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Event-by-event correlations and fluctuations with strongly intensive quantities in heavy-ion collisions with ALICE

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The strongly intensive quantity Σ is a new observable, introduced recently to the domain of heavy-ion physics. In superposition models which assume independent particle production from statistically identical sources, Σ is insensitive to the number of sources and its fluctuations, contrary to the standard forward-backward correlation coefficient (b_{corr}). Therefore, it provides direct information on the multiplicity correlations and fluctuations from a single source.

This poster presents new results on forward-backward correlations studied with the quantity Σ , measured by ALICE at the LHC in Xe-Xe reactions at $\sqrt{s_{\text{NN}}} = 5.44$ TeV and in Pb-Pb collisions at $\sqrt{s_{\text{NN}}} = 2.76$ and 5.02 TeV. The data is shown as a function of the η gap between forward and backward pseudorapidity intervals, the centrality of the collision, and the width of the centrality bin. The study is made with two independent centrality estimators. An opposite ordering of values of Σ as a function of centrality class in Pb-Pb and Xe-Xe collisions is observed for the experimental data and MC HIJING simulations. This nontrivial discrepancy implies that the physical mechanism of particle production differs from that predicted by the models.

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