

Reading: Chapters 7 and 14.4

Problems:

1. Williams, Problem 7.5. In one of his considerations, Chadwick compared maximum velocities of protons and of nitrogen nuclei struck by the radiation from the alpha-beryllium reactions. He assumed that the radiation interacted elastically with the matter.
2. Williams, Problem 7.6. What is the mass defect of ${}^{12}_6\text{C}$?
3. Williams, Problem 7.8.
4. (a) In Coulomb scattering of 7.50-MeV protons by a target of ${}^7\text{Li}$, what is the energy of the elastically scattered protons at 90° ? (b) What is the energy of the inelastically scattered protons at 90° when the ${}^7\text{Li}$ is left in its first excited state at the excitation energy of 0.477 MeV above the ground state? The atomic mass of ${}^7\text{Li}$ is 7.016003 u.
5. The (n,p) reaction, $n + A \rightarrow p + B$, can be regarded as equivalent to β^+ decay in that the same initial and final nuclei are involved. Derive a general expression relating the Q -value of the (n,p) reaction to the energy release Q_{β^+} in β^+ decay.

Reminder!

An outline for your term paper, together with a list of research to be done, is due on Monday, Feb 24.