

INSTANTON-INDUCED PROCESSES IN UNUSUAL COSMIC RAY EVENTS IN TEV REGION ENERGY

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It had been established that there are two species of transverse distributions in nucleon-nuclei and nucleus-nuclei interactions in the TeV region of energy: Stratosphere/JACEE/Concorde Collaborations. In the second class of unusual interactions nearly all secondary neutral pions obtain comparatively large transverse momentum with mean value ~ 0.8 GeV/c.

In order to search the complex hadronic final states in two classes of interactions the structure of density fluctuations in these events have been studied. High order intermittency analysis with rank of moments up to 8 open up the possibility of more stringent test of dynamical models describing multiparticle production. We have obtained that the behaviour of intermittency index $J_q(q)$ from the rank of factorial moment q is also essential differed for these classes of interactions: the weak growth for events with large transverse momentum and strong one for events with standard transverse momentum.

The studied intermittency index behaviour in addition to the previous results on distributions of transverse momentum give us the strong indication of the existence of the new process in the multiparticle production. This is extremely interesting result.

It seems that the perturbative QCD can not describe the data and new mechanism should be involved in that case. One of the possible candidate for that mechanism could be some contribution from nonperturbative QCD dynamics: the existence in QCD vacuum the strong fluctuations of gluon fields so-called instantons.

One of the feature of instanton-induced events is a rather large value of the transverse momentum of all produced particles and smooth distribution of them in phase-space.

From our point of view the lowest order of moments are not very sensitive to the instanton-induced processes and only the consideration of high orders can give the correct results.

Just the same kinematical features have our "anomalous" events.