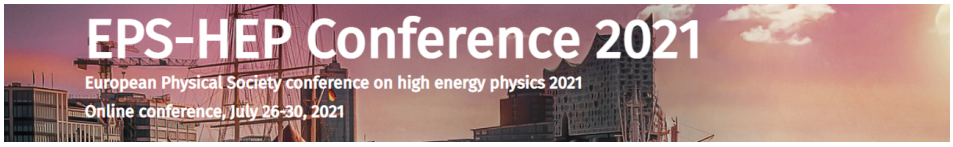

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Tracking and track reconstruction at a muon collider in the presence of beam-induced background

Among the projects currently under study for the post-LHC generation of particle accelerators the muon collider represents a unique machine, which has the capability to provide very high energy leptonic collisions and to open the path to a vast and mostly unexplored Physics program.
However, on the experimental side, such a great Physics potential is accompanied by unprecedented technological challenges, due to the fact that muons are unstable particles. Their decay products interact with the machine elements and produce an intense flux of background particles that eventually reach the detector and might degrade its performance. Being the closest detector to the beamline, the tracker is the most affected by the beam-induced background. This contribution will outline the measures adopted in order to mitigate the background effects on the track reconstruction and will present the tracking performance in the presence of the beam-induced background. We will discuss considerations on the tracker design, ideas of 5D tracking (position, time, and direction), and strategies using novel tracking algorithms based on the A Common Tracking Software (ACTS) library, which was developed with a focus on hadronic environments with high pile-up - we explore the usage of ACTS to perform the track reconstruction in the presence of the beam-induced background.

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Collaboration / Activity

Muon Collider Detector&Physics

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