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The I-tracker proposal for MU2E Experiment at Fermilab

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Abstract content

Within the Standard Model of particle physics (SM), particles decay in a way that conserves lepton flavor numbers. Muons then may decay as follow: $\mu^- \rightarrow e^- \bar{\nu}_{\mu} \nu_e$, plus radiative corrections. In many scenarios of physics beyond the Standard Model (BSM), there are additional decay modes, such as $\mu^- \rightarrow e^- \gamma$ and $\mu^- \rightarrow e^- e^+ e^-$, that violate the lepton flavor number conservation (LFV). The muon-to-electron conversion experiment (Mu2e) is designed to search for the coherent, neutrino-less conversion of a muon to an electron, in the Coulomb field of a nucleus. In order to achieve such a goal a very precise and sophisticated tracker system is needed. For this purpose a specific design (I-tracker) has been proposed. The I-tracker chamber has a geometric structure obtained overlapping two coaxial cylinders with the inner volume delimited by end plates, which shape has been optimized by recent studies. The thickness, of the chamber walls, has been reduced as much as possible in order to be lighter and to have the best transparency (minimum interaction with incoming particles). The total amount of wires is expected to be around 90000 of which 15000 will be the sense wires. In this work we will review the main features of this specific tracking system, developed by a collaboration of Italian Institutions.

Summary

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