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Idenified particle spectra in Pb-Pb, Xe-Xe and p-Pb collisions with Tsallis blast-wave model

We investigate the identified hadrons transverse momentum (p_T) spectra in Pb-Pb (Pb-Pb, Xe-Xe, p-Pb) collisions at

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 $\sqrt{s_{NN}}$ = 2.76 (5.02, 5.44, 5.02) TeV in the framework

of Tsallis-blast wave (TBW) model with a linear transverse velocity profile and with

a constant velocity profile. In this model, the Tsallis temperature (T), the average

radial flow velocity ($\langle \beta \rangle$) and the degree of non-equilibrium (q) of the system are common for all hadrons when a combined fit is performed to the pT spectra of different particles at a given centrality. It is found that the model can describe the particle spectra well up to 3 GeV/c. For both profiles, the transverse

flow velocity decreases from central to peripheral collisions while the non-extensive parameter q exhibits the opposite behavior, indicating a more rapid expansion and less off-equilibrium of the system in more central collisions. Moreover, we observe that in central collisions $\langle \beta \rangle$ and q (T) from the fit with the linear profile are smaller (is slightly larger) than those (that) with the constant profile, while in peripheral collisions $\langle \beta \rangle$, T and q from the former are compatible with those from the latter. We also derived and discussed the relation between the Tsallis temperature and the thermal temperature. In addition, to check whether a scenario of an early freeze-out of strange particles at the LHC exists, the particle spectra are investigated by grouping them into strange and non-strange hadrons. The combined fit gives an insight on the degree of non-equilibrium, the radial flow and the Tsallis temperature of the system at the kinetic decoupling. It provides a comparison between the results at different energies in the same collision system and the results in different collision systems at the same or similar energy.

Topics

Hydrodynamics and Collective Flows

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