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Cosmic ray energy spectrum and mass composition at energies 1015 - 1018 eV

A spectrum of cosmic rays within energy range 1015-3*1017 eV was derived from the data of the small Cherenkov setup, which is a part of the Yakutsk complex EAS array. In this, work a new series of observation is covered. These observations lasted from 2000 till 2010 and resulted in increased number of registered events within interval 1016-1018 eV, which in turn made it possible to reproduce cosmic ray spectrum in this energy domain with better precision. A sign of a thin structure is observed in the shape of the spectrum. It could be related to the escape of heavy nuclei from our Galaxy. Cosmic ray mass composition was obtained for the energy region 1016 - 1018 eV. A joint analysis of spectrum and mass composition of cosmic rays was performed. Obtained results are considered in the context of theoretical computations that were performed with the use of hypothesis of galactic and meta-galactic origin of cosmic rays.

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