FRACTAL STRUCTURE IN RELATIVISTIC HEAVY ION COLLISIONS

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Abstract

Events with large concentration of particles in small rapidity windows have been observed in hadronic intercations[1]. This has led to study of sporadic occurance of large fluctuations in pseudo rapidity density of charged particles. It has been suggested that such kind of behaviour may be a consequence of a transition from Quark Gluon Plasma into a hadronic phase [2]. Bialas and Peschanski [3] suggested a method of scaled factorial moments to find out the origin of non-statistical fluctuations in densities of secondary particles produced in high energy collisions. Such fluctuations may reveal self similar behaviour of multiparticle production. Analogous to well known phenomenon in geometrical and statistical systems, it has been suggested that multiparticle production may also exhibit fractal behaviour. A formalisim to investigate quantitatively any single particle density distribution in the frame work of multifractal characteristics has been prposed [4] involving computation of Gq moments as a function of phase space intervals.

In this work Gq moments are studied as a function of eta bin. We analyze the experimental data from EMU-01 collaboration. In this presentation, the experimental sample used is Pb+ Pb collisions at 160 A GeV. We compare the experimental Gq moments with the statistical Multinomial sample and Monte Carlo sample. The results are also compared with information obtained from pseudo rapidity distributions, where fluctuations are introduced artificially. From a comparitive study information on dynamical fluctuations responsible for multiparticle production in heavy ion intercations at relativistic energies is extracted. References:

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