

Long-Range (Forward-Backward) Pt and Multiplicity Correlations in pp Collisions at 0.9 and 7 TeV

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The ALICE Collaboration

(Submitted by Grigory Feofilov)

Long-range rapidity and azimuthal correlations (LRC) of charged particles are a sensitive tool to study the initial conditions for the Quark Gluon Plasma (QGP) formation [1],[2],[3]. Measured in separated pseudorapidity intervals, these correlations, if they exist, mainly Pt-Nch and Pt-Pt, could be the indication in case of pp collisions of processes like color string fusion[2] or glasma flux tubes formation[3]. The event-by-event analysis of the long-range Forward-Backward (FB) Nch-Nch, Pt-Nch and Pt-Pt correlations has been performed on data of the ALICE experiment obtained in the pp runs at 0.9 and 7 TeV pp collision energies. The following observables were defined: Pt (the average transverse momentum in the event) and Nch (the event multiplicity of charged particles). Two pseudorapidity intervals (the “forward” and the “backward” windows) of the variable width from 0.2 to 0.8 rapidity units were chosen. Correlations were studied as a function of the width of these windows and on the gap between them, as well as for the different configurations of four $\pi/2$ azimuthal sectors relevant to these windows. Methods for separating the short-range correlations and to measure the long-range correlations strength in the limited acceptance of the ALICE central barrel (-0.8, 0.8) are discussed. Analysis results show a behaviour compatible with LRC phenomena for these pp collisions. They are compared to PYTHIA and to the model with independent emitters (strings) [4].

References

- [1] Abramovskii V. A., Gedalin E. V., Gurvich E. G., Kancheli O. V. , JETP Lett., vol.47, 337-339 , 1988.
- [2] M.A.Braun, C.Pajares, Phys.Lett. B287 (1992) 154; Nucl.Phys. B390 (1993) 542; Eur.Phys.J. C16 (2000) 349; N.S.Amelin, N.Armesto, M.A.Braun, E.G.Ferreiro, C.Pajares, Phys.Rev.Lett. 73 (1994) 2813; M.A.Braun, C.Pajares, V.V.Vechernin, Phys.Lett. B493 (2000) 54; Internal Note/FMD, ALICE-INT-2001-16, CERN, Geneva (2001) 13p.; M.A.Braun, R.S.Kolevatov, C.Pajares, V.V.Vechernin, Eur.Phys.J. C32 (2004) 535; V.V.Vechernin, R.S.Kolevatov, Phys. of Atom.Nucl. 70 (2007) 1797; 1809.
- [3] L.McLerran, “The Color Glass Condensate and the Glasma”, Proceedings of the International School of Subnuclear Physics, Subnuclear Series, Vol. 45, 2010.
- [4] V.V. Vechernin, arXiv:1012.0214, 2010.

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Track Classification: Correlations and fluctuations