

Smart Pixels at a Muon Collider

A muon collider offers a means for reaching higher energies by combining the advantages of electron-positron and proton-proton colliders. Beam induced background (BIB), which results from muon decays in the beam, poses a significant challenge for detector design and readout. The pixel detector sits at the heart of the detector and is subjected to the largest rate of BIB. The bandwidth required to send all of the resulting signals off-detector is prohibitive. To overcome this challenge, we propose to develop “smart” pixels with a neural network implemented in front-end electronics to differentiate between clusters of hits produced by BIB and collision particles. We investigate properties of pixel clusters in simulation, and present a neural network that can selectively read out clusters of interest.

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