EARLY EVOLUTION OF TRANSVERSALLY THERMALIZED PARTONS

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Following our recent papers [1,2], we introduce and discuss the hydrodynamic description of transversally thermalized matter, possibly formed at the early stages of ultra-relativistic heavy-ion collisions. The formalism is based on the thermodynamically consistent approach with all thermodynamic variables referring to two-dimensional objects, the so-called transverse clusters, which are identified with the particles having the same rapidity. The resulting hydrodynamic equations for a single cluster have the form of the two-dimensional hydrodynamic equations of the perfect fluid. Since the clusters do not perform any work in the longitudinal direction, their energy is completely transformed and used to generate strong radial and elliptic flows. With a suitable choice of the initial and final temperatures one is able to describe the measured hadron spectra and the elliptic flow coefficient v_2.

The idea of purely transverse equilibration has been analyzed previously by Heinz and Wong in [3] with the conclusion that it cannot be realistic since it does not lead to the large elliptic flow found in the corresponding 3-dimensional hydrodynamic calculations. Our conclusions differ substantially from those reached in [3] because of at least two reasons: Firstly, we compare the results of our model calculations to the present data rather than to other hydrodynamic calculations. Secondly, we use a different technical implementation of the concept of transverse thermalization and longitudinal free-streaming.

References

[1] A. Bialas, M. Chojnacki, and W. Florkowski, arXiv:0708.1076 [nucl-th].
[2] M. Chojnacki and W. Florkowski, arXiv:0710.5871 [nucl-th].
[3] U. Heinz and S. M. H. Wong, Phys. Rev. **C66** (2002) 014907.