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Multiplicity fluctuations in the string model in pp collisions at LHC energies

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The fluctuation of the number of charged particles in a given rapidity interval of observation was studied. Analytical expressions and the Monte Carlo modeling in the framework of a quark-gluon string model were used to calculate scaled and robust variance of the multiplicity in the case with string fusion and without it. The used distribution of primary strings in the transverse plane is consistent with the Regge approach. The string fusion effects were taken into account by implementing of a lattice (grid) in the impact parameter plane. The value of the scaled and robust variance of the multiplicity for pp collisions is calculated at three initial energies: 0.9, 2.76 and 7 TeV, both with and without taking into account the processes of string fusion. The results were compared with the data obtained by ALICE collaborations at CERN. The results of these analytical calculations coincide with the results of MC simulations, this testifies to the correctness of the MC algorithm used. It is shown that for pp collisions at LHC energies, the fluctuations of the particle number from a given string cluster are, due to the presence of short-range correlations between particles, significantly larger than the Poisson ones.

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