Present status and prospects of high-pT and jets in proton-nucleus

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CENTRA-IST (Lisbon) & CERN PH-TH

LPCC workshop 'Prospects of p-Pb collisions during the 2012 LHC HI run', 17 October 2011

jet quenching in AA collisions

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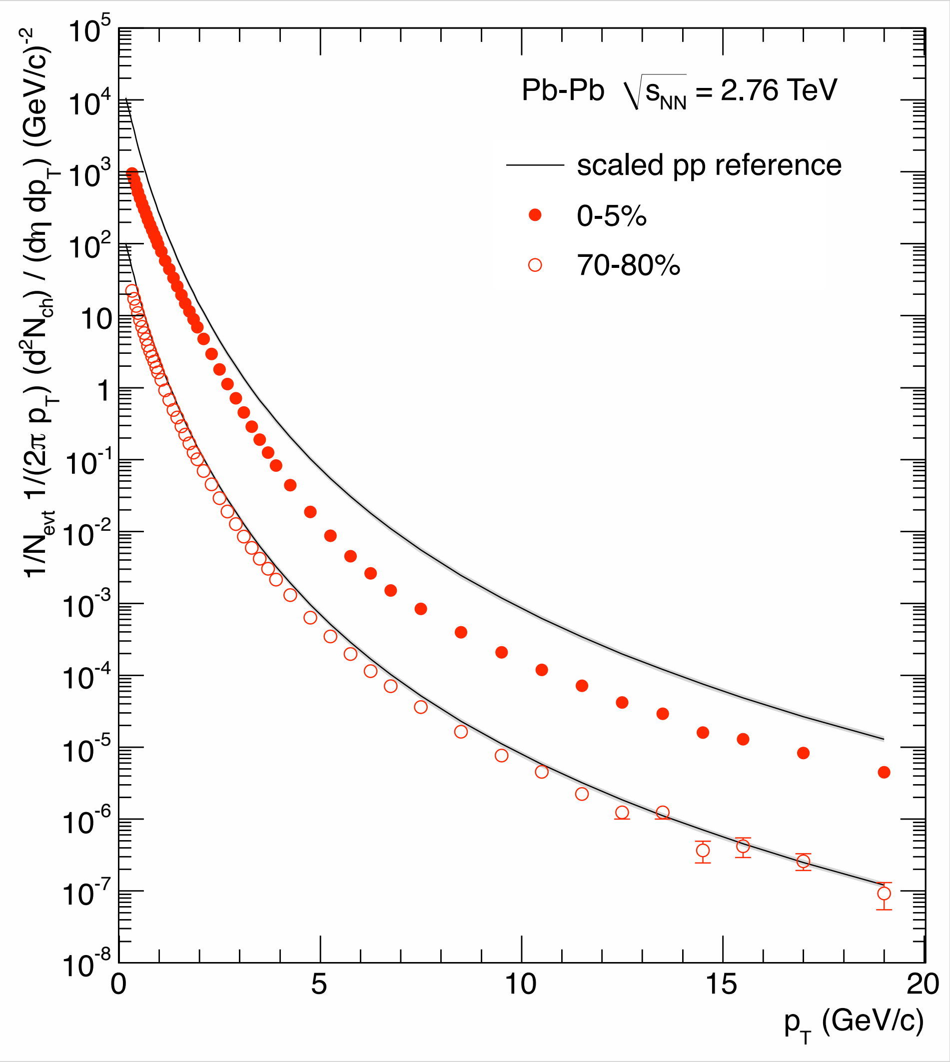
  - ↪ fully reconstructed jets
    - jet suppression, di-jet asymmetry, jet shapes, ...

