Problem 1: Scintillator counter

Consider two particles with masses $m_1$ and $m_2$ and the same momentum $p$. Evaluate the difference $\Delta t$ between the times taken to cross a distance $L$. Suppose we have two scintillator counters that measure $\Delta t$ with a resolution of 300 ps. How large must $L$ be to distinguish $\pi$ and $K$ of 4 GeV momentum with two standard deviations?

Problem 2: Syncrotron radiation

Calculated the energy loss per turn for a circular collider due to syncrotron radiation. Assume an electron-positron collider with a center-of-mass energy of 200 GeV and a proton-proton collider of 14 TeV both with radius $R = 4.3$ km.
8.701 Introduction to Nuclear and Particle Physics
Fall 2020

For information about citing these materials or our Terms of Use, visit: https://ocw.mit.edu/terms.