



High Energy Physics - Phenomenology

# Longitudinal Fluctuations in Partonic and Hadronic Initial State

Yun Cheng, Yu-Liang Yan, Dai-Mei Zhou, Xu Cai, Ben-Hao Sa, Laszlo P. Csernai

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Collective flow in collisions between Lead nuclei at LHC are influenced by random initial state fluctuations, especially for odd harmonics. Here we extend fluctuation studies to longitudinal fluctuations, which may have significant effect on the rapidity distribution of odd harmonics. Furthermore center of mass rapidity fluctuations are measurable, but not yet analysed. Here in the PACIAE parton and hadron molecular dynamics model we make an analysis of initial state fluctuations. As previous analyses discussed mainly the effects of fluctuations on eccentricity and the elliptic flow we pay particular attention to the fluctuations of the Center of Mass rapidity of the system, which is conservatively estimated in our model as  $\{\Delta y\}_{CM} = 0.1$ , by neglecting all pre-equilibrium emission effects that are increasing the  $y_{CM}$  fluctuations.

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