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Muon Energy Regression from Radiative Losses in a Granular Calorimeter

Wednesday 25 August 2021 12:30 (30 minutes)

A challenge for future particle-physics experiments at the high-energy frontier is the precise measurement of muon momenta at very high energy. In this work we discuss the feasibility of an entirely new avenue for the measurement of the energy of muons based on their radiative losses in a dense, finely segmented calorimeter. We demonstrate with an idealised calorimeter layout, how spatial and energy information on emitted electromagnetic radiation may be exploited with 3D convolutional neural networks to obtain an estimate of the muon energy. We show that the fine-grained information on the radiation patterns allows for a significant improvement of the precision of muon energy estimates. Additionally, we show that the regression is entirely complementary to traditional tracker-based measurements, allowing one to achieve good resolution across the energy spectrum.

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

Lukas Layer; INFN, Padova (IT) & Universita' di Napoli "Federico II"; https://www.pd.infn.it/eng/

Internet talk

Yes

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