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Deep Learning Track Reconstruction for TeV-PeV Cosmic Rays in Space

Tuesday 31 May 2022 10:00 (25 minutes)

Astroparticle physics is experiencing a new era of direct precision measurements in space at the highest energies. DArk Matter Particle Explorer (DAMPE) launched in 2015 has recently published the first results on Cosmic Ray proton and helium spectra up to 100 TeV and 80 TeV kinetic energy respectively. The successor mission to be launched in the nearest future, the High Energy Radiation Detector (HERD), is targeted further at the PeV scale.

Track pattern recognition at DAMPE and HERD is a key factor limiting the measurement accuracy. Due to the vast multiplicity of secondary particles at high-energy interactions in the detector, the primary signal is heavily obscured, track reconstruction is becoming a needle in a haystack problem. New tracking techniques are critically demanded in order to fully uncover the science potential of DAMPE and HERD instruments.

In this talk, we present the first findings of the PeVSPACE project, which employs state-of-the-art Deep Learning methods to fundamentally improve the quality of particle tracking for space atroparticle missions at the highest energies. We also give a brief overview of the DAMPE experiment and demonstrate the first application of the developed techniques to the analysis of the DAMPE data.

Consider for young scientist forum (Student or postdoc speaker)

No

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