

## System scan in LHC energy

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The particle production and their ratios for  $\pi$ , k, p are studied in different collisions system at different centre of mass energy based on a blast-wave model with thermal equilibrium mechanism.

The transverse momentum spectra of the above-mentioned particles at the kinetic freeze-out stage are also discussed.

The kinematics freeze-out properties were fitted by the blast wave model. For the existing experimental data, the fitting results are consistent with the data given by the CERN-ALICE experimental group.

Under the framework of interacting hadron resonance gas, chemical freeze-out parameters such as chemical freeze-out temperature, baryon and strangeness chemical potential, and ad hoc suppression factors can be given simultaneously.

Through the thermal equilibrium model, our study constrains the chemical and kinematic freeze-out parameters. This gives us a better understanding of the nature of the dense and hot matter created in high-energy heavy-ion collisions at freeze-out stage.

**Primary author:** WANG, dongfang

**Presenter:** WANG, dongfang

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