NUCLEAR AND PARTICLE PHYSICS
PHY 422/622

ASSIGNMENT I

(1) Consider the two-body hypothesis for beta decay—

$$n \rightarrow p + e^- .$$
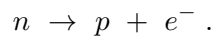
The observed energy spectrum of the electron is given below. Quantitatively argue how these two are incompatible with each other.
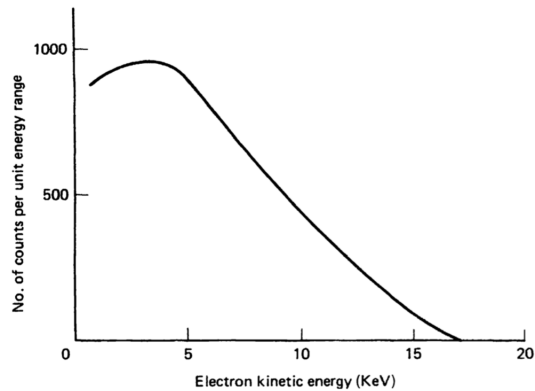
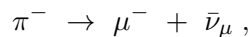(2) Particle k_1 hits particle k_2, which is at rest, leading to a process

$$k_1 + k_2 \rightarrow p_1 + p_2 + \ldots + p_N .$$

Calculate the *threshold* energy for this process.

(3) Consider

$$\pi^- \rightarrow \mu^- + \bar{\nu}_\mu ,$$

where the pion is travelling with a boost β. If $\bar{\nu}_\mu$ emerges at an angle $\pi/2$ to the original π^- direction, at what angle does μ^- emerge?