

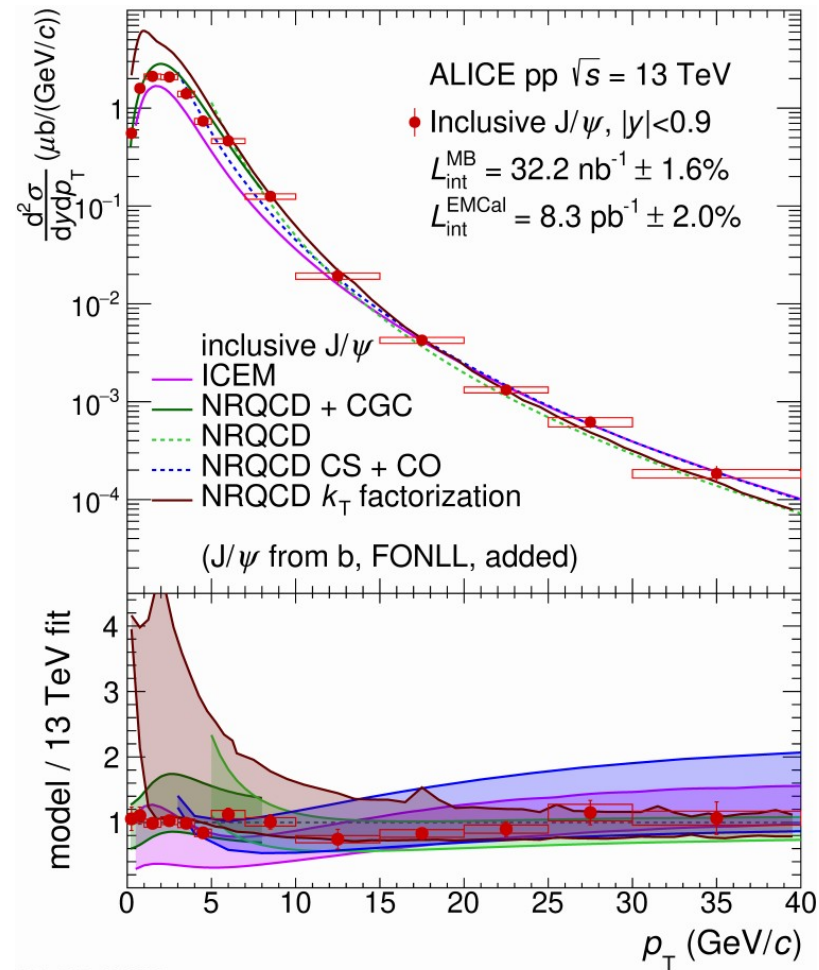
J/ψ Measurements with ALICE

Ailec de la Caridad Bell Hechavarria

WESTFÄLISCHE WILHELMS-UNIVERSITÄT MÜNSTER
INSTITUT FÜR KERNPHYSIK

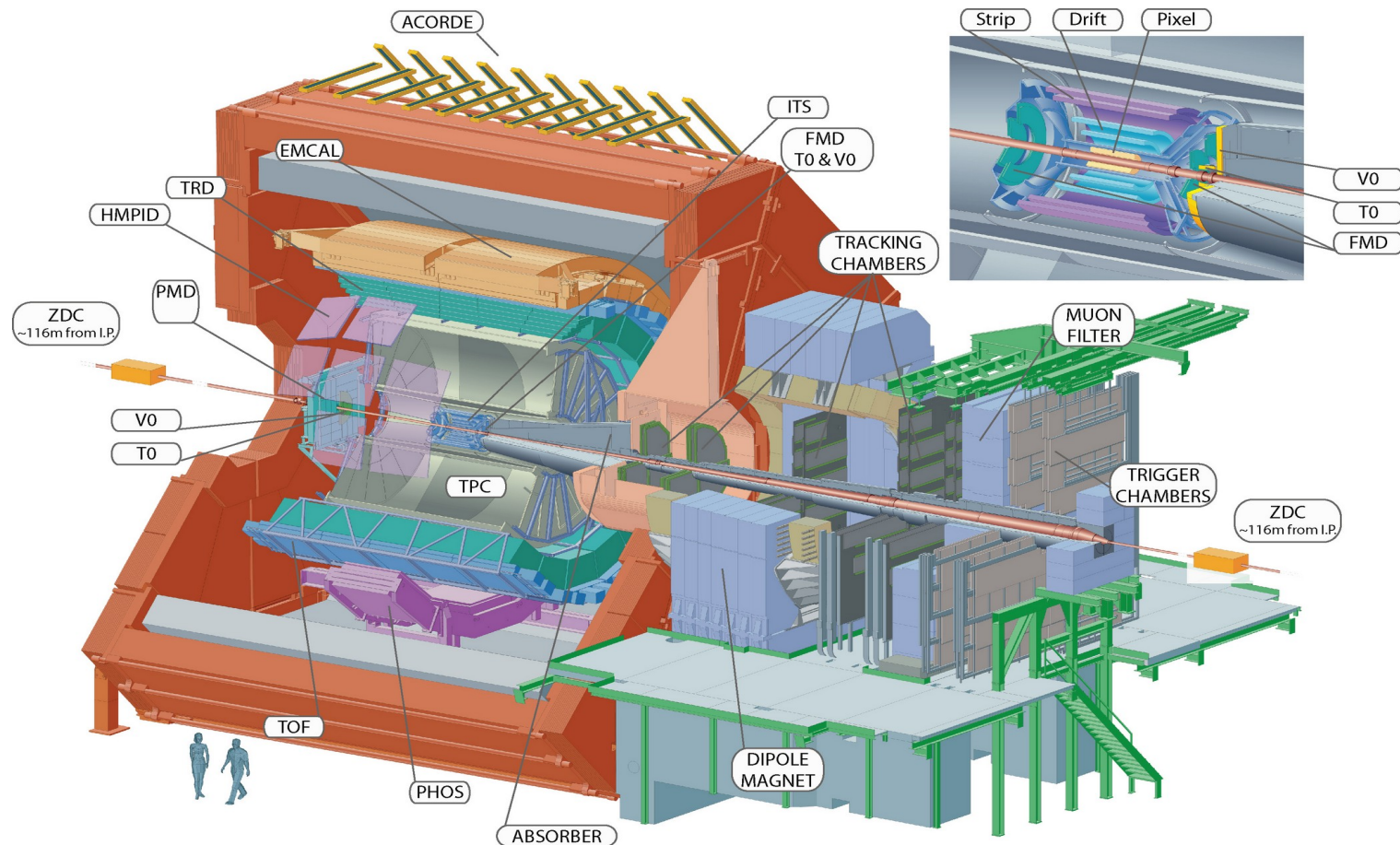
Introduction

- **Heavy quarks** are produced via partonic scattering processes