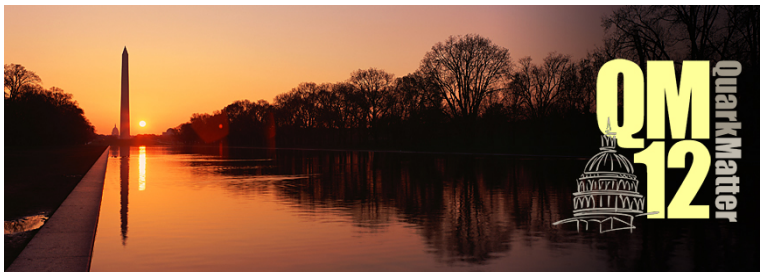

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Highly-anisotropic hydrodynamics in 3+1 space-time dimensions and the early thermalization puzzle

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Recently formulated model of highly-anisotropic and strongly dissipative hydrodynamics is used in 3+1 dimensions to study behavior of matter produced in ultra-relativistic heavy-ion collisions. We search for possible effects of the initial high anisotropy of pressure on the final soft-hadronic observables. We find that by appropriate adjustment of the initial energy density and/or the initial pseudorapidity distributions, the effects of the initial anisotropy of pressure may be easily compensated and the final hadronic observables become insensitive to early dynamics.
Our results indicate that the early thermalization assumption is not necessary to describe hadronic data, in particular, to reproduce the measured elliptic flow v2. The complete thermalization of matter (local equilibration) may take place only at the times of about 1–2 fm/c, in agreement with the results of microscopic models.

Work based on recent publications:

1. Highly-anisotropic hydrodynamics in 3+1 space-time dimensions,
   Radoslaw Ryblewski, Wojciech Florkowski, arXiv:1204.2624
2. Projection method for boost-invariant and cylindrically symmetric dissipative hydrodynamics in 3+1 space-time dimensions.
   Wojciech Florkowski, Radoslaw Ryblewski,
   Phys.Rev. C85 (2012) 044902
3. Highly-anisotropic and strongly-dissipative hydrodynamics with transverse expansion.
   Radoslaw Ryblewski, Wojciech Florkowski, Eur.Phys.J. C71 (2011) 1761
4. Highly anisotropic hydrodynamics – discussion of the model assumptions and forms of the initial conditions.
   Radoslaw Ryblewski, Wojciech Florkowski
   Acta Phys.Polon. B42 (2011) 115
5. Non-boost-invariant motion of dissipative and highly anisotropic fluid.
   Radoslaw Ryblewski, Wojciech Florkowski,
   J.Phys.G G38 (2011) 015104
6. Highly-anisotropic and strongly-dissipative hydrodynamics for early stages of relativistic heavy-ion collisions.
   Wojciech Florkowski, Radoslaw Ryblewski
   Phys.Rev. C83 (2011) 034907

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