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Effective Energy Dissipation and Particle Production in Heavy-Ion Collisions

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In this report, we consider an energy dissipation model for multiparticle production in heavy-ion collisions. The model considers the energy of a collision to be transformed into the produced particles as effective energy of participants, which drives the particle-production process. Within this model, we describe the dependencies of the two key observables, namely the midrapidity charged-particle density and the midrapidity transverse energy, on the center-of-mass energy and on the number of participating nucleons. These dependencies are of great importance in understanding the dynamics of multiparticle production in heavy-ion collisions. The model combines the constituent quark picture of participants (quarks or nucleons) together with the Landau relativistic hydrodynamics [1] and is found to successfully relate the particle production in hadronic and in central nuclear interactions [2]. A good agreement with the available measurements up to the LHC energies is demonstrated clarifying the underlying dynamics of the particle production process in heavy-ion collisions. A detailed study of the bulk observables in the framework of the constituent quark energy dissipation model considered is presented. Predictions are made on the charged particle multiplicity and transverse energy density for the collision energies where experimental data are not available.

References:

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Authors: MISHRA, Aditya Nath (Indian Institute of Technology Indore (IN)); Dr GRINBAUM SARKISYAN, Edward (University of Texas at Arlington (US)); SAHOO, Raghunath (Indian Institute of Technology Indore (IN))

Presenter: SAHOO, Raghunath (Indian Institute of Technology Indore (IN))

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