Particle and Nuclear Physics Module

Horizon Summer School

July 2021

Submission

Please submit your answers through this google form

Question 1

In the Decay Interactions given below, check if baryon, lepton, or flavor number is violated. Also state what kind of interaction it is (Strong, Weak or Electromagnetic).

1. Kaon decay: $K^+ \rightarrow \Pi^+ + \Pi^+ + \Pi^-$
2. Beta-minus decay: $n^+ \rightarrow p^+ + e^- + \bar{\nu}_e$
3. Lambda decay: $\Lambda^0 \rightarrow p^+ + \Pi^-$
4. Lambda decay: $\Lambda^0 \rightarrow n^0 + \Pi^0$

Question 2

Draw Feynman diagrams for the following;

1. Compton Scattering
2. Quark pair annihilation
3. Neutral Kaon to two-pion decay

Question 3

State the drawbacks of;

1. Liquid Drop Model
2. Shell Model

Question 4

A nucleus N_Z^A undergoes three alpha decays and 2 beta-plus decay. What is the number of protons and neutrons in final nucleus that is formed?