

Excitation functions of kinetic freeze-out temperature and transverse flow velocity in proton-proton collisions

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Transverse momentum spectra of negative and positive pions produced at mid-(pseudo)rapidity in inelastic or non-single-diffractive proton-proton (pp) collisions over a center-of-mass energy, \sqrt{s} , range from a few GeV to above 10 TeV are analyzed by the blast-wave model with Boltzmann-Gibbs (Tsallis) statistics. The model results are well fitting to the experimental data measured by the NA61/SHINE, PHENIX, STAR, ALICE, and CMS Collaborations. In a particular superposition with Hagedorn function, both excitation functions of kinetic freeze-out temperature (T_0) of emission source and transverse flow velocity (β_T) of produced particles obtained from a given selection in the blast-wave model with Boltzmann-Gibbs statistics have a hill at $\sqrt{s} \approx 10$ GeV, a drop at dozens of GeV, and then an increase from dozens of GeV to above 10 TeV. Nevertheless, both excitation functions of T_0 and β_T obtained in the blast-wave model with Tsallis statistics do not show such a complex structure, but a very low hill. In another selection for the parameters or in the superposition with the usual step function, T_0 and β_T increase slightly from a few GeV to above 10 TeV.

Type

Parallel talk

Sessions (parallel only)

Heavy Ions

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