

731 Homework set 11 (due Dec. 2)

1. Hydrogen-like atom:

An atom of tritium is in its ground state, when the nucleus suddenly β -decays into a helium nucleus (${}^3\text{He}$) with the emission of a fast electron leaving the atom without perturbing the extra-nuclear electron.

- (a) Find the probability that the resulting He^+ ion will be left in a $1s$ state. (10 pts)
- (b) Find the probability that the He^+ will be left in a $2s$ state. (8 pts)
- (c) What is the selection rule for the l quantum number in this transition? (5 pts)

2. Angular momentum addition:

Sakurai's Problem 20, p. 245. (27 points).