

Study of identified particle production as a function of transverse event activity classifier, S_T in p–p collisions

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The underlying events (UE) in proton-proton (p–p) collisions encompass aspects of the interaction not attributed to the primary hard scattering, but arising from accompanying interactions of the rest of the proton. Traditionally, UE studies involve defining topological regions relative to the leading particle in an event, with the transverse region being especially sensitive to UE activity. Various classifiers have been used to discriminate the extent of UE activity regions.

This contribution introduces a new observable, S_T , defined as the sum of the transverse momentum of charged particles ($\sum_i p_{T_i}$) produced in p–p collisions at LHC energies to probe the underlying events. The production of identified particles like π^\pm , K^\pm , p, K_S^0 , and Λ^0 are studied in different ranges of this transverse activity classifier in p–p collisions at $\sqrt{s} = 13$ TeV using pQCD inspired PYTHIA 8 event generator. A comparative analysis of the identified particle spectra, mean multiplicity and mean transverse momentum has been carried out with respect to S_T and the performance of this new observable is gauged by comparing the results with previously defined R_T observable.

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