

Charmonium production in pp and PbPb collisions with the CMS detector

arXiv:1712.08959 [hep-ph]

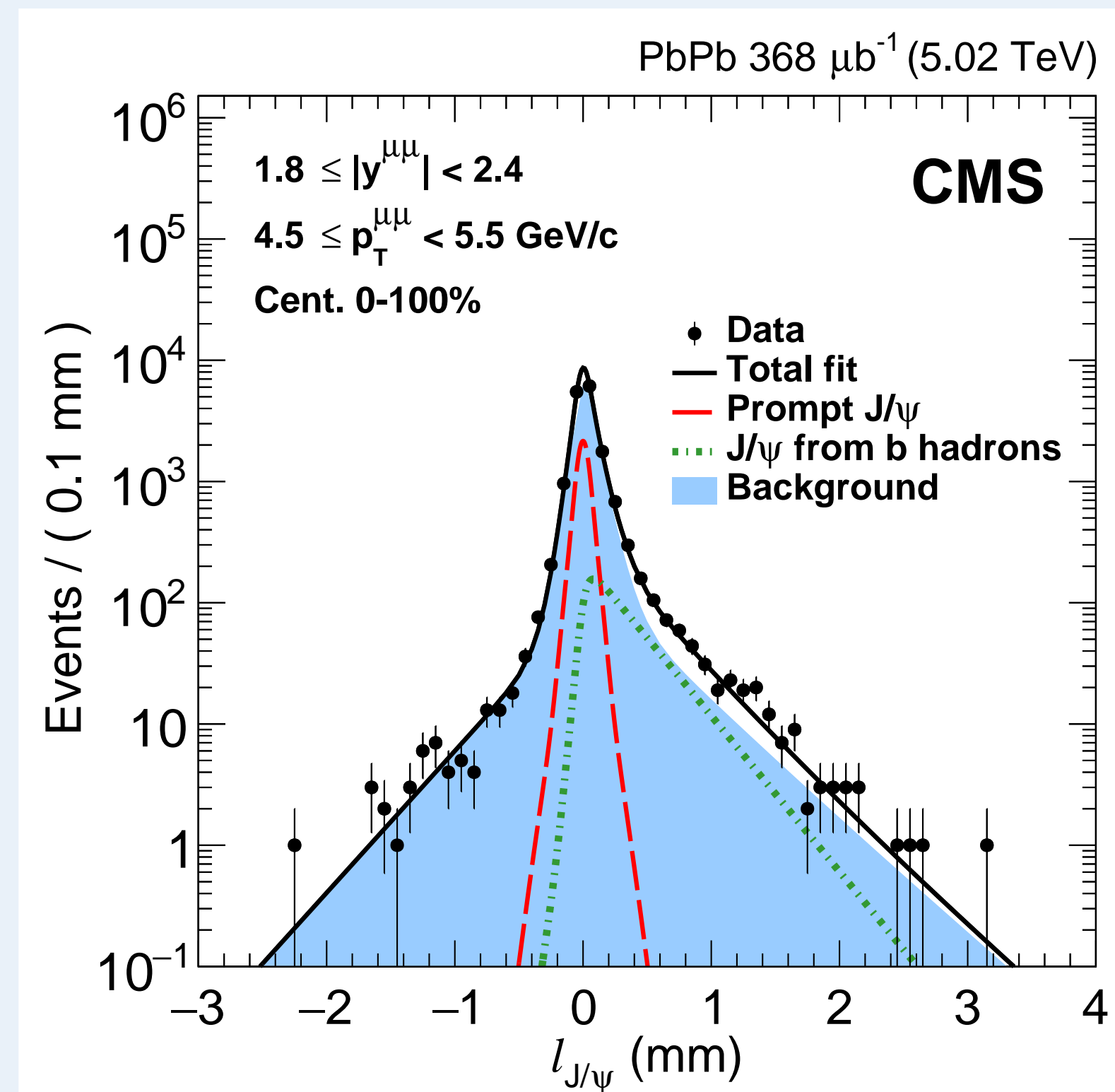