with high momentum transfer, described in perturbative QCD framework.
- **Quarkonium (J/ψ):** the posterior binding into quarkonium state is described as a non-perturbative process.



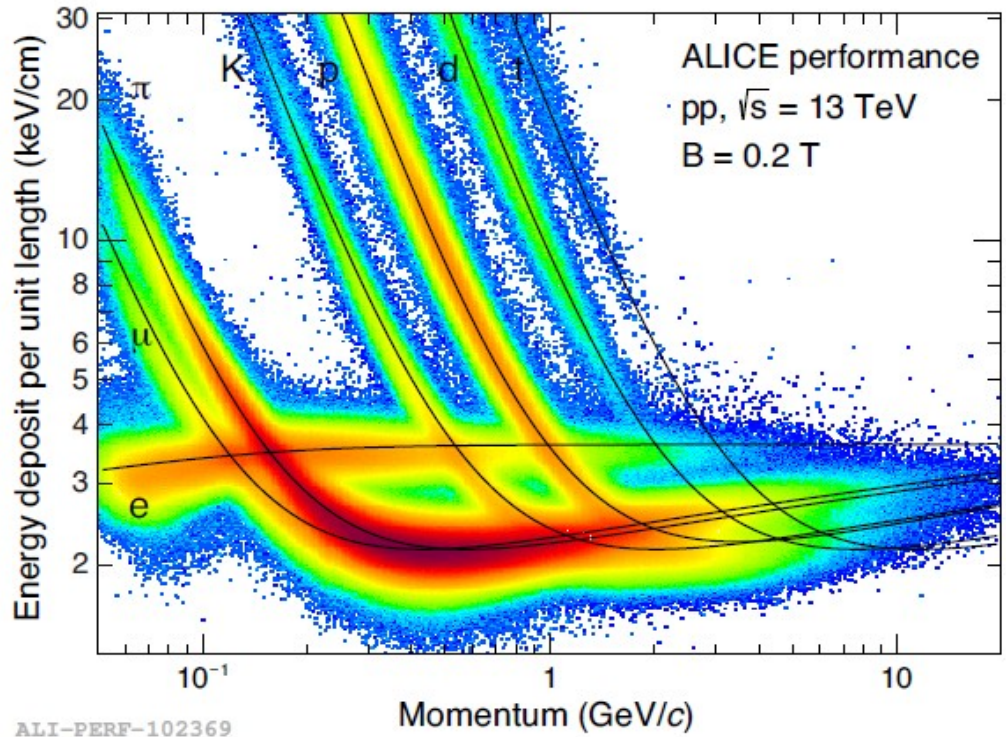
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ALICE Detector



