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Bose-Einstein effects in multiplicity and net-charge correlations in pp collisions using PYTHIA8 simulations

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Correlations between various observables, e.g. multiplicities of particles produced in pp collisions at the LHC energies within intervals separated in pseudorapidity and azimuth angle, could be a sensitive tool to analyze hadron collisions dynamics and test hadron production models.

In this report we present results of studies of multiplicity correlation coefficient topology for like- and unlike-sign pairs of charged particles using PYTHIA8 event generator [1]. Correlation coefficients were extracted using long-range forward-backward correlation method [2].

Peculiar behavior of correlation coefficient topology of net-charge is obtained in short-range region. Analysis shows that effects of Bose-Einstein statistics [3] have strong influence in this region of such correlations.

The results indicate the necessity of experimental studies of net-charge correlation topology that could bring new constraints to PYTHIA8 tunes.

References:

[1] <http://home.thep.lu.se/~torbjorn/Pythia.html>

[2] ALICE collaboration, ALICE Physics Performance Report, vol. 2, part 2 (6.5.15, Long-range correlations, pp. 452-455), CERN/LHCC 2005-030, 5 December 2005

[3] L. Lönnblad, T. Sjöstrand, Eur.Phys.J.C2:165-180, (1998) //arXiv:hep-ph/9711460

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