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Event-by-event viscous hydrodynamics for RHIC and LHC[1] ZHI QIU, ULRICH HEINZ, The Ohio State University — Heavy-ion collisions create deformed quark-gluon plasma (QGP) fireballs which explode anisotropically. The viscosity of the fireball matter determines its ability to convert the initial spatial deformation into momentum anisotropies of the final hadron spectra. The initial deformation fluctuates from event to event. Previous one-shot hydrodynamic calculations dealt with this problem by evolving a single ensemble-averaged smooth initial profile; we here perform event-by-event hydrodynamic simulations and study the spectrum of the initial geometry and final momentum fluctuations in shape and orientation. We study the difference of the resulting spectra and flows between event-by-event and one-shot hydrodynamic calculations, and how these differences are affected by non-zero shear viscosity. We find that the average elliptic flow from an ensemble of individually evolved fluctuating fireballs is smaller than that obtained from a single smooth initial profile with the same average eccentricity. This results in a smaller QGP viscosity extracted from experimental elliptic flow data. We also show results from event-by-event calculations for Pb+Pb collisions at LHC, and compare them with recently measured experimental data.

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