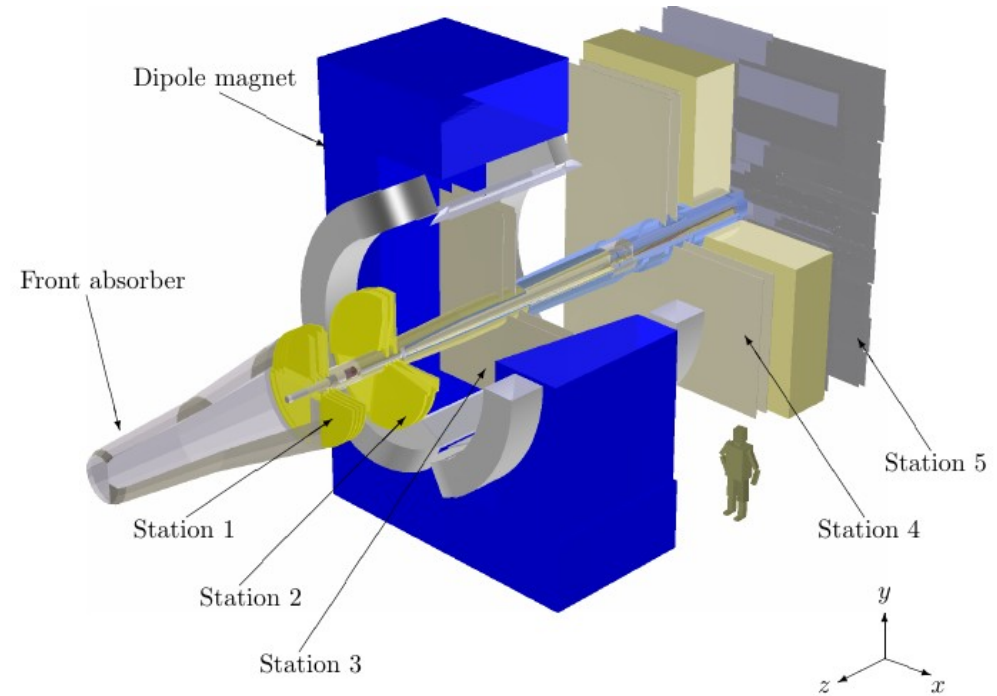
Particle Identification: The TPC

- The TPC identifies particles based on the measurements of the specific energy loss dE/dx of each track.
- It is the largest single detector in ALICE and provides tracking and particle identification in the region $|\eta| < 0.9$



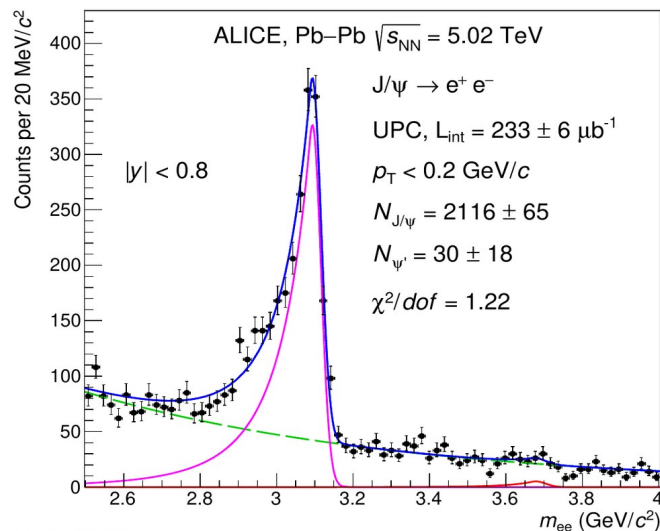
Particle Identification: The Muon spectrometer

- The Muon spectrometer allows the detection and measurement of muons.
- It consists in a thick absorber followed by five stations for tracking and then the trigger chambers for measuring the time-of-flight of the μ particles and allow identification.

