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Collective expansion of K-mesons in heavy-ion collisions on the effect of in-medium Kaon potential and the nuclear equation of state

The production cross sections of K^+ as a function of the transverse kinetic energy (m_T–m) on a nuclear equation of state for K^+ production in heavy ion-collision by using the quantum molecular dynamics model (QMD) is focused for this work. Production of a cross-section of K^+ from ^{58}Ni+^{58}Ni collision at energy 1.93 A GeV and rapidity range (y_{cm}) from -0.69 to 0.06 are considered. The production cross sections of K^+ as a function of the transverse kinetic energy are computed and compared with the KaoS experiments. The theoretical calculations execute with and without Brown-Rho (K^+N) potential as well as a soft and hard equation of state (soft and hard EOS). The result displayed the theoretical calculations with the soft EoS are analogous to the hard EoS. The theoretical calculation with the soft and hard EOS while taking into account the Brown-Rho (K^+N) potential is consistent with the KaoS experiment, this indicates that the production cross-sections of K^+ as a function of the transverse kinetic energy have a great sensitive probe to examine the equation of state at high temperature and high density.

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