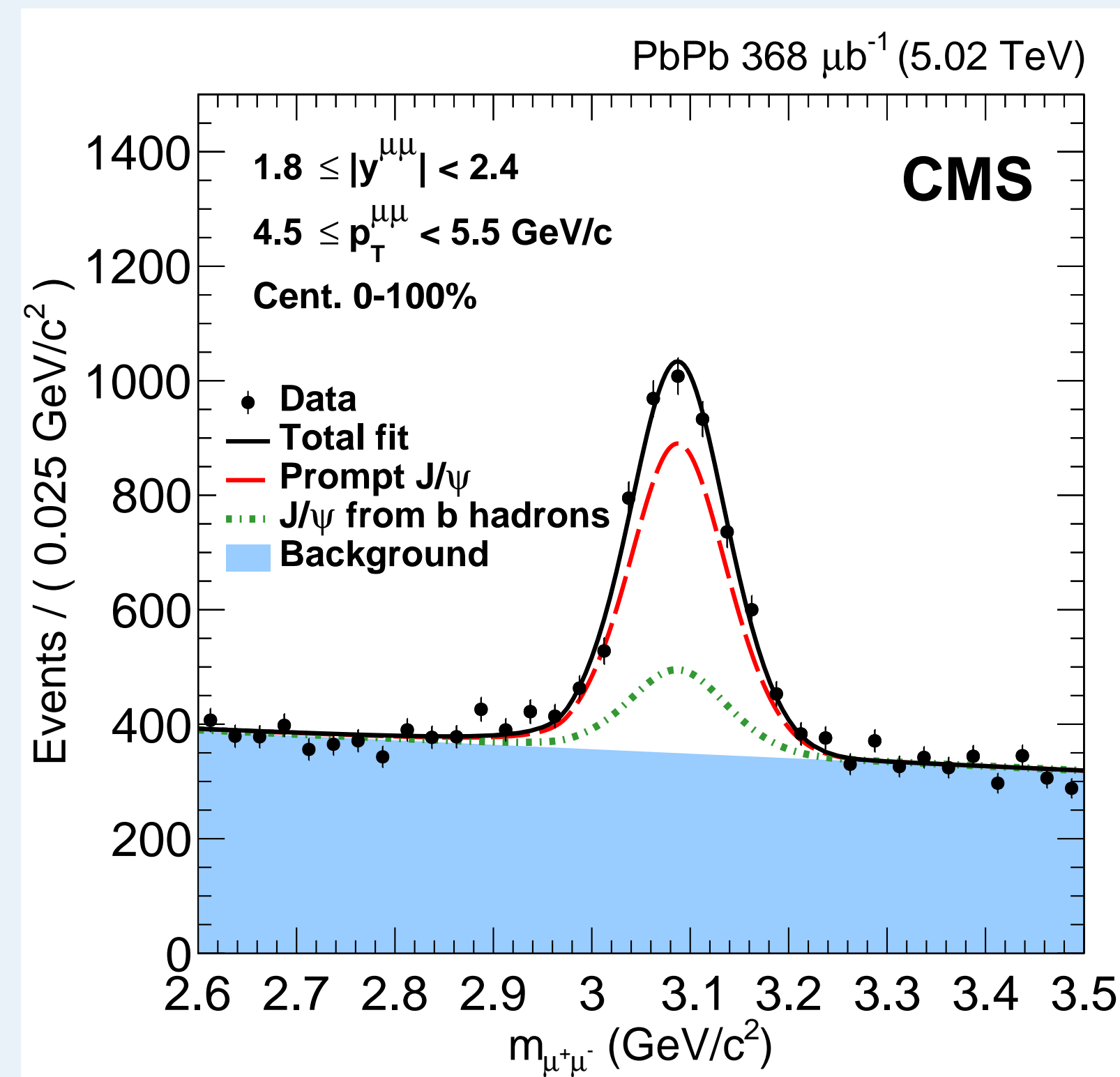
Émilien Chapon, on behalf of the CMS Collaboration
emilien.chapon@cern.ch