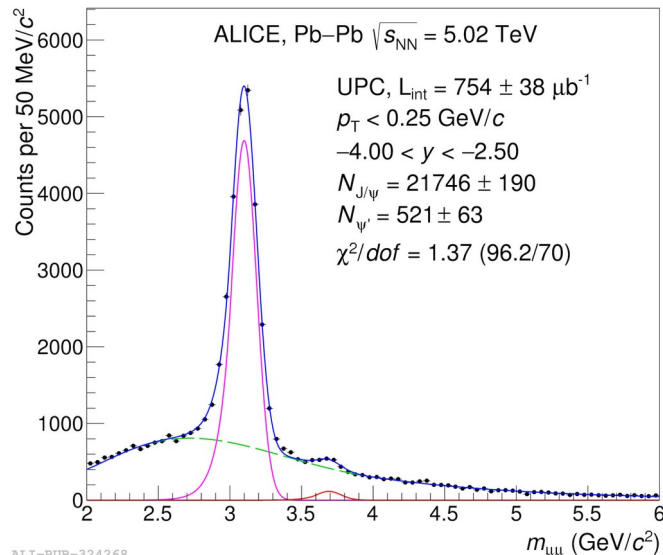


J/ψ detection: Pb-Pb, UPC

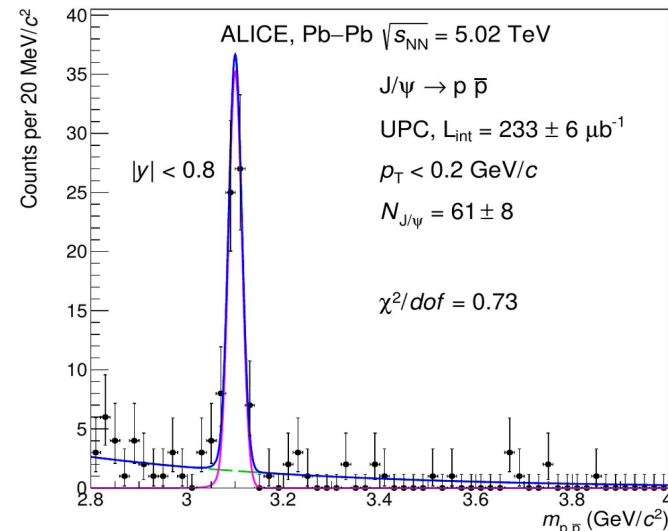
- Recent ALICE measurements of J/ψ photoproduction in Pb-Pb ultra-peripheral collisions in three different decay channels where the invariant mass distribution of dielectrons have a different shape due to Bremsstrahlung.



