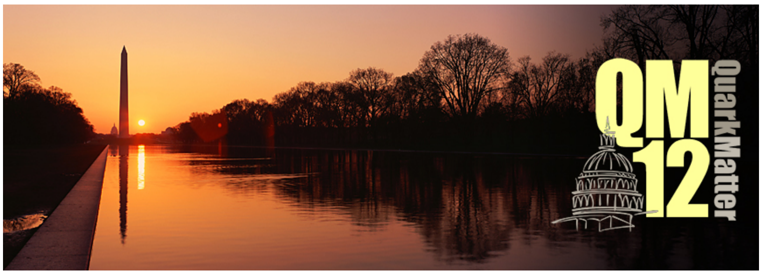

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Event-by-event distribution of azimuthal asymmetries in ultrarelativistic heavy-ion collisions

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Nowadays, relativistic dissipative fluid dynamics is a common tool to describe the space-time evolution of the quark-gluon plasma (QGP) created in ultrarelativistic heavy-ion collisions. The validity of the fluid-dynamical approach is experimentally confirmed by the fact that initial-state anisotropies are directly converted into nonvanishing (event-averaged) Fourier coefficients $\langle v_n \rangle$ of the decomposition of the single-inclusive momentum distribution of hadrons with respect to the azimuthal angle. From the magnitude of the $\langle v_n \rangle$ one can obtain information about the size of dissipative corrections and thus infer the value of the viscous coefficients of the QGP.

It has been realized that, for a proper comparison to experimental data and a reliable extraction of viscosity, fluid-dynamical calculations have to be performed on an event-by-event basis. Therefore, fluid dynamics should not only be able to predict the correct event-averaged $\langle v_n \rangle$, but also their distributions. In this paper, we investigate the event-by-event distribution of the initial-state eccentricities ε_n, and show how they correlate with the event-by-event distribution of the Fourier coefficients v_n. In order to generate the initial state, we use the Monte-Carlo Glauber model of Ref.\ [1]. For the fluid-dynamical evolution, we use the model of Refs.\ [2]. The final hadron spectra are calculated with the Cooper-Frye freeze-out procedure.

We demonstrate that the event-by-event distributions of the v_n, and not only their average values, are promising observables to gain information about the initial state of the fluid-dynamical evolution and the transport properties of the hot and dense, strongly interacting matter created in heavy-ion collisions.

[1] H.˜Holopainen, H.˜Niemi, and K.˜J.˜Eskola,
Phys.\ Rev.\ {\bf C83}, 034901 (2011),
[arXiv:1007.0368 [hep-ph]].

[2] H.˜Niemi, G.˜S.˜Denicol, P.˜Huovinen, E.˜Molnar, and D.˜H.˜Rischke,
Phys.\ Rev.\ Lett.\ {\bf 106}, 212302 (2011),
[arXiv:1101.2442 [nucl-th]];
H.˜Niemi, G.˜S.˜Denicol, P.˜Huovinen, E.˜Molnar and D.˜H.˜Rischke,
arXiv:1203.2452 [nucl-th].

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