Introduction

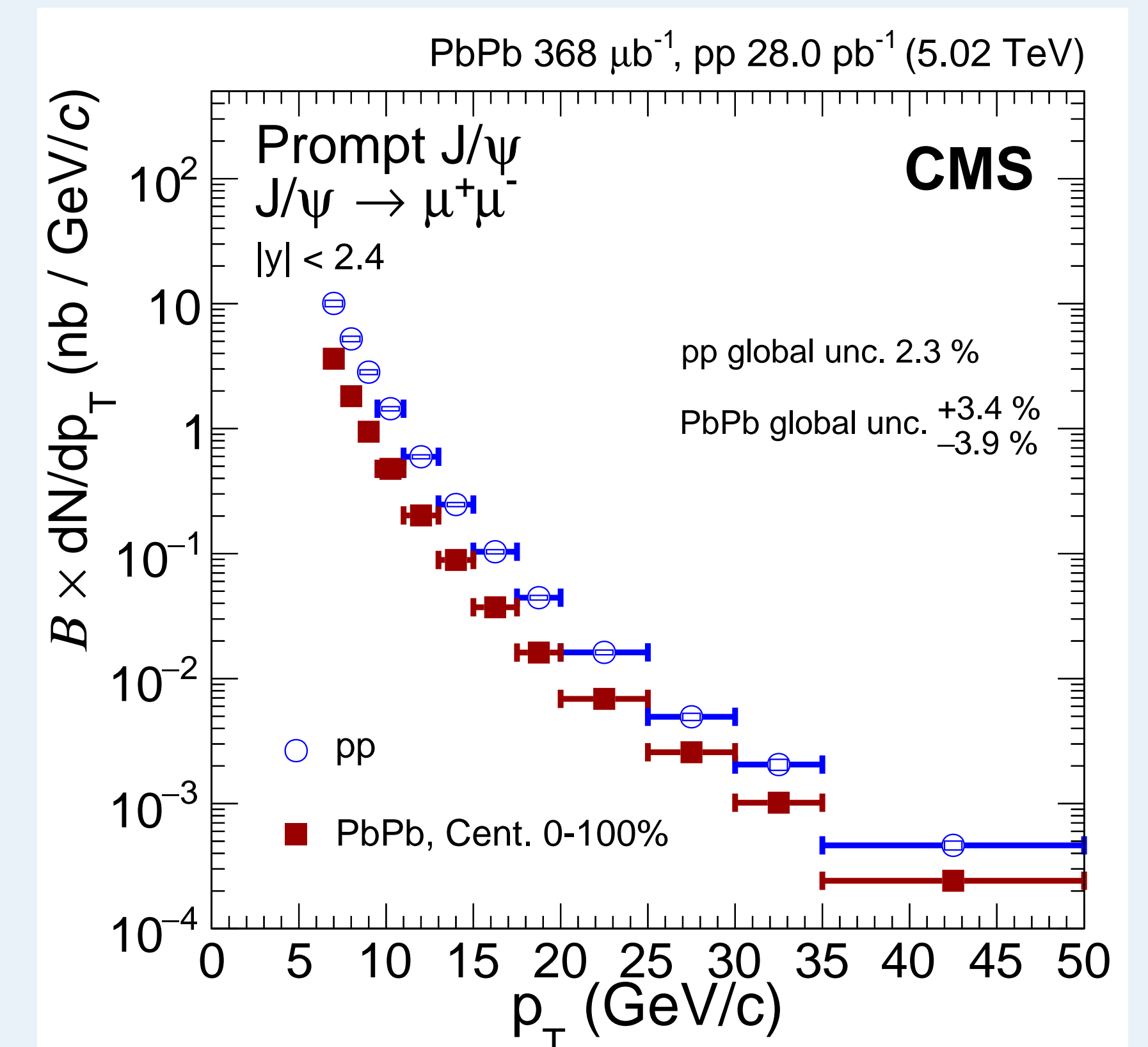
We report prompt J/ψ and $\psi(2S)$ production in pp and PbPb collisions at $\sqrt{s_{NN}} = 5.02$ TeV, in the range $|y| < 2.4$ and $3 < p_T < 50$ GeV [1]. Besides cold nuclear matter effects, such as nuclear PDFs and final state interactions, charmonium production in PbPb is also sensitive to Debye screening, regeneration in the plasma, and parton energy loss.

