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The dipole flow in Cu+Au and Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV with the STAR detectors

The dipole flow originates from the asymmetry in the initial density distributions either due to projectile-target asymmetry (Cu+Au collisions) or due to the event-by-event fluctuations. Unlike the conventional directed flow that is rapidity-odd in symmetric collisions, the dipole flow is rapidity-even and has weak dependence on the pseudorapidity. The dipole flow has a characteristic of zero net transverse momentum in the system. We present the dipole flow, the conventional directed flow, and the average projection of the transverse momentum on the flow direction for charged particles in Cu+Au and Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV in the STAR experiment. The directed flow is measured with respect to the spectator planes and with the three-point correlator including the participant planes as functions of the pseudorapidity, the transverse momentum, and collision centrality. Results are compared with the results in Pb+Pb collisions at the LHC. We discuss the system size and initial geometry dependence of the dipole-like fluctuations and their implications.

Preferred Track

Collective Dynamics

Collaboration

STAR

Primary author: NIIDA, Takafumi (Wayne State University)

Presenter: NIIDA, Takafumi (Wayne State University)

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