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Measurement of prompt $\psi(2S)$ production cross sections in proton-lead and proton-proton collisions at $\sqrt{s(NN)}=5.02$ TeV

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Abstract

Measurements of prompt $\psi(2S)$ meson production cross sections in proton-lead (pPb) and proton-proton (pp) collisions at a nucleon-nucleon center-of-mass energy of $\sqrt{s(NN)} = 5.02$ TeV are reported. The results are based on pPb and pp data collected by the CMS experiment at the LHC, corresponding to integrated luminosities of 34.6 nb⁻¹ and 28.0 pb⁻¹, respectively. The nuclear modification factor R_{pPb} is measured for prompt $\psi(2S)$ in the transverse momentum range $4 < p(T) < 30$ GeV/c and the center-of-mass rapidity range $-2.4 < y(CM) < 1.93$. The results on $\psi(2S)$ R_{pPb} are compared to the corresponding modification factor for prompt J/ψ mesons. The results point to different nuclear effects at play in the production of the excited charmonium state compared to the ground state, in the region of backward rapidity and for $PT < 10$ GeV/c. (C) 2019 The Author. Published by Elsevier B.V.

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