Units, units, units! Almost no one made it through the problem set without making a unit error. Not only do I think that we should all be able to check our own units by now, but most of those who made mistakes could have found them by reconciling their units. Good explanations of different systems of units can be found in Jackson’s or Griffith’s texts. See me if you need a copy. I was kind this time—But the next time . . . , well you were warned! (ok, I’ll be kind next time too, but after that . . . 😊)

Transition probabilities from $J = 0 \rightarrow J' = \text{anything}$. The branching ratios from a $J = 0, m_J = 0$ state to the different magnetic sub-levels of a $J' \neq 0$ are equal. Everyone should know this simple argument why this is true: The $J = 0$ state is spherically symmetric, there is no special direction. If the branching ratios were not equal, one magnetic sub-level would receive more of the population than the others. This means that the sample would acquire a polarization and have a preferred direction. But that’s nonsense, our choice of quantization axis is arbitrary so a preferred direction does not exist and the branching ratios must be equal.

—Damon