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Correlations of net-charge, net-kaon and net-proton in Pb-Pb at $\sqrt{s_{NN}} = 5.02$ TeV with ALICE

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Correlations between net-conserved quantities such as net-baryon, net-charge and net-strangeness are essential probes of QCD phase structure and are related to the ratios of thermodynamic susceptibilities in lattice QCD calculations. The study of these correlations can probe thermal conditions in a medium and help to elucidate the nature of the strongly interacting matter formed in high-energy nuclear collisions. Recent lattice QCD results suggest that the presence of a magnetic field has a significant impact on the ratios of thermodynamic susceptibilities. Therefore, correlations between net-conserved charges could be used to study the magnetic field produced in peripheral heavy-ion collisions.

We present the new results on the first-order correlations of net-proton, net-charge, and net-kaon, where net-proton and net net-koan act as a proxy of net-baryon and net-strangeness, respectively. The measurements are performed as a function of centrality in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV using the data recorded by the ALICE detector. The results are compared with corresponding results at lower collision energies from the STAR experiment at RHIC and with theoretical predictions from lattice QCD, the Hadron Resonance Gas model, and the HIJING event generator.

Category

Experiment

Collaboration (if applicable)

ALICE

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