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Event-by-Event Identified Particle Ratio Fluctuations in Pb-Pb Collisions with ALICE using the Identity Method

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The study of event-by-event fluctuations of identified hadrons may reveal the degrees of freedom of the strongly interacting matter created in heavy-ion collisions and reflect the underlying dynamics of the system. The observable ν_{dyn} , which is given in terms of the moments of identified-particle multiplicity distributions, is used to quantify the magnitude of the dynamical fluctuations in event-by-event measurements of given particle ratios. The ALICE detector at the LHC is well suited for the study of ν_{dyn} , due to its excellent particle identification capabilities.

Particle identification that is based on the measurement of the specific ionisation energy loss dE/dx works well on a statistical basis, but suffers from ambiguities when applied on the event-by-event level. A novel experimental technique called the “Identity Method” was recently proposed to overcome such limitations. The method follows a probabilistic approach using the inclusive dE/dx distributions measured in the ALICE TPC, and determines the moments of the multiplicity distributions by an unfolding procedure. In this contribution, an analysis of identified particle ratio fluctuations that applies the Identity Method to Pb-Pb data from ALICE will be presented.

On behalf of collaboration:

ALICE

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