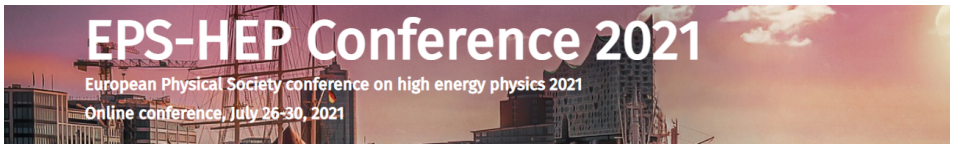

Contribution ID: **546** Type: **Parallel session talk**

Quarkonium production in pp, p-Pb, and peripheral Pb-Pb collisions with ALICE (12'+3')

Tuesday 27 July 2021 09:30 (15 minutes)

The production of quarkonia, bound states of heavy quark-antiquark pairs, in hadronic collisions is a unique testing ground for our understanding of QCD as the theory of the strong interaction. The hard scattering that produces the heavy-quark pair can be described within perturbative QCD, whereas the evolution of this pair into a colorless bound state involves soft scales. At LHC energies, quarkonia are abundantly produced, and hence can be used to investigate multiple parton interactions. In addition, in pp collisions, quarkonium production serves as a reference for the production in proton-nucleus and nucleus-nucleus collisions, where it becomes sensitive to cold nuclear matter effects (nuclear shadowing of the parton density, energy loss of the $q\bar{q}$ pair while traversing the nucleus, rescattering/break-out effects) and hot nuclear effects (QGP formation). Furthermore in peripheral Pb-Pb collisions, J/ψ photoproduction in coincidence with hadronic interaction can probe the initial state of the heavy-ion collision. ALICE is able to measure quarkonia both at forward ($2.5 < y < 4$) and midrapidity ($|y| < 0.9$) down to zero transverse momentum in all collision systems provided by the LHC, which is a unique feature. In this contribution, final results in pp collisions on J/ψ, ψ(2S), and Υ(nS) production at forward rapidity at $\sqrt{s}$ = 5.02 TeV, and on J/ψ production at midrapidity at $\sqrt{s}$ = 5.02 and 13 TeV will be presented. At midrapidity, the prompt J/ψ production, originating from direct quarkonium production in the collision, and the non-prompt J/ψ production, originating from b-hadron decays are measured separately. Inclusive J/ψ cross section is measured at midrapidity up to 40 GeV/c at $\sqrt{s}$ = 13 TeV, thanks to events triggered according to the energy deposition in EMCAL. Results on the hadron multiplicity dependence of J/ψ production at $\sqrt{s}$ = 5.02 and 13 TeV at both central and forward rapidities, and preliminary results on the multiplicity dependence of ψ(2S) and Υ(1S, 2S) production at forward rapidity at $\sqrt{s}$ = 13 TeV will be shown. In p-Pb collisions, at forward rapidity and $\sqrt{s_{NN}}$ = 8.16 TeV, final results on ψ(2S) yield modification, including its dependence on the event centrality and on Υ production will be presented. Finally, we will show new results based on the full Run 2 Pb-Pb statistics on J/ψ photoproduction in hadronic semi-central collisions at forward rapidity. The comparison of results across different beam energies and with theoretical model calculations will also be discussed.

Collaboration / Activity

ALICE

First author

Email

Primary authors: COLLABORATION, ALICE; PACHMAYER, Yvonne

Presenter: PACHMAYER, Yvonne

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