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pT dependence of the correlation between initial spatial anisotropy and final momentum anisotropies in relativistic heavy ion collisions

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The particle momentum anisotropy (v_n) produced in relativistic nuclear collisions is considered to be a response of the initial geometry or the spatial anisotropy ϵ_n of the system formed in these collisions. The linear correlation between ϵ_n and v_n quantifies the efficiency at which the initial spatial eccentricity is converted to final momentum anisotropy in heavy ion collisions. We study the transverse momentum, collision centrality, and beam energy dependence of this correlation for different charged particles using a hydrodynamical model framework. The ($\epsilon_n - v_n$) correlation is found to be stronger for central collisions and also for n=2 compared to that for n=3 as expected.However, the transverse momentum (p_T) dependent correlation coefficient shows interesting features which strongly depends on the mass as well as p_T of the emitted particle. The correlation strength is found to be larger for lighter particles in the lower p_T region. We see that the relative fluctuation in anisotropic flow depends strongly on the value of η/s specially in the region $p_T < 1$ GeV unlike the correlation coefficient which does not show significant dependence on η/s.

Preferred track

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