Energy Dependence of String Fragmentation Function and φ Meson Production

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Abstract: The φ meson productions in Au+Au and/or Pb+Pb collisions at AGS, SPS, RHIC, and LHC energies have been studied systematically with a hadron and string cascade model LUCIAE. After considering the energy dependence of the model parameter α in string fragmentation function and adjusting it to the experimental data of charged multiplicity to a certain extent, the model predictions for φ meson yield, rapidity, and transverse mass distributions are compatible with the experimental data at AGS, SPS and RHIC energies. A calculation for Pb+Pb collisions at LHC energy is given as well. The obtained fractional variable in string fragmentation function shows a saturation in energy dependence. It is discussed that the saturation of fractional variable in string fragmentation function might be a qualitative representation of the energy dependence of nuclear transparency.

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