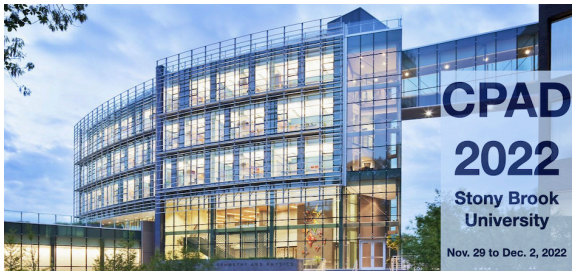

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A tracker for PIONEER

Wednesday, 30 November 2022 11:55 (20 minutes)

A next-generation rare pion decay experiment, PIONEER at the Paul Scherrer Institute, is strongly motivated by several inconsistencies between Standard Model (SM) predictions and data pointing towards the potential violation of lepton flavor universality. It aims to measure the difference between decay of pion into electron and muon with a precision of 1 part in 10^4 to study lepton flavor universality and the rare process of pion beta decay, with 3 to 10-fold improvement in sensitivity, to test CKM unitarity, which is very important in light of the recently emerged tensions. In addition, various exotic rare decays involving sterile neutrinos and axions will be searched with unprecedented sensitivity. The aimed precision requires excellent reconstruction of decay particles which the collaboration aims to achieve with a detector consisting of a segmented Low Gain Avalanche Detector (LGAD) based Active Target (ATAR), a Liquid Xenon Calorimeter of 25 radiation length and a tracker. We present GEANT study of an optimized micro-RWell tracker surrounding the ATAR to achieve the required precision.

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