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Excitation Functions of Strange-Particle Production in Central Heavy-Ion Collisions from RHIC to LHC: Particle Yields, mean (p_T) and Transverse Energy Density ratios

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We present an extended analysis of the transverse energy density ⟨dE_T/dy⟩ at midratpiidty and relevant values of multiplicity density ⟨dN/dy⟩ and mean transverse momenta ⟨p_T⟩ for identified strange particles produced in the most central A+A collisions at high energies. The study is based on published experimental data on transverse momentum distributions and particle yields obtained in Au+Au, Pb+Pb, and Xe+Xe collisions in the energy range √(S_NN) from 39 GeV to 5.44 TeV . Particular attention is paid to the quantities entering the calculation of ⟨dE_T/dy⟩: the particle rapidity density ⟨dN/dy⟩ and the mean transverse momentum ⟨p_T⟩ measured at midrapidity . We investigate their dependence on the collision energy √(S_NN) for different strange-particle species and compare the power-law fits of the corresponding excitation functions. The obtained energy dependences of ⟨dN/dy⟩, ⟨p_T⟩, and ⟨dE_T/dy⟩ are analyzed to test the hypothesis of a common production mechanism for particles with different strange-quark content. The results are discussed within the Multipomeron exchange model and the Bjorken approach to energy density estimation in relativistic heavy-ion collisions. The authors acknowledge Saint-Petersburg State University for a research project ID: 153212394

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