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## Simulation studies of event-by-event fluctuations of mean transverse momentum ( $\langle p_T \rangle$ ) in pp collisions at $\sqrt{s}$ = 13 TeV with PYTHIA8 and HERWIG7 models

Measurements of event-by-event mean transverse momentum  $(\langle p_T \rangle)$  fluctuations are reported in terms of the integral correlator  $\langle \Delta p_T \Delta p_T \rangle$  and skewness of the event-wise  $\langle p_T \rangle$  distribution in pp collisions at  $\sqrt{s} = 13$  TeV with the Monte Carlo event generators PYTHIA8 and HERWIG7. The final-state charged particles with transverse momentum  $(p_T)$  and pseudo-rapidity  $(\eta)$  range  $0.15 \leq p_T \leq 2.0$  GeV/c and  $|\eta| \leq 0.8$  were considered for the investigations. The correlator  $\langle \Delta p_T \Delta p_T \rangle$  is observed to follow distinct declining trends with the average charged particle multiplicity ( $\langle N_{ch} \rangle$ ) for the PYTHIA8 and HERWIG7 models. Furthermore, both models yield positive finite skewness in low-multiplicity events. The observables are additionally studied using the transverse spherocity estimator ( $S_0$ ) to comprehend the relative contributions of hard scattering (jets) and soft multi-partonic interactions (MPI). The present comparative measurements using these models would provide a better understanding of the fluctuation dynamics and construct a crucial baseline to search for non-trivial fluctuations in heavy-ion collisions.

## Field of contribution

Phenomenology

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