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System-size dependence of charged kaon and pion production in nucleus-nucleus collisions at beam energies of 40A GeV and 158A GeV

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The NA49 collaboration measured the rapidity and transverse mass distributions of kaons and pions in Pb+Pb collisions at different centralities. These data are complemented by results from the small systems C+C and Si+Si. We find that the centrality dependence of kaon and pion production is reproduced by microscopic transport model calculations (HSD and UrQMD2.3) within 20% or better. The mean transverse mass evolves with centrality as expected for increased stopping and energy deposition. The centrality dependence of the widths of the rapidity distributions in Pb+Pb collisions does not smoothly connect to results from the small systems p+p, C+C, and Si+Si. In Pb+Pb collisions the K/π ratios show a smooth increase with centrality at both beam energies with saturation setting in around 100-200 (60-100) wounded nucleons for 40A GeV (158A GeV). This behavior fits well into the trends observed at lower (AGS) and higher (RHIC) energies.

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