Signal extraction



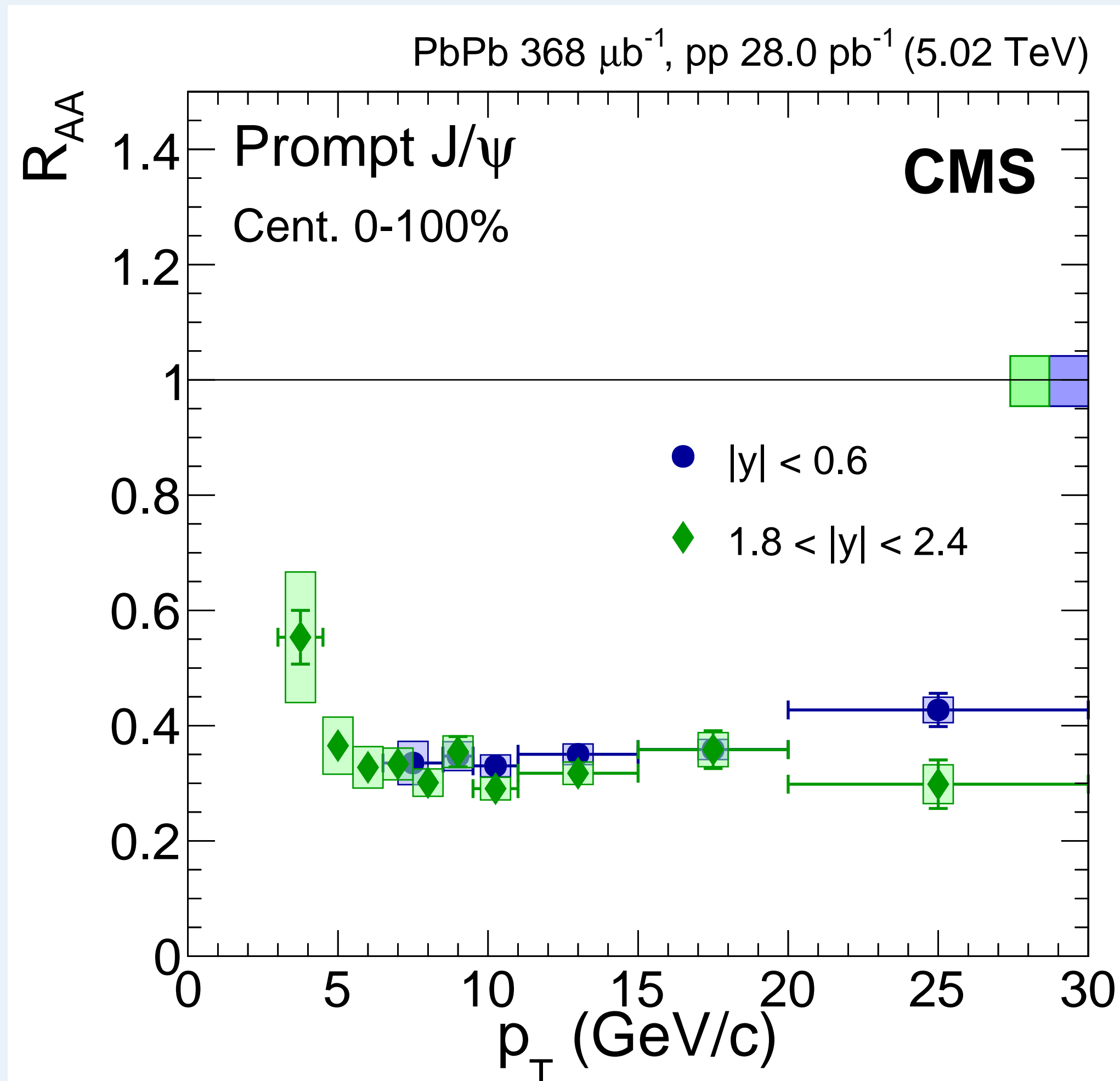
Nonprompt charmonia originate from the **decay of B mesons**, which can be resolved using a **two-dimensional fit** of the **dimuon mass** and the **pseudo-proper decay length** $l_{J/\psi}$, reconstructed using the distance between the primary and dimuon vertices.

