Contribution ID: **95** Type: **Poster**

MPGD-based Hadronic Calorimeter for Muon Collider Experiments

Thursday 7 September 2023 10:30 (10 minutes)

The future development of High Energy Particle physics in the post High Luminosity LHC era could greatly benefit from a Multi-TeV muon collider, which stands as one of the most promising options. This machine would enable leptonic collisions at high center-of-mass energy, creating opportunities for a wide range of unexplored physics studies. However, designing an appropriate detection system poses a significant technological hurdle due to the inherent instability of muons. The interaction between muon decay products and the components of the machine can generate a substantial background particle flux, which may negatively impact the performance of the detector. In this presentation, we will showcase the latest simulation studies that have been conducted to optimize the design of the detector, along with an overview of the potential detector technologies that could meet the demanding requirements of a Muon Collider. Special attention will be given to the ongoing research and development efforts in this field.

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Session Classification: Poster Session II

Track Classification: Gas-based Detection Methods