

Charmonium production in proton-proton and proton-lead collisions at the LHC measured with ALICE

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The ALICE experiment at CERN probes the exotic state of hot and dense matter created in ultrarelativistic heavy ion collisions - the Quark-Gluon Plasma (QGP). Due to its short lifetime, the QGP can be studied only via its signatures. The suppression of charmonia, which are the bound states of charm and anticharm quark pair, was proposed as a proof of formation of the deconfined medium. Nevertheless, to understand which effects among those acting on the charmonia production in nucleus-nucleus collisions truly stem from the presence of the QGP, ALICE also studies the production of charmonia in pp and p-Pb collisions. The QGP is expected not to form in these systems. Furthermore, charmonium production combines processes at both soft and hard scales of the QCD, which can therefore be tested by measuring the charmonium kinematic distributions in pp collisions. Measurements of charmonia production in p-Pb collisions can unveil more information on the cold nuclear matter (CNM) effects originating from the binding of the nucleons in the nucleus.

In this seminar, we will motivate the study of the charmonium production in pp and p-Pb collisions. We will review recent measurements in the forward rapidity region with ALICE at different energies in pp and p-Pb. Particular focus will be given to the first excited state J/ψ . In the second part, we will discuss the studies of the dependence of charmed hadron production on the charged particle multiplicity. In pp, the production of multiplicity dependence of charmed hadrons could unveil information on the mechanisms contributing to the particle production, namely the Multiple Parton Interactions (MPI). In p-Pb, similar measurements are expected to be more sensitive to various CNM effects.