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Effects of a phase transition on HBT correlations in an integrated Boltzmann+Hydrodynamics approach

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A systematic study of HBT radii of pions, produced in heavy ion collisions in the intermediate energy regime (SPS), from an integrated (3+1)d Boltzmann+hydrodynamics approach is presented. The calculations in this hybrid approach, incorporating an hydrodynamic stage into the Ultra-relativistic Quantum Molecular Dynamics (UrQMD) transport model, allow for a comparison of different equations of state (EoS) retaining the same initial conditions and final freeze-out. The results are also compared to the pure cascade transport model calculations in the context of the available data. Furthermore, the effect of different treatments of the hydrodynamic freeze-out procedure on the HBT radii are investigated. It is found that the HBT radii are essentially insensitive to the details of the freeze-out prescription as long as the final state interactions in the cascade are taken into account. The HBT radii R_L and R_O and the R_O/R_S ratio are sensitive to the EoS that is employed during the hydrodynamic evolution. We conclude that the increased lifetime in case of a phase transition to a QGP (via a Bag Model equation of state) is not supported by the available data.

References:
Q.f. Li, J. Steinheimer, H. Petersen, M. Bleicher and H. Steocker,
"Effects of a phase transition on HBT correlations in an integrated Boltzmann+Hydrodynamics approach,"
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