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Insights into freeze-out properties of systems produced in relativistic heavy-ion collisions

An important way to characterize the overall features of high-energy nuclear collisions is to analyze the transverse momentum distributions of produced particles. In these collisions, the differences in shape between the positive and negative pion transverse momentum spectra at low pT 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(sNN)=2.4 GeV and measured with HADES experiment are investigated. 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 pT 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 systems produced in these collisions will be presented. These results are connected with the kinetic freeze-out dynamics.

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