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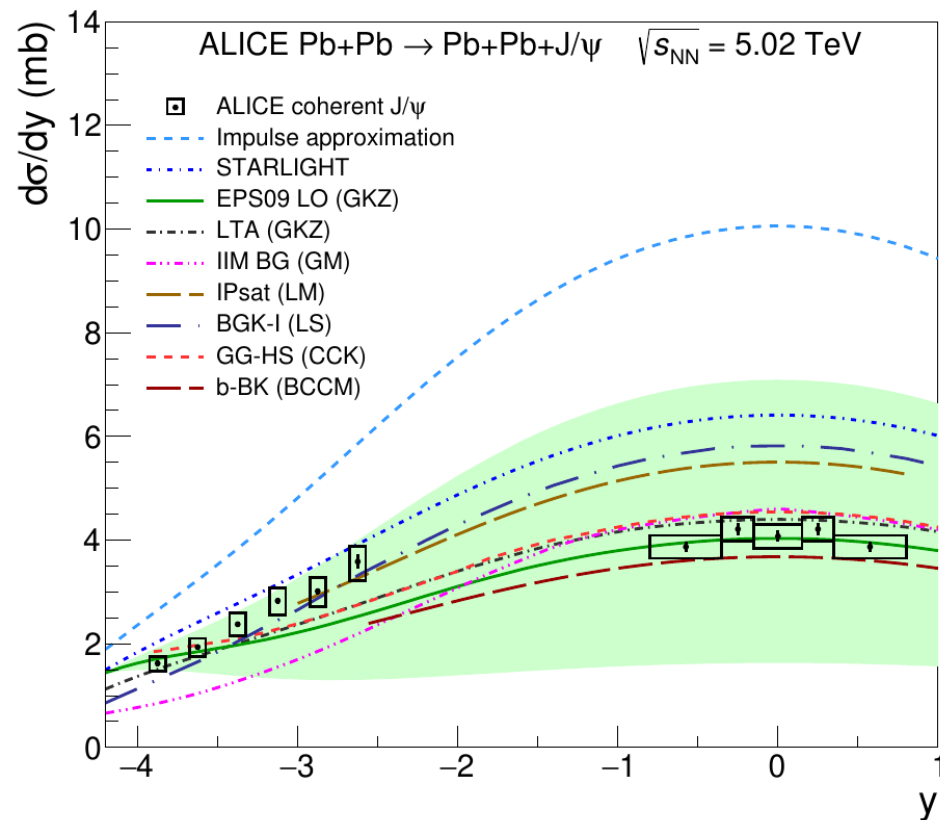
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J/ψ photoproduction

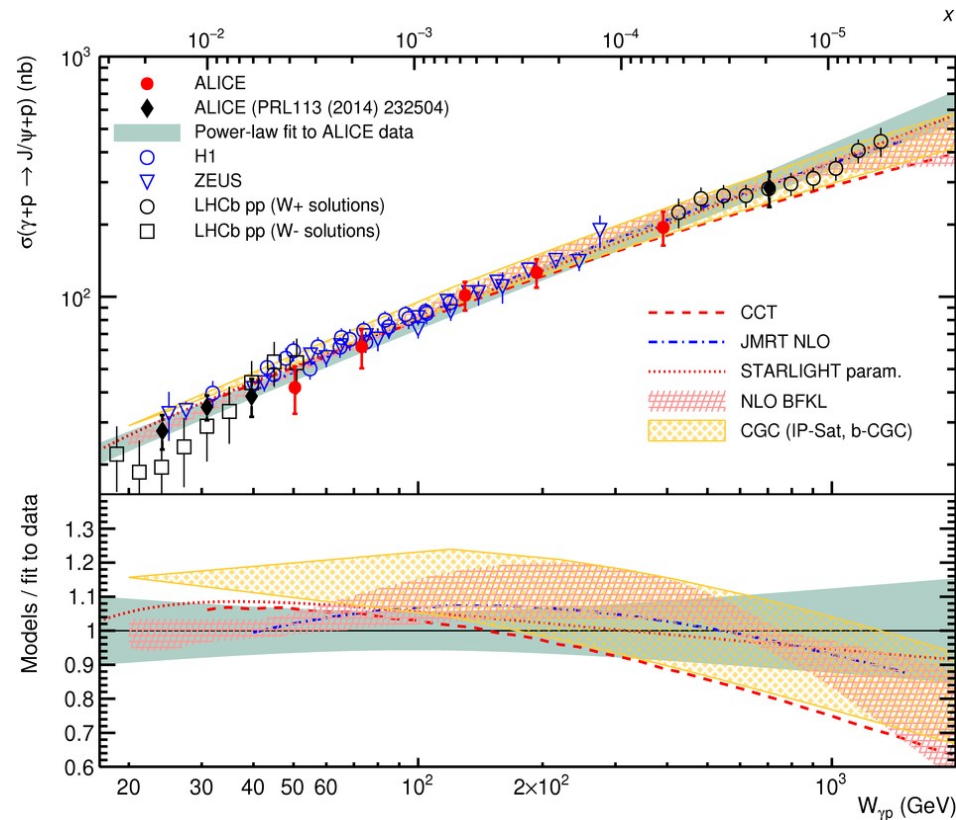
- Measurements of coherent J/ψ photoproduction cross section allows the study of shadowing effects (shadowing factor=0.65) at low x (0.3 - 1.4×10^{-3}).
- Recent ALICE measurements are compared to models assuming no gluon shadowing (impulse approximation), to models predictions employing parametrization of nuclear gluon shadowing (EPS09 LO), or color dipole approach coupled to the Color Glass Condensate formalism (BGK-I).



