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Quarkonium production in nucleus-nucleus collisions with ALICE at the LHC

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ALICE is the LHC experiment dedicated to the study of high energy heavy-ion collisions, where the formation of a hot and dense strongly-interacting medium, a Quark-Gluon Plasma (QGP), is expected. Considerable theoretical and experimental efforts have been invested in the last 30 years to study the properties of the QGP. One of the signals of QGP formation is the suppression of quarkonia, bound states of quark-antiquark pairs, due to color Debye screening. Measurements from Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV and $\sqrt{s_{NN}} = 5.02$ TeV revealed a suppression of quarkonium yields in central collisions, compared to binary-scaled pp collisions. However, the magnitude of the suppression is smaller than what was observed at lower energies at the SPS and RHIC, indicating that charmonium (re)generation via the (re)combination of charm and anti-charm quarks plays an important role at LHC energies. The measurement of elliptic flow of J/ψ further constrains the interplay between charmonium suppression and (re)generation mechanisms in Pb-Pb collisions. Bottomonia measurements in heavy-ion collisions shows a strong suppression effect with very little or no (re)generation of bottomonia from the medium or phase boundary.

Differential measurements of the nuclear modification factor of J/ψ , $\psi(2S)$ and Υ will be presented as a function of centrality, transverse momentum and rapidity for Pb-Pb collisions at $\sqrt{s_{rmNN}} = 5.02$ TeV. Measurements of the $\psi(2S)$ over J/ψ ratio as a function of centrality and transverse momentum will also be shown. The results on the J/ψ $\langle p_T \rangle$ and $\langle p_T^2 \rangle$ as a function of centrality will be presented. We will also report the latest results on J/ψ elliptic flow in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV. A comparison of the ALICE results with model predictions and with other experimental measurements will be presented.

Experimental Collaboration

ALICE Collaboration

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