

Determining initial state fluctuations from flow measurements

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Long-range azimuthal correlations are generated by fluctuations of the initial energy distribution, followed by collective flow.

We list eight independent observables which can be measured using multiparticle azimuthal correlations in the first three Fourier harmonics. Some of these observables are already well known, such as $v_2\{2\}$ and $v_2\{4\}$, but most of them are new, in particular, the joint correlations between v_1 , v_2 and v_3 .

We show that by taking ratios of these observables, one can construct quantities which are largely independent of the hydrodynamic response of the medium, and thus are solely determined by initial fluctuations.

We present predictions for these ratios using a Monte-Carlo Glauber model and a Monte-Carlo KLN model, and compare to existing data from STAR and ALICE.

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