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Reference *pp* cross-sections for *J/ψ* studies in proton-lead collisions at √sNN = 5.02 and comparisons between ALICE and LHCb results
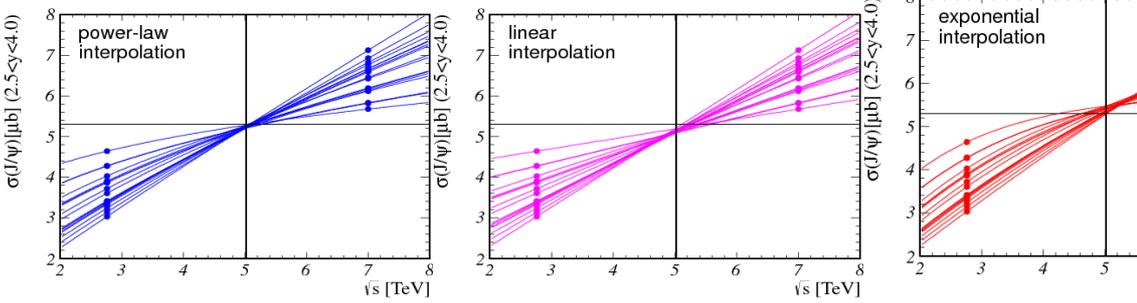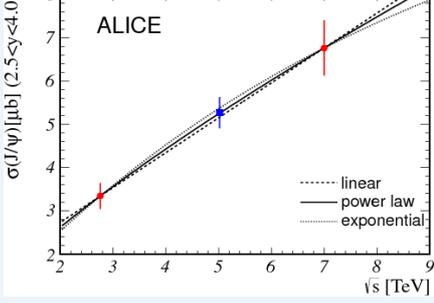
The paper is available here⬏.

LHCb-CONF-2013-013

Abstract

The ALICE and LHCb collaborations have studied *J/ψ* production at forward rapidities in proton-lead collisions at √s = 5.02 TeV using the dimuon channel. The evaluation of cold nuclear matter effects requires the knowledge of the corresponding *J/ψ* cross-section in *pp* collisions at the same centre-of-mass energy and in the same kinematic range. In this note the interpolation procedure used to determine this quantity and the related consistency checks are described. Finally, the results from the two experiments on nuclear modification factors are shortly summarized and found to be in good agreement.

Figures

(pdf and eps versions are available under attachments).

Caption	Figure
Figure 1: Comparison of power-law (top left), linear (top right) and exponential (bottom) interpolations for the energy dependence of the *J/ψ* production cross-sections for the theoretical predictions given in Tab. 2. Ideally all curves should go through σ(√s = 5.02 TeV) = 5.3 µb.	
Figure 2: Cross-section interpolation for the ALICE data. The point at √s = 5.02 TeV is the result of the interpolation procedure, the error	

bar shows the result from error propagation of the experimental uncertainties of the measurements at √s = 2.76 and 7 TeV.

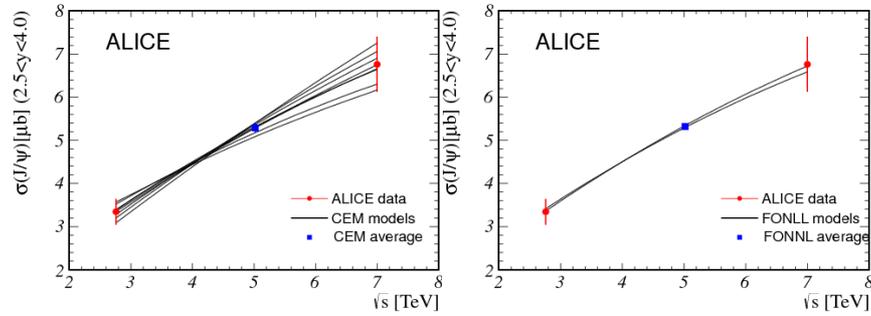Figure 3: Cross-section interpolation by fitting theoretical predictions to the ALICE data points.

