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Measurements of J/ψ production in pp collisions at LHC energies with ALICE

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Charmonium production in hadronic collisions is a complex process involving both hard scales, i.e. the production of charm-anticharm quark pairs in initial hard collisions, and soft scales, i.e. the subsequent formation of a bound charmonium state. The former can be addressed by perturbative Quantum ChromoDynamics (QCD), whereas the latter fall into the non-perturbative regime of QCD. Theoretical models are not yet able to provide a comprehensive description of all aspects of charmonium production in hadronic collisions. Experimental data on charmonium production in proton-proton collision are relevant to constrain the above mentioned theoretical models; in addition they serve as a crucial baseline for proton-nucleus collisions, in which Cold Nuclear Matter effects can occur, as well as for nucleus-nucleus collisions, where the production of a hot medium is expected, which can lead to suppression or enhancement mechanisms.

ALICE has unique capabilities among the LHC experiments to measure J/ψ production both at forward rapidity in the $\mu^+\mu^-$ decay channel and at mid-rapidity in the e^+e^- decay channel down to zero transverse momentum.

In this talk we will present an overview of ALICE results concerning the measurements of J/ψ production in pp collisions at $\sqrt{s}$ = 7 TeV and at $\sqrt{s}$ = 8 TeV collected during the LHC Run-1, as well as first results at forward rapidity from pp collisions at $\sqrt{s}$ = 13 TeV and at $\sqrt{s}$ = 5 TeV collected during the first part of LHC Run-2. In particular, the measurements of J/ψ production as function of transverse momentum, rapidity, and charged-particle multiplicity will be discussed and compared to theoretical models.

Summary

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