Influence of Chiral Mean Field on Kaon In-plane Flow in Heavy Ion Collisions

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Abstract: The influence of the chiral mean field on the K^+ in-plane flow in heavy ion collisions at SIS energy is investigated within covariant kaon dynamics. For the kaon mesons inside the nuclear medium a quasi-particle picture including scalar and vector fields is adopted and compared to the standard treatment with a static potential. It is confirmed that a Lorentz force from spatial component of the vector field provides an important contribution to the in-medium kaon dynamics and strongly counterbalances the influence of the vector potential on the K^+ in-plane flow. The calculated results show that the new FOPI data can be reasonably described using the Brown & Rho parametrization, which partly takes into account the correction of higher order contributions in the chiral expansion. This indicates that one can abstract the information on the kaon potential in a nuclear medium from the analysis of the K^+ in-plane flow.

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