

CHAPTER OVERVIEW

9: Many-Body Problems in Quantum Mechanics

In this final section we study a variety of problems in many-body quantum mechanics. First, we introduce the Hartree-Fock method for taking into account the effect of electron-electron interactions in atoms. Next, we describe spin waves in magnetic materials using the Heisenberg model. Third, we describe the behaviour of an atom interacting with photons in a cavity, and introduce the Jaynes-Cummings Hamiltonian. And finally, we take a brief look at the basic ideas behind quantum field theory.

[9.1: Interacting Electrons in Atomic Shells](#)

[9.2 Spin Waves in Solids](#)

[9.3: An Atom in a Cavity](#)

[9.4: Outlook: Quantum Field Theory](#)

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