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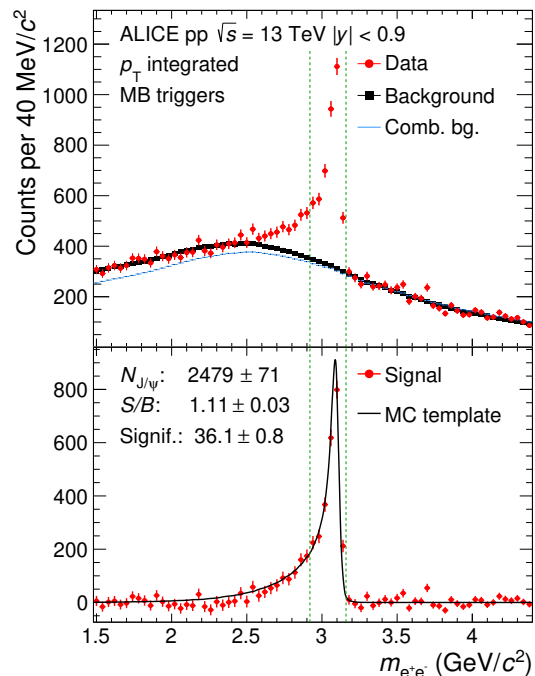
J/ψ photoproduction off protons

- The exclusive photoproduction off protons is a probe to search saturation effects.
- Including latest ALICE data in p-Pb collisions a range in $W_{\gamma p}$ from 24 to 706 GeV is covered which corresponds to x values between 2×10^{-2} to 2×10^{-5} .
- The ALICE data is compared with theory models and a power law $N(W_{\gamma p}/W_0)^\delta$ was fit to the data points.

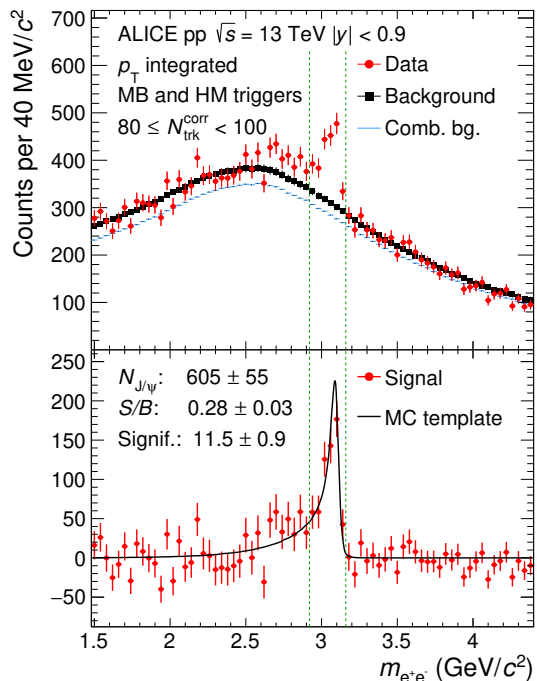


J/ψ detection: pp collisions

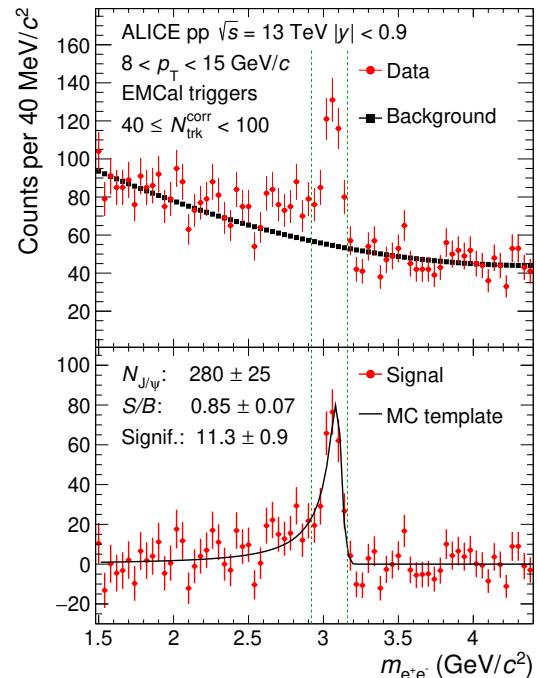
- The J/ψ signal reconstructed in its dielectron decay channel in pp data in Minimum Bias (MB), High Multiplicity triggered and high p_T (EMCal triggers).



