An Introduction to Second Quantization and Path Integral in Statistical Mechanics

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1 Introduction

Second Quantization is the best way to describe the many-body quantum systems. We can construct the path integral method of Grand Canonical

2 Second Quantization

3 Coherent States for Bosons

4 Grassmann Number and Coherent States for Fermions

4.1 Grassmann Number

4.2 Coherent States

5 Path Integral Representation of Grand Canonical Partition Function

6 Matsubara Representation, Green Function and Bose/Fermi Distribution

6.1 Matsubara frequencies

6.2 Ensemble Average and Green Function

6.3 Bose/Fermi Distribution