



Contribution ID: 954

Type: Oral presentation

$\Upsilon(nS)$ meson production in Pb+Pb and pp collisions

Thursday, 7 April 2022 11:50 (20 minutes)

Measurements of bottomonium states in heavy-ion collisions provide a powerful tool to study both initial-state effects on heavy-quark production and final-state interactions between heavy quarks and the quark-gluon plasma (QGP).

The ATLAS experiment at LHC has measured the production of bottomonium states $\Upsilon(1S)$, $\Upsilon(2S)$ and $\Upsilon(3S)$, in Pb+Pb and pp collisions at a center-of-mass energy per nucleon pair of 5.02 TeV. The data correspond to integrated luminosities of 1.38 nb^{-1} of Pb+Pb data collected in 2018, 0.44 nb^{-1} of Pb+Pb data collected in 2015, and 0.26 fb^{-1} of pp data collected in 2017. The final ATLAS result on the production of three bottomonium states will be reported. The measurement in Pb+Pb collisions is compared to that in pp collisions to extract the nuclear modification factor, R_{AA} , as a function of event centrality, p_T and rapidity, and compared to several theoretical models.

We will also present a new measurement studying the relationship between the production of hard and soft particles through the correlation of Upsilon meson states with the inclusive-charged particle yields. The analysis is performed using the full-luminosity ATLAS Run-2 13 TeV pp data. A description of the technical challenges associated with a heavy-ion style analysis in high-pileup pp data will be shown, as well as the results and their physics implications.

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