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Ultra-High Energy Proton-Proton Collision in the Laboratory System as the Source of Proton, Neutrino and Gamma Spectra in Astrophysics

This paper argues that production, collisions, and decays of matter in space
result in the form of particle spectra, which are measured in cosmic rays and astrophysics. Protons, nuclei, and dark matter are the known forms of matter in the Galaxy. If we understand how a high-energy proton produces protons in a collision with another proton (or antiproton), we can predict the form of the spectra of secondary particles. This is also the way to clarify the nature of Dark Matter (DM).
LHC experiments can provide us with the proton spectrum at the very high energy
(VHE) of collision. The suggested method means only to convert this spectrum into the laboratory system of coordinates and to compare it with the spectra of various CR particles. It has been shown that spectra of cosmic protons reproduce the form of proton production spectrum at the single collision of the initial
proton of ultra-high energy (UHE), which was predicted in the Quark-Gluon String
Model. The specifics of proton energy spectrum in c.m.s. are the following: the growing central-rapidity table due to the proton-antiproton pairs production and the triple-Pomeron peak at the end of spectrum because of diffraction dissociation of initial proton. This peak or bump in the neutrino spectra is expected in the recent measurements at the UH energies.
The gamma spectrum in the entire diapason of gamma energies has also the
distinct bump at the highest energy that is the signature of proton-proton collision.

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