jet quenching without jets

suppression of high-p_t single hadronic spectra



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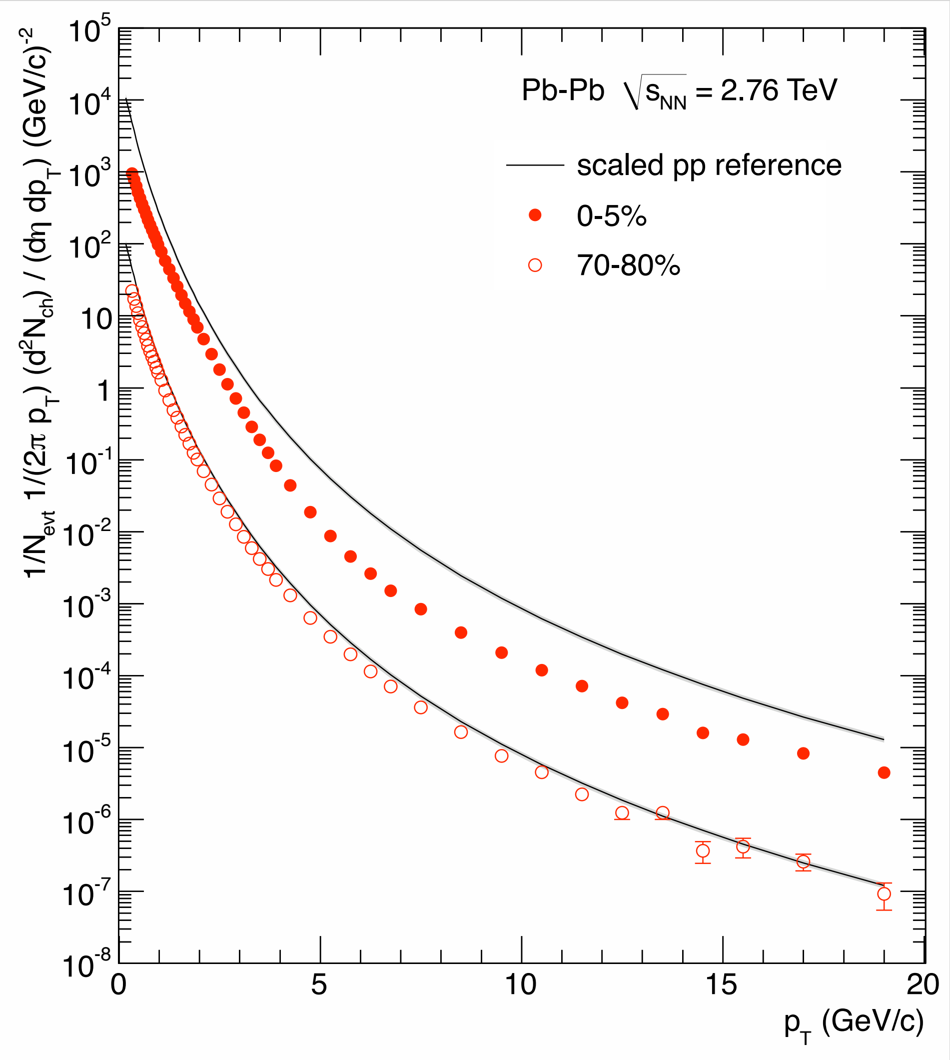

