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Beauty production studies via quarkonia measurements with ALICE

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Charm and beauty quarks are produced at the earliest stages of ultrarelativistic heavy-ion collisions through hard scattering processes. Quarkonium production serves as a probe of the perturbative aspects of quantum chromodynamics (QCD) through heavy-quark production in the initial hard scattering, while the non-perturbative aspects play a crucial role in the subsequent formation of the heavy quark-antiquark bound state. Moreover, charmonium production can be separated into two main components: a prompt contribution from directly produced charm–anticharm pairs and a non-prompt contribution originating from the decays of beauty hadrons.
In this talk, measurements of prompt and non-prompt J/ψ production performed by the ALICE Collaboration in pp and Pb–Pb collisions will be presented at midrapidity ($|y| < 0.8$) and forward rapidity ($2.5 < y < 3.6$). Thanks to the upgraded ALICE detector in Run 3 and the high-luminosity data collected, the first preliminary measurements of the $B^{\pm}$ meson production cross section at midrapidity in pp collisions at $\sqrt{s}$ = 13.6 TeV will be shown, along with the first results on prompt and non-prompt ψ(2S) production at midrapidity. The experimental results will be compared with existing theoretical model predictions.

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