

Pion and eta production in elementary and heavy-ion collisions at SIS energies

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Collaboration

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Abstract content

Pion production is the dominating inelastic process in nucleus-nucleus collisions. At beam energies on the order of 1 - 2 GeV per nucleon pions are predominantly created via the excitation and the decay of hadron resonances. The $\Delta(1232)$ baryon resonance is most copiously produced, but as the incident energy increases, higher lying resonances, such as $N(1440)$, $N(1520)$, $N(1535)$, $\Delta(1600)$, etc., also contribute to pion production in a wide energy range and to η production close to threshold. These contributions stand out clearly in the dielectron invariant mass distributions measured in elementary and heavy-ion collisions at SIS18 energies. A detailed description of the resonance and meson production in elementary hadronic collisions is indeed a crucial ingredient of transport model calculations. In this contribution we present the results of a study of pion and eta production in pp , pA and AA collisions measured with HADES at GSI. The main focus will be on 40% most central Au(1.23 GeV)+Au collisions. Our results contribute with an unprecedented statistics to systematic studies of pion production in heavy ion collisions. The yields, transverse mass and angular distributions are compared with transport model calculations as well as with existing data from other experiments.

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