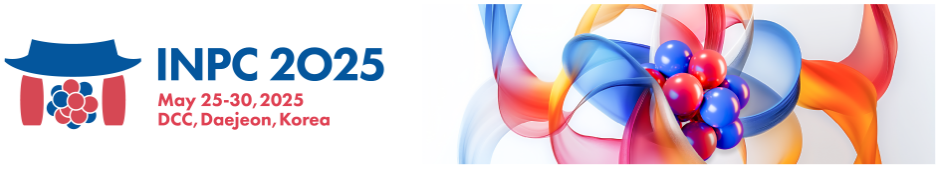

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# New high-precision measurement of the nuclear modification of prompt and nonprompt charmonia at unprecedently high ($p_{\mathrm{T}}$) in PbPb collisions with CMS

*Friday, 30 May 2025 09:10 (15 minutes)*

Quarkonia serve as powerful probes for investigating heavy quark dynamics and bound state behavior across multiple scales in heavy ion collisions. The production of prompt charmonia primarily reflects interactions between charm quarks and medium components, while nonprompt charmonia, produced through B hadron decay, illuminate beauty quark behavior. High-$p_{\mathrm{T}}$ measurements provide novel insights into color charge energy loss within the medium. Leveraging the extensive PbPb collision dataset from CMS, we present highly precise nuclear modification factors for both prompt and nonprompt J/$\psi$ and $\psi$(2S) mesons, along with their relative ratios. Our prompt measurements reach unprecedented $p_{\mathrm{T}}$ ranges for quarkonia in heavy ion collisions. These comprehensive measurements will provide crucial insights into the sequential suppression of heavy quark bound states in the quark-gluon plasma, while the high-precision nonprompt data will significantly constrain the degree of beauty quark interactions within the medium.

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