

Special Problem 6.2:

(a) Assume that π^- mesons are incident upon protons at a center-of-mass energy of about 1232 MeV so that the isospin- $\frac{3}{2}$ – spin- $\frac{3}{2}$ resonance (the $(\frac{3}{2}, \frac{3}{2})$ Δ resonance) dominates the scattering. Compute the ratio of the $\pi^- p \rightarrow \pi^- p$ and $\pi^- p \rightarrow \pi^0 n$ cross-sections.

(b) The Δ^+ resonance decays strongly (in of the order of 10^{-23} seconds) both to $n + \pi^+$ and to $p + \pi^0$. Find the ratio of the two production rates.