Contribution ID: **368** Type: **Poster**

An Initial State with local shear and vorticity for peripheral heavy ion collisions

Tuesday 15 May 2018 19:10 (30 minutes)

More than 15 years ago a longitudinal effective string rope model was proposed [1] to construct nucleus-nucleus collision Initial State (IS) for realistic 3+1D relativistic fluid dynamical models. This model reflected correctly not only the energy-momentum, but also angular momentum conservation, initial shear flow, and local vorticity [2]. Recent experimental and theoretical developments indicate that angular momentum, local vorticity and the subsequent particle polarization is observable and provides valuable information: a significant Λ polarization was detected and analyzed in detail in the RHIC BES program [3].

On the other hand, recent developments in parton kinetic and field dominance models provide a rather different initial state configuration, more compact for non-central collisions, see for example [4], what makes us revisit the early IS model [1] in that direction.

We will present a new initial state model for hydrodynamical simulation of relativistic heavy ion collisions, which is based on Bjorken-like solution applied streak by streak in the transverse plane [5]. The proposed model satisfies all the conservation laws including conservation of a strong initial angular momentum which is present in non-central collisions. As a consequence of this large initial angular momentum we observe the fluid shear in the IS, which leads to large flow vorticity. Another advantage of the proposed model is that the initial state can be given in both [t,x,y,z] and [τ, x, y,η] coordinates.

[1] V.K. Magas, L.P. Csernai, D.D. Strottman, Phys. Rev. **C64** (2001) 014901; Nucl. Phys. **A712** (2002) 167.
[2] L.P. Csernai, V.K. Magas, D.J. Wang, Phys. Rev. **C87** (2013) 034906.
[3] L. Adamczyk et al. (The STAR Collaboration), Nature **548** (2017) 62.
[4] L.G. Pang, H. Petersen, G.Y. Qin, V. Roy and X.N. Wang, Nucl. Phys. **A956** (2016) 272.
[5] V.K. Magas, J. Gordillo, D.D. Strottman, Y.L. Xie and L.P. Csernai, ***arXiv:1712.00283 [nucl-th]***.

Content type

Theory

Collaboration

Centralised submission by Collaboration

Presenter name already specified

Authors: Prof. MAGAS, Volodymyr (University of Barcelona); Mr GORDILLO, Joel (University of Barcelona); STROTTMAN, Daniel (L); XIE, Yilong (University of Bergen); CSERNAI, Laszlo Pal (University of Bergen)

Presenter: Prof. MAGAS, Volodymyr (University of Barcelona)

Session Classification: Poster Session

Track Classification: Initial state physics and approach to equilibrium