

3-D Source Functions at RHIC from the AMPT Model

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For heavy ion collisions, the Hanbury-Brown Twiss (HBT) effect provides information on both the spatial extent and the duration of the emission source. It can also provide three-dimensional information on the geometry of the emission source [1]. Because a multi-phase transport (AMPT) model can describe the non-equilibrium freeze-out process, it is a natural and powerful tool for studying the interferometry of hadrons. Furthermore, it can be used to study the roles of different degrees of freedom in the final correlations. Previously the AMPT model has roughly reproduced the pion correlation functions in momentum space in Au+Au collisions at 130A GeV [2] as well as the radius parameters used to fit the correlation functions in Au+Au collisions at 130 and 200A GeV [2] [3].

Here we present results from the AMPT model on pion source functions in Au+Au collisions at RHIC, including source functions along the out, side and long directions using the spherical harmonics method [1]. In the mean time, the correlation functions in momentum space with the same kinematical cuts will be calculated for the same collision system. The effects of partonic interactions on the 3-dimensional source functions and the correlation functions will be investigated. We will also investigate the effects of kinematical cuts on both the source functions and correlation functions in momentum space in order to make apple-to-apple comparisons with the experimental data available at RHIC [4]. Then the discrepancies between AMPT model predictions and data will be identified and can be further investigated.

References

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