

The Zeeman effect

Preparatory questions

1. Draw a diagram that shows the effect of a weak magnetic field on the otherwise degenerate substates involved in the transitions which produce the green line (5460.7 \AA) and the yellow doublet (5769.6 \AA and 5790.7 \AA) of mercury. See Melissinos-,page 41,43 and 243.
2. Derive the Lande g-factors for the states involved in the production of these lines.
3. What would the Zeeman effect be on the 5461 \AA line if the gyromagnetic ratio of the electron were 1 instead of 2.001?
4. Estimate the Doppler width of the 5461 \AA line from the mercury lamp and compare it with the expected Zeeman splittings. Assume the temperature of the emitting vapor is 500 K.