CONTENTS**

CHAPTER ONE : INTRODUCTION

1.1 Historical review	1
1.2 Aim and objective	2
CHAPTER TWO : SOME FUNDAMENTAL CONCEPTS IN QUANTUM	
OPTICS	
2.1 Introduction	6
2.2 Formulation of quantum mechanics	6
2.2.1 Hilbert space	7
2.2.2 Linear operators	9
2.2.3 Statistical states in quantum theory	11
2.3 Quantization of the harmonic oscillator	13
2.4 Equation of motion in quantum mechanics	21
2.5 The two level atom	24
${\bf CHAPTER\ THREE: INVESTIGATION\ OF\ ABSORPTION-DISPERSION}$	
RELATION WITH DIPOLE-DIPOLE INTERACTION	
(ON-RESONANCE CASE)	
3.1 Introduction	28
3.2 Master equation with dipole-dipole interactions	29
3.3 Absorption and dispersion spectrum	35
3.4 Results and discussions	38

## CHAPTER FOUR: INVESTIGATION OF ABSORPTION-DISPERSION RELATION WITHOUT DIPOLE-DIPOLE INTERACTION (OFF-RESONANCE CASE)

4.1 Introduction	51
4.2 Master equation without dipole-dipole interactions	53
4.3 Absorption and dispersion spectrum	62
4.4 Results and discussions	65

APPENDIX 90