

# Modern Mathematical Physics

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March 21, 2022

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**Part I**

**Quantum mechanics**

# **Chapter 1**

## **Wave-particle duality**

**1.1 Particle properties of light**

**1.2 Wave properties of electrons**

**1.3 Atomic structure**

# **Chapter 2**

## **Quantization**

### **2.1 Interpretations of quantum physics**

### **2.2 Representation of CCR**

# **Chapter 3**

## **Schrödinger equation**

### **3.1 Time-independent potential**

### **3.2 Time-dependent potential**

# **Part II**

## **Statistical mechanics**



# **Chapter 4**

## **Thermodynamics**

**4.1 Equilibrium**

**4.2 Kinetic theory of gas**

**4.3 Ensembles**

# Chapter 5

## Quantum statistics

### 5.1 Fermions and Bosons

Two statistics Fermi sea Bose-Einstein condensation

### 5.2 Solid state physics

phonon

# Chapter 6

## Renormalization group

### 6.1 Phase transition

Magnetic models Ginzburg Landau theory

## **Part III**

# **Quantum field theory**

# **Chapter 7**

## **Perturbative field theory**

## **Chapter 8**

### **Non-perturbative field theory**

## **Chapter 9**

### **Nonabelian gauge theory**

## **Part IV**