Figure 4: Cross-section interpolation for the LHCb data using three phenomenological models. The upper row shows the results for prompt *J/* production (top left) and for *J/* mesons from b-hadron decays (top right). The bottom row plot shows the interpolation for inclusive *J/* production. The points at √s = 5.02 TeV are the nominal results of the interpolation procedure, the error bar is the result from error propagation of the experimental uncertainties of the measurements at √s = 2.76, 7 and 8 TeV.
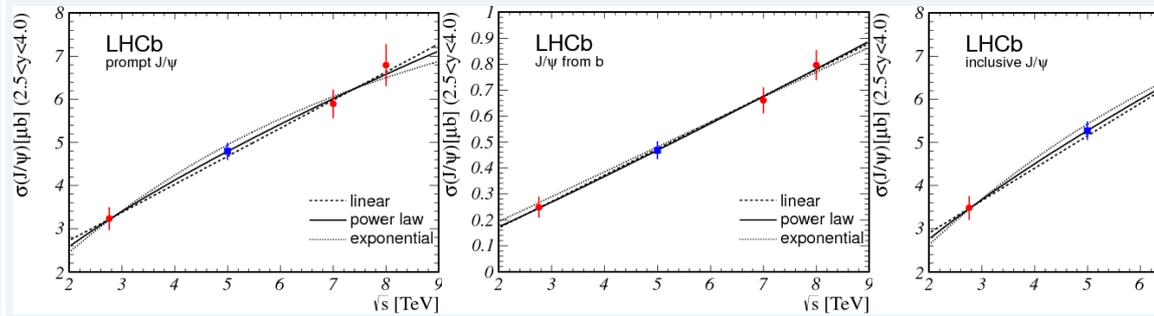
Figure 5:
Differential
cross-sections
d /dy at √s = 2.76
and 7 TeV, as
measured by
ALICE. On the left
hand plot the
calculated values at
√s = 5.02 TeV are
separately shown
for each
interpolation
function (linear,
power law and
exponential),
together with their
weighted average.
The right hand
figure shows fits to
the interpolated
d /dy values at √s
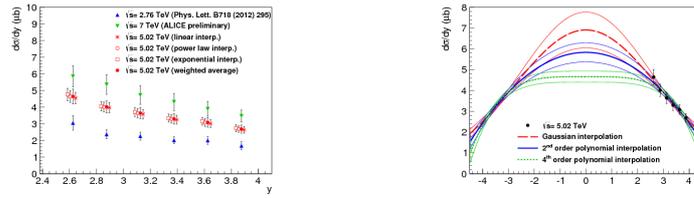= 5.02 TeV. See
text for details.

Figure 6:
Differential
cross-section for
inclusive *J/*
production in pPb
collisions as a
function of rapidity
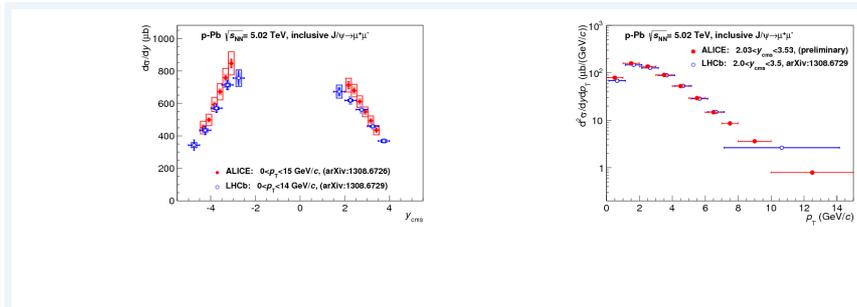*y* (left) and
transverse
momentum p_T
(right).

Figure 7: Nuclear
modification factor
as a function of
rapidity. The left
hand plot shows
the measurements
integrated over the
accessible
kinematic range of
both experiments,
the right hand plot
displays the
differential
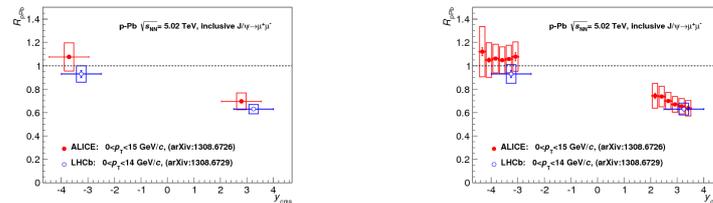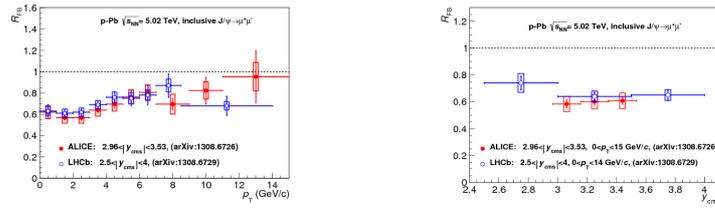measurement by
the ALICE
collaboration.

Figures

Figure 8: Forward-backward production ratio for inclusive *J/* production in pPb collisions as a function of p_T (left) and as a function of rapidity (right), for both experiments.	

-- KatharinaMueller - 16 Jan 2014

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