



Contribution ID: 33

Type: **Talk**

Further study on the ridge effect in hydrodynamic model

Thursday, 15 October 2009 11:20 (30 minutes)

In a recent paper [1], the hydrodynamic code NeXSPheRIO was used in conjunction with STAR analysis methods to study two-particle correlations as function of $\Delta\eta$ and $\Delta\phi$. Both the ridge-like near-side and double-hump away-side structures were obtained. The appearance of the ridge-like structure is related to the combined effect of high-energy density tubes in the initial conditions and the transverse expansion of the fluid. As far as the near-side ridge is concerned, this statement can easily be accepted, if some high-density tubes are located close to the surface of the hot matter. As for the less trivial away-side structure, made of double ridges placed symmetrically with respect to the high- p_T trigger in the most central collisions, it is hard to understand. A closer look at the flow produced in the neighborhood of such a tube, showed that actually the ridge structure in our hydrodynamics, both nearside and the away-side, is due to a peculiar flow effect of interference between the peripheral high-energy tubes and the background hot matter in expansion. The p_T -dependence of the two-particle correlation function in $\Delta\phi$, produced by this mechanism, is similar to the PHENIX data [3].

We have further studied this mechanism, computing the three-particle correlation, which may discriminate between this and the popular Mach cone mechanism [4].

References:

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Session Classification: Dynamics and the Equation of State (2/2)

Track Classification: Investigating Dynamics and the EOS with Correlations