

Quarkonium production as a function of charged particles multiplicity in pp and p-Pb collisions measured by ALICE at the LHC

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In pp collisions such as the ones delivered by the LHC since 2010, the production of heavy quarks proceeds dominantly from the hard scattering of two gluons. These quarks then hadronize in either open heavy-flavor hadrons or quarkonia (e.g. J/ψ , Υ). The study of quarkonium production as a function of the charged particle multiplicity therefore naturally links soft and hard processes that occur in the collision and allows one to study their interplay. While a linear increase of quarkonium production as a function of the charged particle multiplicity can be reasonably well understood in the context of multi-parton interactions, the observation of deviations with respect to a linear increase requires a more detailed description of the collision and the inclusion of additional mechanisms such as collective effects, color reconnection or percolation. In addition, further insight on the interplay between soft and hard processes can also be gained experimentally by measuring correlations between the quarkonium and the other hadrons produced in the collision as a function of both pseudo-rapidity and azimuthal angle.

The ALICE detector at the LHC measures quarkonium production down to zero transverse momentum in two rapidity ranges: at mid-rapidity in the di-electron decay channel using the central barrel and at forward rapidity in the di-muon decay channel using the muon spectrometer. In this presentation we will discuss the production of quarkonia as a function of the charged particle multiplicity as measured by ALICE in pp collisions for center-of-mass energies ranging from 2.76 TeV to 13 TeV in these two rapidity ranges and for several intervals of the quarkonium transverse momentum. Similar measurements in p-Pb collisions at center of mass energies per nucleon-nucleon collision of 5.02 and 8.16 TeV will also be presented. These results will be compared to corresponding measurements performed for D mesons, as well as to model calculations. Finally, J/ψ -hadron correlations at mid-rapidity in pp collisions at $\sqrt{s} = 13$ TeV will also be discussed.

Summary

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