Multi-Particle States II

Lecture 32

Physics 342
Quantum Mechanics I

Monday, April 19th, 2010

We continue with the implications of the spin-statistics connection for in-distinguishable two-particle states.

Homework

Reading: Griffiths, pp. 203–214.

Problem 32.1

Griffiths 5.11. Corrections to the energy spectrum of Helium.

Problem 32.2

Consider an infinite square well containing two (indistinguishable) non-interacting spin one bosons. If the combined spin state is $|00\rangle$, what is the ground state wavefunction and what energy does it have? (Use the Clebsch-Gordon table to determine the expression for $|00\rangle$ in terms of the two-particle spin states).

Problem 32.3

Two (noninteracting) electrons are in a harmonic oscillator potential. Find the ground state energy and express the full ground state wavefunction (i.e. give its expression in terms of the spatial variables x_1 and x_2, and the two-particle spin states, include all functional dependence, don't just write $\psi_5(x_1)\,\psi_7(x_2)$, for example) if the spin state is $|10\rangle$.