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Study of Backscattering Effects on the Particle Identification

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One of the consequences of having a high-density calorimeter as part of an experiment is a large number of secondary shower particles generated in the calorimeter – some of which scatter back up towards the charge measurement devices. This so-called "backscatter effect" can interfere severely with accurate charge measurement of the primary nucleus, especially at high energies, as the number of backscattered particles increases with the incident energy. In this analysis, we study the effect of backscattered particles on particle identification by simulating the ISS-CREAM instrument model detector response using the GEANT3 simulation package with the FLUKA hadronic model. Our study shows the importance of the fine segmentation of charge detectors above the calorimeter. It can minimize backscattered particle contamination in the same charge detector segment as the incident particle to avoid its charge misidentification. We will present simulation results regarding charge measurements, including the tracking resolution, backscattering effects, and charge determination efficiency.

Keywords

Backscattering Effects; Particle Identification

Collaboration

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other Collaboration

Subcategory

Experimental Methods & Instrumentation

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