Cross sections



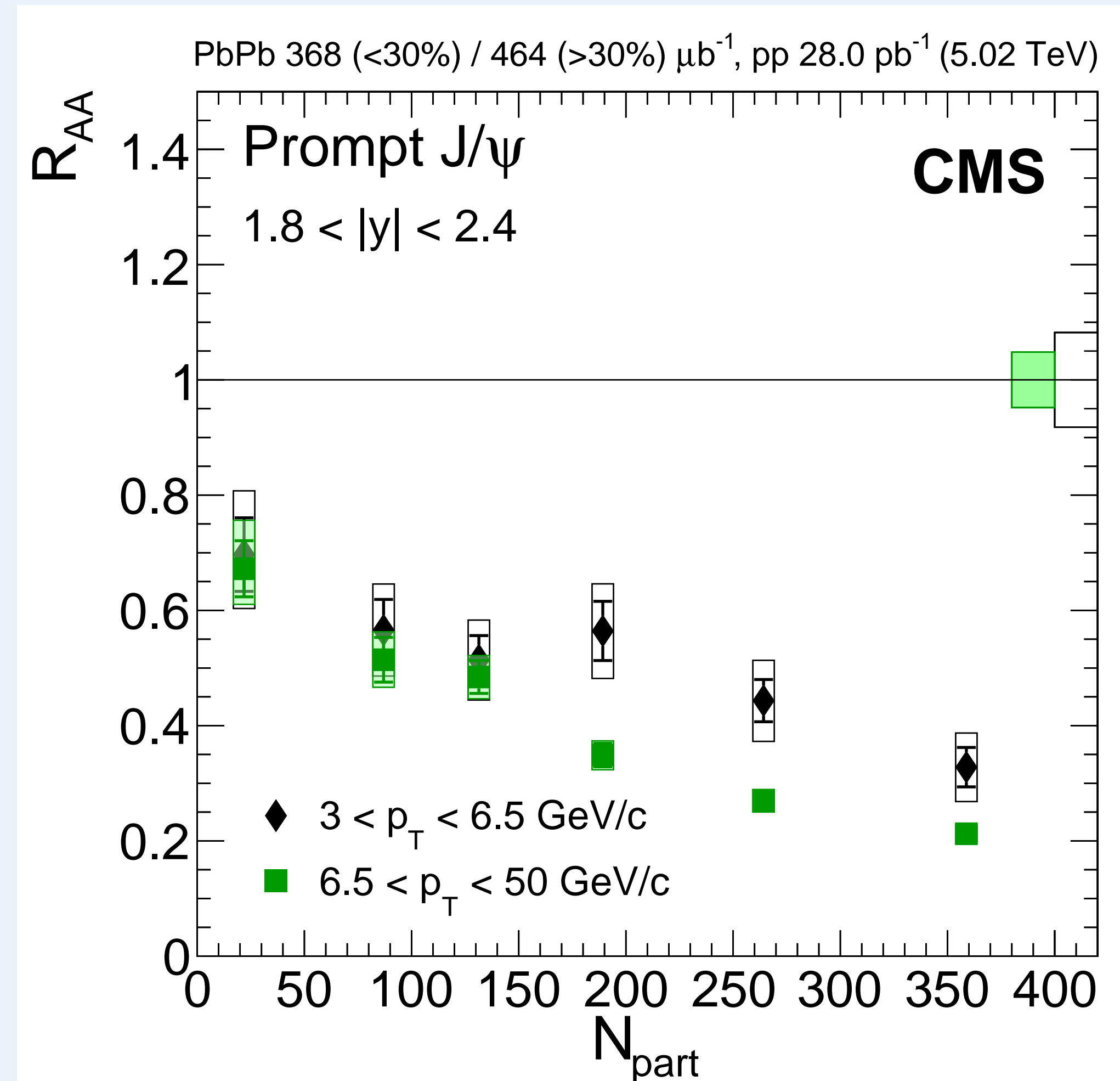
Cross sections can be directly compared to production models in pp and PbPb.