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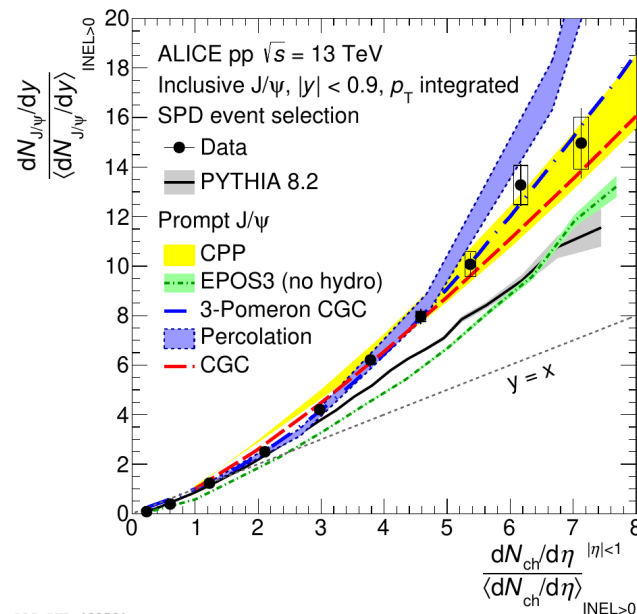
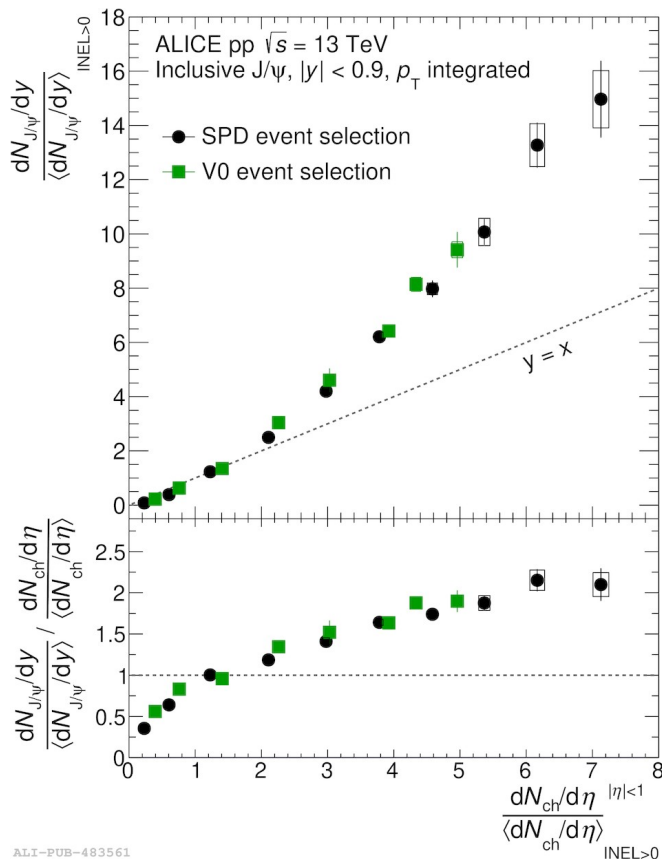
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J/ψ vs charged particle multiplicity

- A stronger than linear increase of the normalized J/ψ yield regarding the normalized multiplicity is observed at mid and forward rapidity measurements.

