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First data from the DAMPE space mission

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The DAMPE (DARK Matter Particle Explorer) satellite was launched on December 17, 2015 and is in smooth data taking since few days after. It was designed in order to properly work for at least three years and, thanks to its large geometric factor (about 0.3 m² sr for protons and nuclei), is integrating one of the largest exposure for galactic cosmic ray studies in space.

Even if primarily optimized for the study of electrons and gammas, the detector provides good tracking and calorimetric performances also in the case of protons and nuclei, together with the possibility of ion identification through multiple charge measurements.

This will allow precise measurement of proton and nuclei energy spectra from tens of GeV up to about 100 TeV, the high energy limit being essentially determined by the overall geometric factor and the calorimeter's dynamic range.

In particular, the energy region between 1-100 TeV will be explored with higher precision compared to previous experiments: spectral indexes for individual species could then be well measured and evidence for the observed hardenings could be checked and better quantified.

This would be very important for a comparison with state-of-the-art models of galactic CR acceleration/propagation mechanisms.

The information from the various subdetectors (e.g. ion charge measurement, precision tracking, shower topology) allows an efficient identification of the electron signal over the large (mainly proton-induced) background. As a result, the all-electron spectrum will be measured with excellent resolution from few GeV up to few TeV, thus giving the possibility to identify possible contribution of nearby sources.

Presenter: DE MITRI, Ivan (LE)

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