9. Nuclear Physics
9.6 Gamma Decay
Gamma Decay

Very similar to atomic physics transitions

Nuclei have excited states similar to atoms

γ decays important in decays following α and β decays

Practical consequences

  Fission: Significant energy released in γ decays

  Radiotherapy: γ from Co-60 decays

  Medical imaging, e.g. Tc

  Studying γ emission to deduce spin and parity of excited states
Nuclear Spectroscopy

Every isotope has its characteristic γ-ray spectrum

Red: $^{60}\text{Ni}$ from the decay of $^{60}\text{Co}$
Blue: $^{137}\text{Ba}$ from the decay of $^{137}\text{Cs}$
Mössbauer effect

initial state

Recoiling nucleus

final state

\[ \Delta E = E_i - E_f \]