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Evidence for X(3872) Production in PbPb collisions and studies of its prompt production with CMS

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The first evidence for X(3872) production in relativistic heavy ion collisions is reported. The X(3872) hadron is studied in PbPb collisions at a center-of-mass energy of 5.02 TeV per nucleon pair, using the decay chain $X(3872) \rightarrow J/\psi\pi\pi \rightarrow \mu^+\mu^-\pi^+\pi^-$ decay chain. The data were recorded with the CMS detector in 2018 and correspond to an integrated luminosity of 1.7/nb. The measurement is performed in the rapidity and transverse momentum ranges $|y| < 1.6$ and $15 < p_T < 50$ GeV. The significance of the inclusive X(3872) signal is 4.2 standard deviations. The prompt X(3872) to $\psi(2S)$ yield ratio is found to be $\rho^{PbPb} = 1.08 \pm 0.49(stat) \pm 0.52(syst)$, in contrast to typical values of 0.1 for pp collisions. This result provides a unique experimental input to theoretical models of the production mechanism and the nature of the X(3872) state. Future plan to exploit the Run 3 data is also presented in this talk.

Collaboration

CMS

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