R_{AA} : p_T dependence



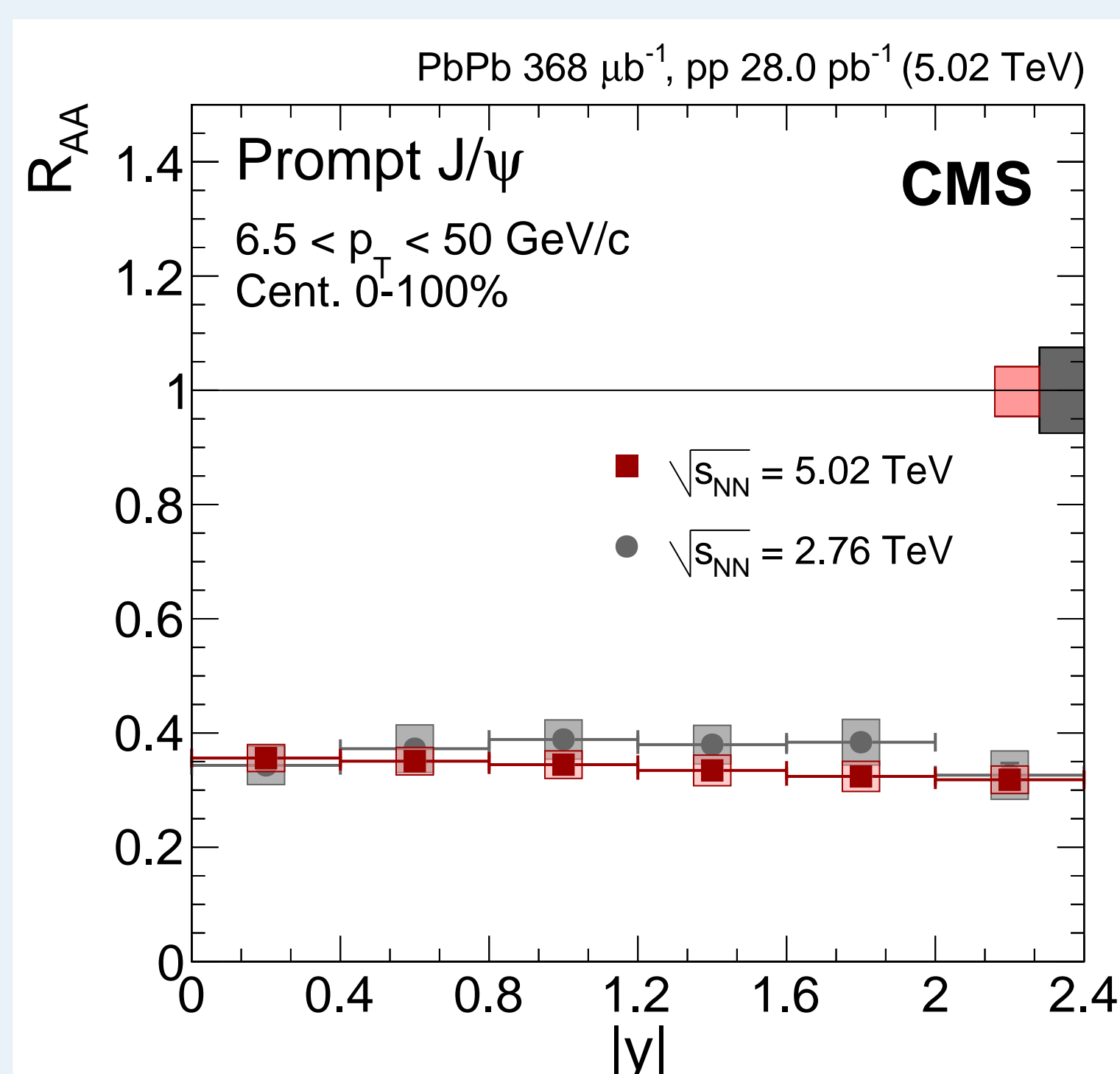
Hint for a **smaller suppression** at low p_T (regeneration?).

