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MPI dependence of the near- and away-side p_T spectra for 5 TeV pp, p-Pb and Pb-Pb collisions with the ALICE detector at the LHC

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The similarities between pp, p-A and A-A collisions have not been fully understood. One issue when comparing e.g. transverse momentum (p_T) distributions for different colliding systems at similar mid-rapidity multiplicity, is that selection biases and autocorrelations may play different roles. Recently, the use of the correlation between relatively high- p_T tracks ($p_T^{\text{leading}} > 5 \text{ GeV}/c$) and hadrons at lower momenta ($0.5 < p_T^{\text{associated}} < 5 \text{ GeV}/c$) has been proposed in order to introduce a new multiplicity estimator. Based on distinct regions defined by $\Delta\phi = \phi_{\text{leading}} - \phi_{\text{associated}}$, the so-called transverse region, $\pi/3 < |\Delta\phi| < 2\pi/3$, can be used to build a multiplicity estimator (N_T) which by definition does not contain the leading and sub-leading jet peaks. In pp collisions simulated with QCD-inspired event generators like PYTHIA, N_T is sensitive to Multiple Partonic Interactions (MPI).

This MPI-motivated analysis has been successfully applied to ALICE $\sqrt{s} = 13 \text{ TeV}$ pp data; we now extend the study to bigger systems like p-Pb and Pb-Pb collisions. In this work, the p_T spectra in the near ($|\Delta\phi| < \pi/3$), away ($|\Delta\phi| > 2\pi/3$) and transverse regions will be presented a function of N_T . Results include measurements for pp, p-Pb and Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02 \text{ TeV}$. Comparisons among the near and away side p_T spectra, at the same N_T and $\sqrt{s_{NN}}$, will be shown. The role of auto-correlations and potential effects of MPI in p-Pb and Pb-Pb collisions will be discussed. Comparisons with existing QCD-inspired event generators will be shown.

Collaboration (if applicable)

ALICE

Track

Jets and High Momentum Hadrons

Contribution type

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