ICHEP 2022

Report of Abstracts

https://agenda.infn.it/e/28874

Abstract ID : **45**

HE Stratosphere Event of 1975 Revisited: the Difference between the Patterns of Astroparticle Interaction and LHC Nucleus-Nucleus Collision.

Content

The event of astroparticle collision at high energy was detected in 1975 during the balloon flight in the stratosphere. The data of hundred particle tracks in x-ray films have been re-analyzed in the style of LHC experiments: rapidity distributions of charged particles and transverse mass spectra of multi-particle production have been built. The comparison of multiple histograms with the expectations of the Quark-Gluon String Model (QGSM) gives us, at first sight, the conclusion that it might be the carbon nucleus collision with the matter of atmosphere at the c.m.s. equivalent energy $\sqrt{s} \geq 5$ TeV. After QGSM analysis of these scarce data, we know the following: the value of maximal rapidity of one projectile proton and the density of particle multiplicity in the central rapidity region. Besides this, the transverse mass distributions have been built, which show how many protons are in every particular range of rapidity. In such a way, we certainly can distinguish how this astroparticle interaction is similar to or differs from the average A-A collision event at LHC. Nevertheless, the data indicate the features that cannot be associated with nucleus-nucleus collision: one particle with transverse mass 16 GeV was detected and a small nucleon population is seen in the region of projectile fragmentation that doesn't correspond to the carbon nucleus collision. Both facts make us convinced that there might be a baryonic DM decay. These quasi-stable baryon-antibaryon neutral states have been suggested in the earlier paper (Piskounova O., 2018). They are to be formed under the huge gravitation pressure at giant massive objects like Black Holes. The relativistic jets are spreading baryonic DM in space. Finally, we conclude that the cosmic ray experiments on the high altitudes in the atmosphere are, on one hand, good supplements to the LHC measurements. On the other hand, they are able to discover events of new astroparticle collisions in the full kinematical region, while colliders are studying nuclear interactions only in the central rapidity region. Such experiments, which are detecting the very first collision of the astroparticle with the atmosphere, have preferred to be constructed with the application of up-to-date electronic methods.

Alternative Track

Field

Phenomenology

Final Speaker

Yes

In-person participation

No

Centralised Submission

No

Collaboration

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Submitted by **PISKOUNOVA, Olga** on **Wednesday, February 23, 2022**