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Measurement of the all-particle and light-component cosmic ray energy spectra with ARGO-YBJ

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Cosmic ray physics in the 1TeV-10PeV primary energy range is among the main scientific goals of the ARGO-YBJ experiment. The detector, located in the Cosmic Ray Observatory of Yangbajing (Tibet, China) at 4300m a.s.l., is a full coverage Extensive Air Shower array, consisting of a carpet of Resistive Plate Chambers (RPC) of about 7000m². The apparatus layout, performance and location offer a unique opportunity for a detailed study of several characteristics of the cosmic ray flux. Moreover the analog readout of the RPC signals indeed provides a powerful tool to study, with unprecedented resolution and without saturation, the extensive air shower space-time structure down to few meters from its axis.

New results concerning the measurement of the all-particle and of the light-component (i.e. protons and helium) cosmic ray energy spectra, between approximately 5 TeV and 5 PeV, will be reported.

The study of this energy region is particularly important not only for a better understanding of the so called knee of the energy spectrum and of its physical origin, but also as a powerful cross check among very different experimental methods (e.g. direct vs indirect measurements).

A precise knowledge of CR spectra in this energy region is also a fundamental input for any reliable calculation of atmospheric neutrino and muon fluxes.

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