

Quantum Physics, Preparation for Friday, Apr. 12

Study Moore Q14

I hope you can manage the entire chapter.

Presentations/Examples for Class

Let's do Q14R.2 and Q14R.3 in the next class. They both look fun. You don't need to prepare. We'll just set aside class time to puzzle through them. Perhaps you all will choose some other interesting problems from Q14 to challenge us.

For Problem Set 17

Reasoning about decays

In Sections Q14.2 and Q14.3, Moore makes quantum-mechanical energy-level-filling arguments that help us understand why some isotopes are stable, and what decays are preferred. I'll be frank and say that I don't remember how these arguments go! So I am looking forward to doing them too.

1. Q14B.2, p. 229, the decay of ${}^{12}_5\text{B}$.
2. Q14B.5, p. 229, the decay of ${}^{41}_{20}\text{Ca}$ (see also the next problem on electron capture)

β^+ Decay vs. Electron Capture

If a nucleus emits a positron (and a neutrino), then at the same time, a proton must turn into a neutron, or charge would not be conserved. A different process called electron capture also turns a proton into a neutron.

3. Q14B.6, p. 229, electron capture
4. Q14B.7, p. 229, β^+ decay

α Decay

5. Q14M.3, p. 229, α decay of Uranium into Thorium

The Hypothesis of the Neutrino

6. Q14M.5, p. 230, part (b) only