Contribution ID: **159** Type: **poster**

Cluster Counting Technique for Enhanced Particle Identification in the IDEA Drift Chamber

The IDEA (Innovative Detector for an Electron-positron Accelerator) experiment features a cutting-edge drift chamber designed for high-precision tracking and particle identification in future e^+e^- collisions. In this talk we will examine the design choices made for the chamber's gas mixture, wire materials, and soldering techniques that ensure high performance and low material budget. One of the most innovative aspects of this detector is the integration of cluster counting technique, which significantly enhance particle identification over traditional methods. This talk will explore the hardware aspects of the drift chamber, including the readout electronics and the implementation of Cluster Counting/Timing techniques. These innovations allow for improved separation of muons, pions and kaons across a broad momentum range. Additionally, experimental validation through beam tests conducted at CERN will be discussed, highlighting the efficiency of cluster counting in real-world conditions and its potential to meet the demands of future high-energy physics experiments.

Workshop topics

Detector systems

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