



# CONTENTS

	PAGE
Preface to the Second Edition .....	xi
Preface .....	xiii

## CHAPTER 1 THE FORMATION OF QUANTUM CONCEPTS

1.1 Unsolved Problems in Classical Physics .....	1
1.2 The Concept of Quanta of Energy .....	7
1.3 The Concept of Quanta of Radiation .....	21
1.4 Elaborations of the Concept of Quanta.....	36
1.5 Applications of Quantum Conceptions to the Molecular Kinetic Theory .....	45

## CHAPTER 2 EARLY APPLICATIONS OF QUANTUM CONCEPTIONS TO LINE SPECTRA

2.1 Regularities in Line Spectra .....	65
2.2 Bohr's Theory of the Hydrogen Atom.....	70

## CHAPTER 3 THE OLDER QUANTUM THEORY

3.1 Quantum Conditions and the Adiabatic Principle .....	93
3.2 The Correspondence Principle.....	110
3.3 The Zeeman Effect and Multiplet Structure .....	118
3.4 Exclusion Principle and Spin .....	130

## CHAPTER 4 THE TRANSITION TO QUANTUM MECHANICS

4.1 Applications of Quantum Conceptions to Physical Optics .....	166
---	-----

4.2 The Philosophical Background of Nonclassical Interpretations .....	173
4.3 Nonclassical Interpretations of Optical Dispersion .....	186

## CHAPTER 5

### THE FORMATION OF QUANTUM MECHANICS

5.1 The Rise of Matrix Mechanics.....	208
5.2 Modifications of Matrix Mechanics .....	228
5.3 The Rise of Wave Mechanics.....	242

## CHAPTER 6

### STATISTICAL TRANSFORMATION THEORY

6.1 The Introduction of Probabilistic Interpretations .....	299
6.2 The Transformation Theory .....	309
6.3 The Statistical Transformation Theory in Hilbert Space.....	323

## CHAPTER 7

### THE COPENHAGEN INTERPRETATION

7.1 The Uncertainty Relations.....	343
7.2 Complementarity .....	360

## CHAPTER 8

### VALIDATION OF THE THEORY

8.1 Some Applications of the Theory .....	384
---	-----

## CHAPTER 9

### TWO FUNDAMENTAL PROBLEMS

9.1 Completeness .....	389
9.2 Observation and Measurement .....	392

Concluding Remarks .....	402
--------------------------	-----

Appendix A .....	407
------------------	-----

Appendix B .....	410
------------------	-----

Appendix C .....	412
------------------	-----

Bibliography.....	417
-------------------	-----

Name Index.....	429
-----------------	-----

