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A deep learning method for event recognition in CALET data

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The Calorimetric Electron Telescope (CALET) is a powerful tool to observe cosmic-ray electrons between 1 GeV and 20 TeV. Its 30 radiation-length calorimeter enables total containment of electron-induced showers up to TeV energies, yielding an energy resolution of $\sim 2\%$ for these events. The CALET all-electron spectrum obtained using the first 7.5 years of data closely matches the one produced by the AMS-02, but DAMPE and Fermi-LAT are in tension in the 30 GeV - 20 TeV energy range. To investigate this tension, we developed an alternative classification method between electrons and protons using machine learning techniques instead of a deterministic algorithm. These unsupervised learning techniques are used to find clustering in the flight data events without training on simulated data. Here we present preliminary results from this analysis, and the performance of the trained method when applied to the simulated dataset.

Collaboration(s)

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