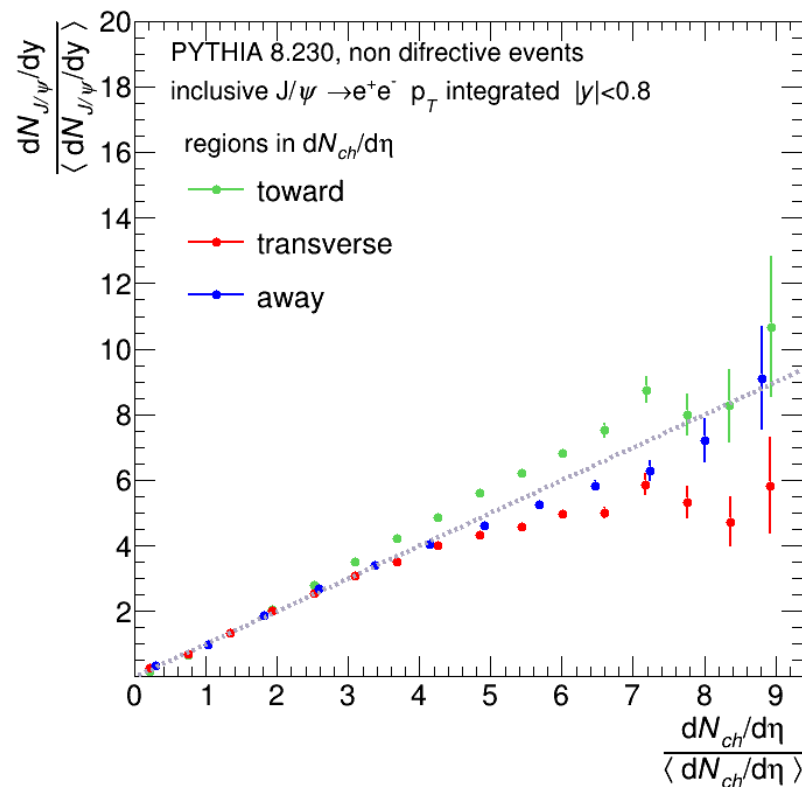
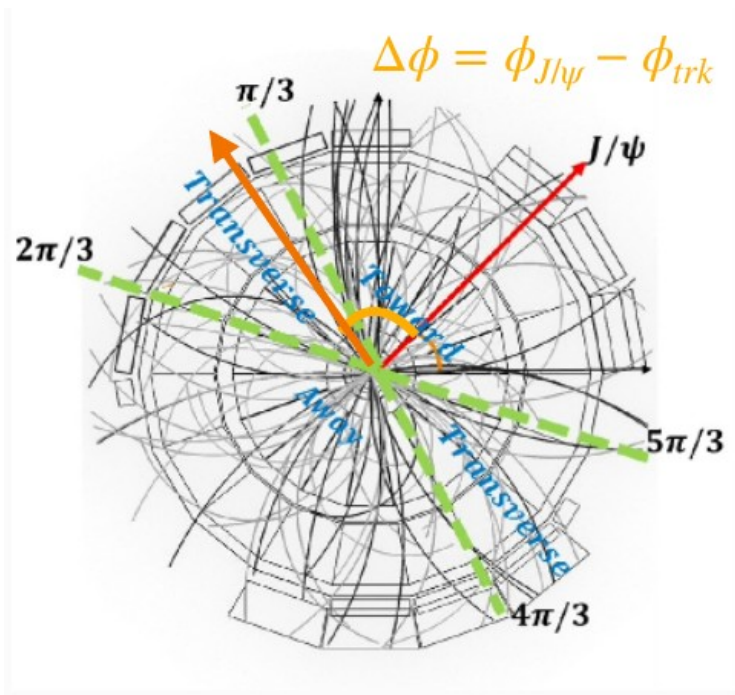


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J/ψ vs charged particle multiplicity: Studies with PYTHIA8

- Reconstruction of three regions in the azimuth plane regarding the emitted J/ψ pair candidate. For each track one can define:



Weber, S.G., Dubla, A., Andronic, A., Morsch, A. Eur. Phys. J. C 79 (2019) 36, arXiv:1811.07744



Conclusions:

- The ALICE detector has good capabilities for measuring J/ψ mesons at forward and mid-rapidity.
- A stronger than linear increase of the J/ψ yield with the production of charged-particles per event is observed in previous ALICE publications.
- Ongoing studies on local multiplicity, defining three regions in the azimuth plane of the emitted J/ψ , in order to provide further input on possible autocorrelation effects that may explain the increase of the J/ψ with the event multiplicity.