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New results on collision dynamics in relativistic heavy-ion collisions

In heavy-ion collisions, the differences in shape between the positive and negative pion transverse momentum spectra at low p_T can be used to study the Coulomb final-state interaction. The charged pions, as the most abundantly produced and lightest species, are the particles most strongly influenced by the Coulomb field generated by the positive net-charge of the stopped participant protons. The effects of the Coulomb interaction on charged pion production in Au+Au collisions at $\sqrt{s_{NN}}=2.4$ GeV are investigated. From the π^\pm transverse momentum spectra measured with HADES experiment, the negative-to-positive pion ratios as a function of transverse momentum are obtained and used to analyze the Coulomb interaction. The “coulomb kick” (a momentum change due to Coulomb interaction) and initial pion ratio for different rapidity intervals were obtained. In order to study the non-equilibrium degree of these collisions, the p_T spectra are studied using Tsallis distribution as a parametrization. The rapidity dependence of the Tsallis fit parameters, Tsallis temperature, and non-extensivity parameter, a parameter characterizing the degree of non-equilibrium for the system produced in these collisions will be presented. These results are connected with the kinetic freeze-out dynamics.

Category

Experiment

Collaboration (if applicable)

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