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Inclusive J/ψ production in pp, p-Pb and Pb-Pb collisions at forward rapidity with ALICE at the LHC

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The ALICE collaboration has studied inclusive J/ψ production in pp, p-Pb and Pb-Pb collisions with the ALICE Muon Spectrometer. The measurement was performed in the rapidity range $2.5 < y_{lab} < 4.0$, studying the decays into muon pairs. The J/ψ production cross-sections in pp at $\sqrt{s} = 7$ TeV, both integrated and differential in rapidity and in transverse momentum will be presented.

The J/ψ nuclear modification factor as a function of rapidity or transverse momentum in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV will be presented and compared to theoretical models. A suppression of the J/ψ has been found in Pb-Pb collisions, with respect to the J/ψ measured in pp collisions at the same center-of-mass energy. p-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV have also been studied at the LHC, in order to measure the effects related to cold nuclear matter, which, for charmonia, include gluon shadowing (or gluon saturation), energy loss and nuclear absorption. The study of these effects in p-Pb collisions is important in order to be able to disentangle hot and cold nuclear matter effects in Pb-Pb collisions. Results on inclusive J/ψ nuclear modification factor in p-Pb collisions will be presented and compared to theoretical models. Since the LHC provided both p-Pb and Pb-p collisions, forward and backward rapidity region were probed. The implication of these results for the interpretation of Pb-Pb collision results will be discussed.

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