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Particle production as a function of underlying event-activity and very forward energy with ALICE

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In this contribution, the similarity between small and large collision systems will be explored using the underlying event (UE) charged particle density, N_T, and the self-normalized observable based on transverse region multiplicity, R_T. A study of KNO-like scaling properties of the N_T distributions in pp collisions at $\sqrt{s}$ = 2.76, 5.02, 7 and 13 TeV will be presented. Final measurements of charged particle production as a function of N_T in pp, p–Pb and Pb–Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV will be presented in the toward, away and transverse regions. In addition, the UE contributions measured in the transverse region are subtracted from the toward and the away regions to search for jet-like modifications in small collision systems. The jet-like signals are studied both as a function of N_T and of the leading particle transverse momentum. To explore the particle species dependence, the final results of π, K and p production as a function of R_T in pp collisions at $\sqrt{s}$ = 13 TeV are presented. In addition, results on very forward energy, measured by the ALICE zero degree calorimeters (ZDCs), and differential studies of particle production will be presented for $\sqrt{s}$ = 13 TeV pp collisions and $\sqrt{s_{NN}}$ = 8.16 TeV p–Pb collisions. The event-activity based on UE measurements and very forward energy for pp collisions will be compared with p–Pb collisions. Finally, the results will be compared with the expectations of QCD-inspired Monte Carlo event generators, such as PYTHIA and EPOS-LHC, to test if these models can describe both the UE and the forward fragmentation observables, which are mainly driven by non-perturbative QCD physics.

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