

Chapter 30: Nuclear Physics and Radioactivity

Giancoli Text Sections

- 30-1 Structure and Properties of the Nucleus
- 30-2 Binding Energy and Nuclear Forces
- 30-3 Radioactivity
- 30-4 Alpha Decay
- 30-5 Beta Decay
- 30-6 Gamma Decay

Summary

Chapter 30 focuses on the nucleus, the center of the atom. The structure and properties of the nucleus and its decay patterns are discussed.

Major Concepts

By the end of the chapter, you should understand each of the following and be able to demonstrate their understanding in problem applications as well as in conceptual situations.

- Nuclei
 - Nucleons
 - Atomic number
 - Mass number
 - Isotopes
 - Binding energy
 - Stability
- Nuclear forces
 - Strong force
 - Weak force
- Radioactivity
 - Alpha decay
 - Beta decay
 - Gamma decay

Formulas

$$1 \text{ u} = 1.6605 \times 10^{-27} \text{ kg} = 931.5 \text{ MeV}/c^2$$

$$\alpha \text{ particle } \quad {}^4_{+2}\text{He}^{++}$$

$$\beta \text{ particle } \quad {}^0_{-1}\text{e}^{-}$$

γ high energy radiation

$$\text{positron} \quad {}^0_{+1}\text{e}^{+}$$

$$\text{proton} \quad {}^1_{+1}\text{p}^{+}$$

$$\text{neutron} \quad {}^1_0\text{n}$$