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Development of a pattern recognition algorithm for reconstructing multi-particle events in the Mu2e detector

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Mu2e is an upcoming experiment at Fermilab and its main goal is to search for CLFV in the coherent transition of a muon into an electron on an Al target. In Mu2e, multi-particle events can occur simultaneously within the same time region, and it is crucial to accurately identify each particle track, including signals, to improve the robustness of track-finding methods and enhance reconstruction efficiency. $\bar{p}$ annihilation is one of the background events and produces multiple particles that can mimic signal events. Additionally, photons from radiative pion captures can produce an $\gamma \to e^+e^-$ pair, which can be used to calibrate the Mu2e momentum scale and the resolution. The Mu2e track reconstruction sequence begins by grouping hits produced in the tracker based on time and z coordinate information, called TimeCluster, and selected hits are processed to reconstruct helices and determine their momentum. The current pattern recognition algorithms identify a single helix per TimeCluster for single-track events. A new pattern recognition algorithm is being developed to reconstruct multi-particle events, and its features for finding multiple tracks and the current evaluation results will be discussed.

Autore principale: Sig. KITAGAWA, Hussain (Istituto Nazionale di Fisica Nucleare)

Relatore: Sig. KITAGAWA, Hussain (Istituto Nazionale di Fisica Nucleare)

Classifica Sessioni: Frontiera dell'Energia

Classificazione della track: Frontiera dell'Energia