R_{AA} : centrality dependence



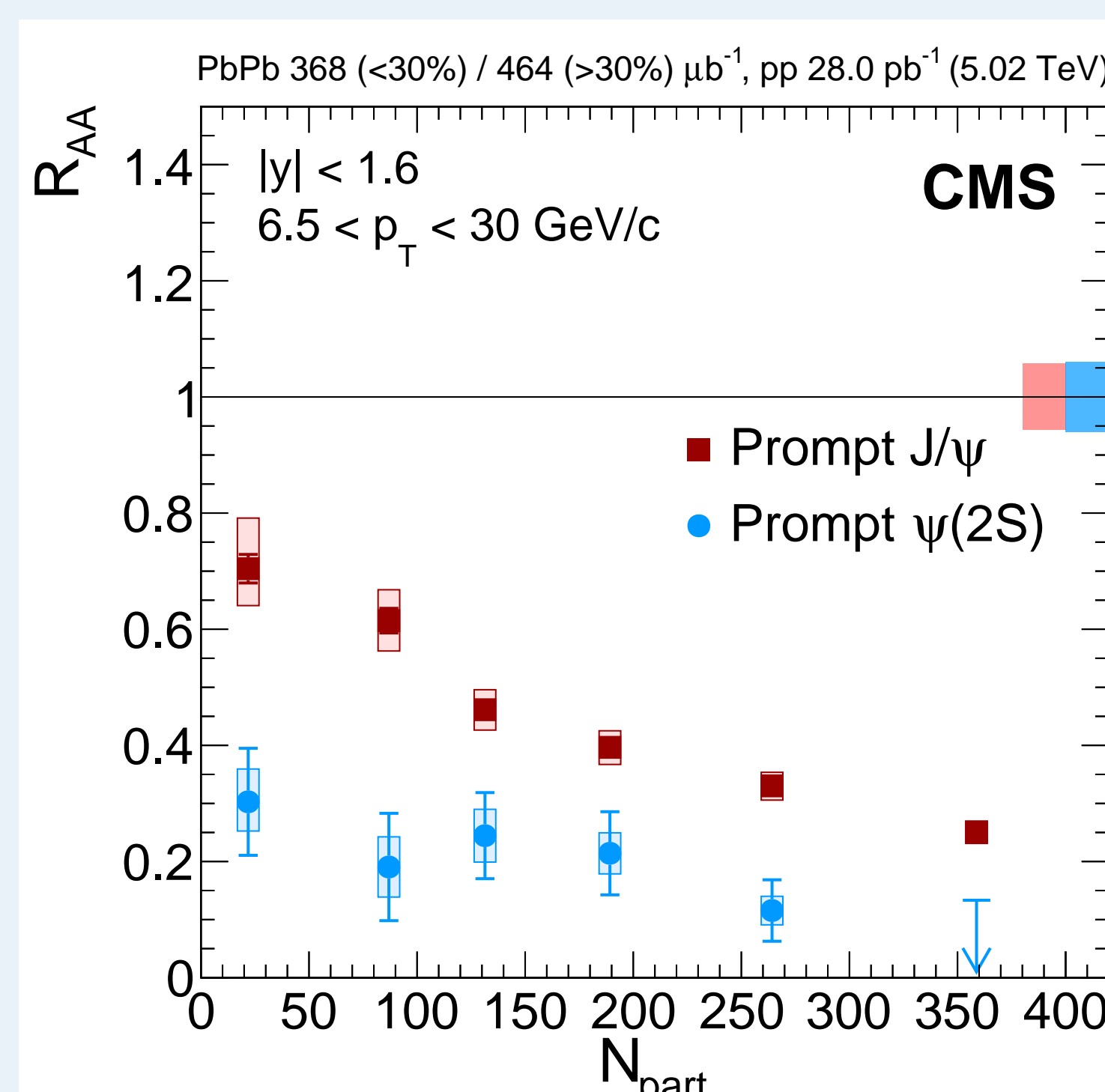
Larger suppression in central than peripheral events. **Smaller suppression** at low p_T in central events (regeneration?).

R_{AA} : $|y|$ and $\sqrt{s_{NN}}$ dependence



No significant rapidity dependence.
Good agreement between $\sqrt{s_{NN}} = 5.02$ TeV and 2.76 TeV.

R_{AA} : $\psi(2S)$



Using a previous measurement [2], we construct the R_{AA} of prompt $\psi(2S)$: **larger suppression** for prompt $\psi(2S)$ than prompt J/ψ .

Summary

- Final differential measurements results of prompt J/ψ and $\psi(2S)$ in pp and PbPb at $\sqrt{s_{NN}} = 5.02$ TeV over a wide kinematic range are presented [1].
- Indication for less J/ψ suppression at low p_T and forward rapidity.
- No significant \sqrt{s} dependence is observed.
- $R_{AA}(\psi(2S)) < R_{AA}(J/\psi)$ in all kinematic ranges studied.
- Nonprompt J/ψ results also available.

References

- [1] CMS Collab., arXiv:1712.08959 [hep-ph].
- [2] CMS Collab., PRL 118 (2017) 162301.