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On the measurement of the elemental composition in the PeV energy region: a critical review

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“A statistically significant detection of Cosmic Rays above about 100 TeV/n can be obtained only from ground operating detectors (arrays/telescopes).

The reconstruction of the primary characteristics (energy, mass, arrival direction) is carried out in an indirect way exploiting the detection of Extensive Air Showers.

Strictly speaking, no air shower experiment measures the primary composition of CRs. We exploit different mass-sensitive EAS observables.

But the sensitivity to the mass of these observables are different, in particular because they investigate different kinematic regions of the hadronic interaction undergone by the primary particle.

The results on the elemental composition in the PeV energy region are still conflicting and can be divided into 2 categories, those that find a knee of the light component below the PeV and those that find the knee of the protons at the same energy as the knee of the all particle energy spectrum.

In this talk we will show that, according to the results obtained by a number of experiments in the last decades, the reconstructed primary spectra of the different components seems to depend on the observed kinematic region of the hadronic interaction.”

Presenter: DISCIASCIO, Giuseppe

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