

Reading: Griffiths, pages 140-160

1) Below is a table of Clebsch-Gordan coefficients.

TABLE 4.8: Clebsch-Gordan coefficients. (A square root sign is understood for every entry; the minus sign, if present, goes *outside* the radical.)

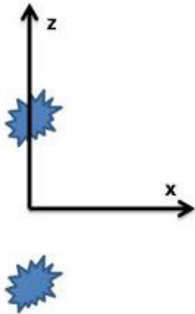
A particle of spin 1 and a particle of spin 2 are at rest in a box such that the box's spin is 3, and its z component is \hbar . If you measured the z component of the angular momentum of the spin-2 particle, what values might you get and what is the probability of each one?

- a) $-\hbar$ with $P=1/15$ or 0 with $P=8/15$ or \hbar with $P=6/15$
- b) $2\hbar$ with $P=1/15$ or $-\hbar$ with $P=1/3$ or $+\hbar$ with $P=3/5$
- c) $2\hbar$ with $P=1/15$ or \hbar with $P=8/15$ or 0 with $P=6/15$
- d) $-\hbar$ with $P=\sqrt{1/15}$ or 0 with $P=\sqrt{8/15}$ or \hbar with $P=\sqrt{6/15}$
- e) The table does not have an entry for this configuration

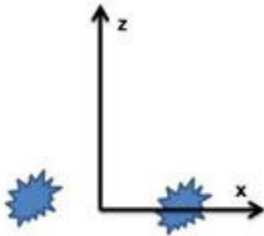
TURN OVER

2) A beam of electrons propagating along the y direction (into the page) in spin state $|\uparrow_z\rangle$ is sent through a Stern-Gerlach apparatus with a horizontal magnetic field gradient in the $-x$ direction. Which of the cloud patterns do you expect to see on a distant phosphor screen in the x - z plane?

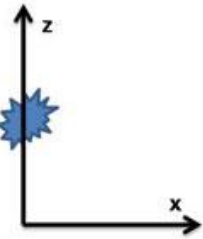
a)



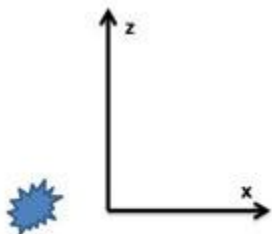
b)



c)



d)



e) none of the above