



Contribution ID: 397

Type: **Parallel session talk**

## Recent charmonium measurements in Pb–Pb collisions with ALICE

*Monday 21 August 2023 17:00 (15 minutes)*

Charmonia have long been recognized as a valuable probe of the nuclear matter in extreme conditions, such as the strongly interacting medium created in heavy-ion collisions and known as quark-gluon plasma (QGP). At LHC energies, the regeneration process due to the abundantly produced charm quarks, was found to considerably affect measured charmonium observables. Comprehensive production measurements of charmonia, including both ground and excited states, are crucial to discriminate among different regeneration scenarios assumed in theoretical calculations. Charmonia can also be sensitive to the initial state of the heavy-ion collision. In particular, their spin-alignment can be affected by the strong magnetic field generated in the early phase, as well as by the large angular momentum of the medium in non-central collisions. The determination of the component originating from beauty hadron decays, known as non-prompt charmonium, grants a direct insight into the nuclear modification factor of beauty hadrons, which is expected to be sensitive to the energy loss experienced by the ancestor beauty quarks inside the QGP. Furthermore, once it is subtracted from the inclusive charmonium production, it allows for a direct comparison with prompt charmonium models.

In this contribution, newly published results of inclusive  $J/\psi$  production, including yields, average transverse momentum and nuclear modification factors, obtained at central and forward rapidity in Pb–Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV, will be presented. At midrapidity, newly published measurements of prompt and non-prompt  $J/\psi$  production will also be shown. Recently published results obtained at forward rapidity in Pb–Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV will be discussed. These include, among others, the  $\psi(2S)$ -to- $J/\psi$  (double) ratio and the  $\psi(2S)$  nuclear modification factor, as well as the  $J/\psi$  polarization with respect to a quantization axis orthogonal to the event-plane. Results will be compared to available model calculations.

### Collaboration / Activity

ALICE

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