XXIV QUARK MATTER DARMSTADT 2014

Contribution ID: **612** Type: **Contributed Talk**

QGP properties from flow and correlations

Wednesday, 21 May 2014 12:50 (20 minutes)

Recently the results of azimuthal HBT measurements with respect to the second and third order event plane are presented by PHENIX [1].
They extract ϵ_2 and ϵ_3 from the HBT radii which contain information about not only the source shape at freezeout but also the space-time evolution of QGP matter.
They show the relation between initial $\epsilon_{2,3}$ which are obtained using a Glauber model and final $\epsilon_{2,3}$ which are extracted from the HBT radii.
They find that the final ϵ_2 from the HBT radii is finite and smaller than the initial ϵ_2.
On the other hand, the final ϵ_3 is vanishing, in spite of existence of finite initial ϵ_3.
The interesting different response of ϵ_2 and ϵ_3 during space-time evolution gives us a clue to understand the detailed QGP properties.

For analyses of such high statistics experimental results, we develop a state of the art numerical scheme of causal viscous hydrodynamics for relativistic heavy ion collisions, which has a shock-wave capturing scheme and less numerical dissipation [2]. Furthermore, using the hydrodynamic algorithm, we construct a hybrid model of hydrodynamic model plus UrQMD to include the realistic freezeout processes.
Using the model we investigate the time evolution of spatial anisotropies ϵ_n.
We find that the sign of ϵ_3 changes from positive to negative during the space-time evolution, which suggests a solution of the vanishing final ϵ_3 from the HBT radii by PHENIX.
From detailed analyses from flow and correlations, we discuss the initial conditions of hydrodynamic model and the detailed QGP properties such as transport coefficients.

[1] T. Niida for the PHENIX collaboration, Nucl. Phys. A 904-905C (2013) pp. 439-442 [arXiv:1304.2876]

[2] Y. Akamatsu, S. Inutsuka, C. Nonaka, M. Takamoto, J. Comp. Phys. (2014), pp. 34-54, [arXiv:1302.1665]

On behalf of collaboration:

None

Primary author: NONAKA, Chiho (Nagoya University)

Co-authors: Mr BERNHARD, Jonah (Duke Univesrity); Prof. BASS, Steffen A. (Duke University); AKAMATSU, Yukinao (Nagoya University)

Presenter: NONAKA, Chiho (Nagoya University)

Session Classification: Correlations and fluctuations

Track Classification: Collective Dynamics