

Phys 242 Homework

Problem Set 3

Due Wednesday, September 13

1. Thornton and Rex 2.84
2. Thornton and Rex 2.93
3. Thornton and Rex 2.101. Also, what are the energies of the π^0 's? And what are their speeds?
4. A 20-megaton hydrogen bomb explodes. 1 ton of TNT equals 4.18×10^9 J. How much mass was used up in the explosion?
5. Consider the reaction $pp \rightarrow ppB\bar{B}$ where the B and \bar{B} are B meson particles, each with a mass of $5 \text{ GeV}/c^2$.
 - a) What kinetic energy must the beam protons have in the center-of-mass frame to produce B particles? (Assume the products are all produced at rest.)
 - b) What kinetic energy must the beam proton have in the laboratory frame (i.e. the other proton is at rest) to produce B particles?