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Hydrodynamic evolution of the event-by-event fluctuating initial state

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In high energy heavy ion collisions of RHIC and LHC, a strongly interacting quark gluon plasma (sQGP) is created. Due to the finite number of nucleons, the initial distribution fluctuates on an event-by-event basis. This medium undergoes a hydrodynamic evolution, before it freezes out to form a hadronic matter. In the last years it has been revealed that if measuring relative to higher order event planes Ψ_n, higher order flow coefficients v_n for $n > 2$ can be measured. It also turned out that Bose-Einstein (HBT) correlation radii also show 3rd order oscillations if measured versus the third order event plane Ψ_3. The initial transverse plane anisotropy causing these phenomena can be translated into a series of anisotropy coefficients or eccentricities: ϵ_2, ϵ_3, ϵ_4, etc. These anisotropies then evolve in time, and result in measurable momentum-space anisotropies, to be measured with respect to their respective symmetry planes. In our work we investigate the time evolution of the asymmetries and the mixing of spatial and momentum space anisotropies via numerical viscous hydrodynamics and via analytic solutions.

On behalf of collaboration:

NONE

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