Practice Set-2

Phys 438/538: Atomic, Molecular and Optical Physics

February 18, 2016

Not to be graded

1) Consider a given state of a quantum system composed of two spin-1/2 particles which is expressed in a basis of total spin and total third component (i.e., z component) of spin as $|\psi\rangle = \frac{1}{2}|1,-1\rangle + \frac{1}{\sqrt{2}}|1,0\rangle - \frac{1}{2}|0,0\rangle$

a) What is the probability that one of the particles is spin up?

b) What is the probability that one of the particles is spin down and the other is spin up?

c) What is the probability that both particles are spin up?

d) What is the probability that both particles are spin down?

2) Calculate the Clebsch-Gordan table for the addition of a spin-1 particle with a spin-1/2 particle.