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Design and simulation of a MPGD-based hadronic calorimeter for Muon Collider

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The project of a Multi-TeV Muon Collider represents a unique opportunity to explore the high energy physics frontier and to measure with high precision the Higgs coupling with the other particles of the Standard Model as well as the Higgs self-coupling, in order to confirm the results already achieved in the SM and possibly to find evidences for new physics. One of the major challenges for the design and optimization of the technologies suitable for a Muon Collider experiment is represented by the high background induced by the decay of the muons coming from the beam.
This contribution will present the design of an innovative MPGD-based hadronic calorimeter.
The detector consists of a sampling calorimeter exploiting MPGDs as active layers: the MPGDs offer a fast and robust technology for high radiation environments and a high granularity for precise spatial measurements. Moreover, the detector is designed to optimize the jet reconstruction and for background suppression. The calorimeter is simulated using the Geant4 toolkit to support the detector R&D. The detector design and layout optimization supported by the simulation will be presented.

Collaboration

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