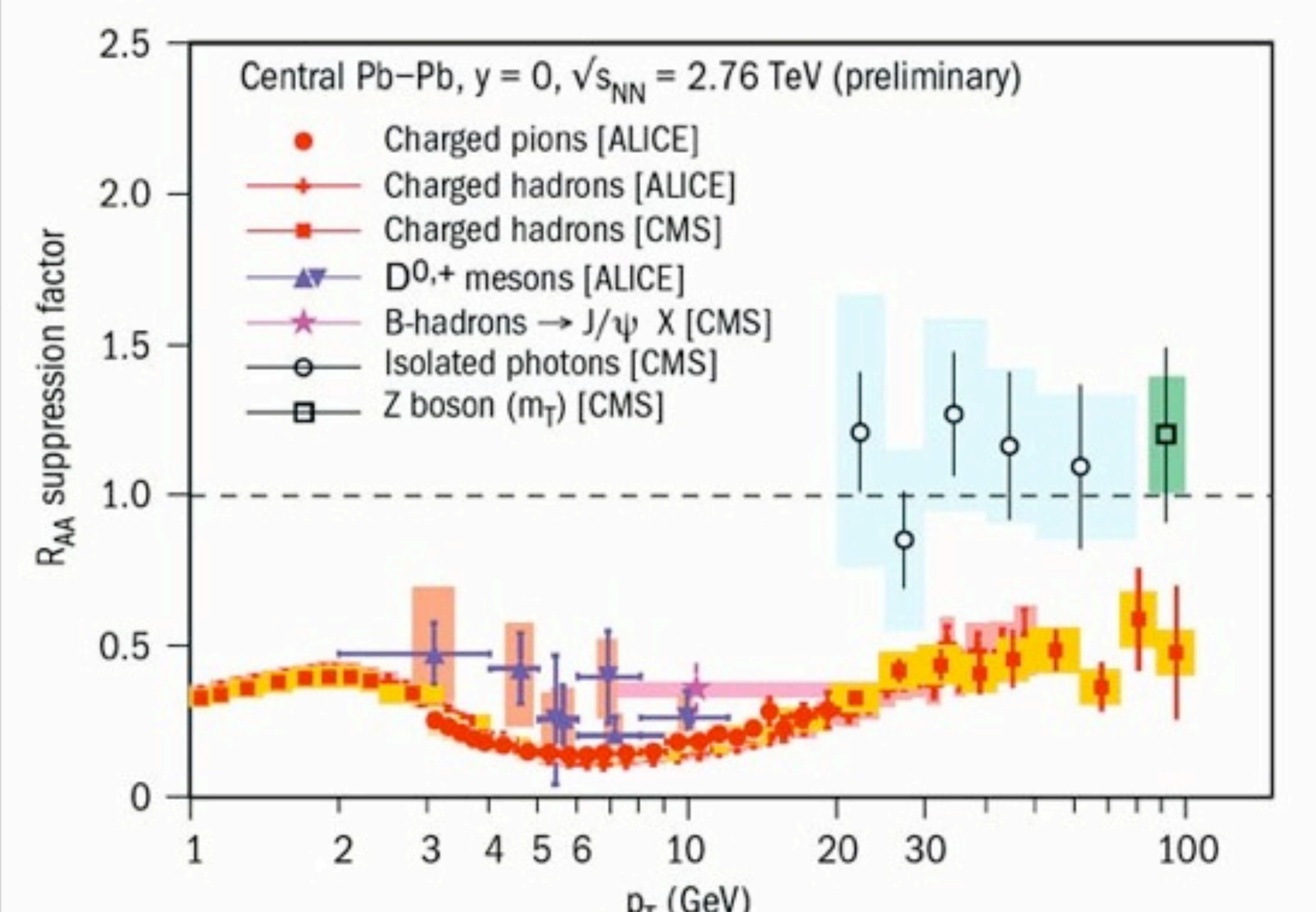

d'Enterria (2011)

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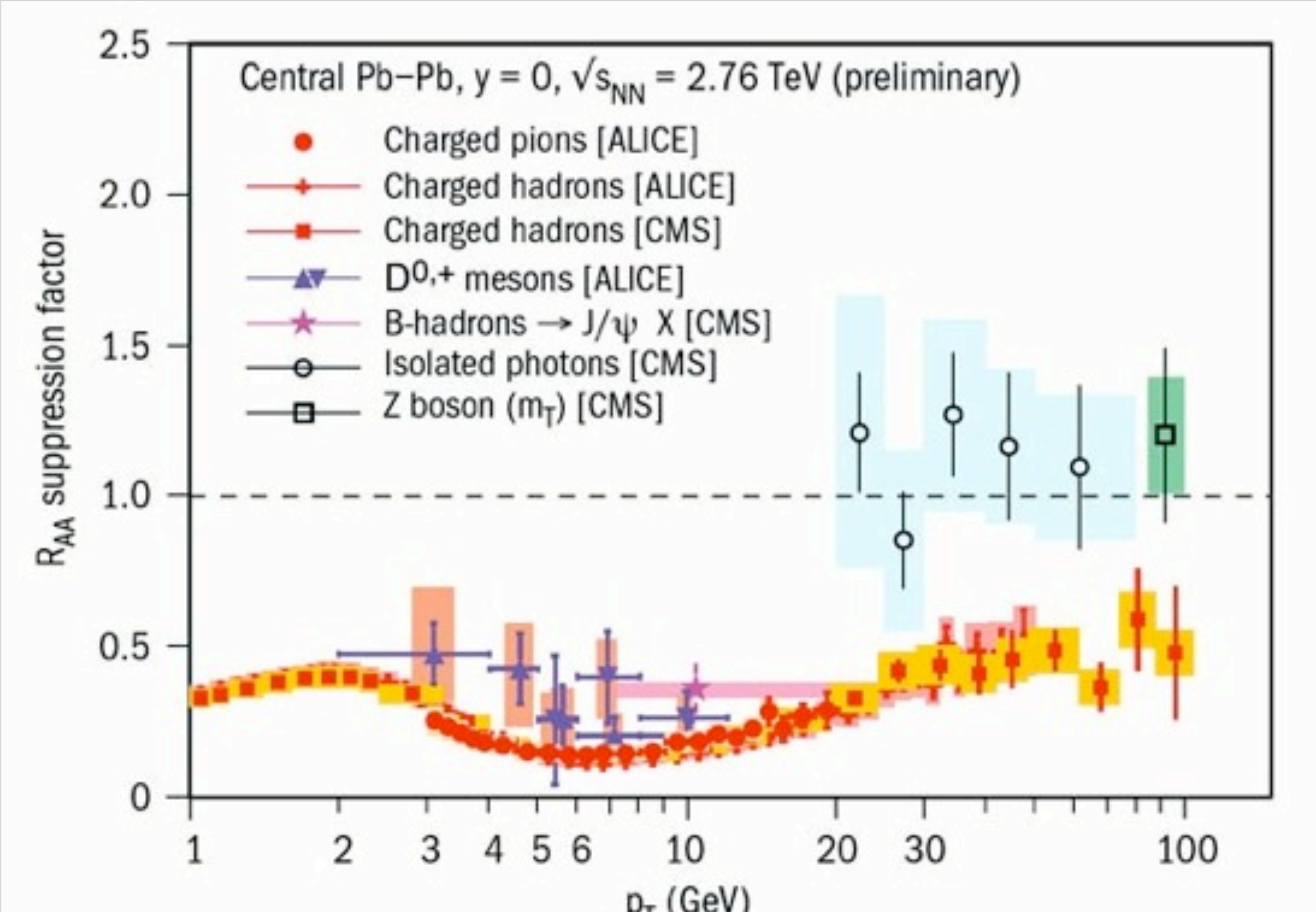

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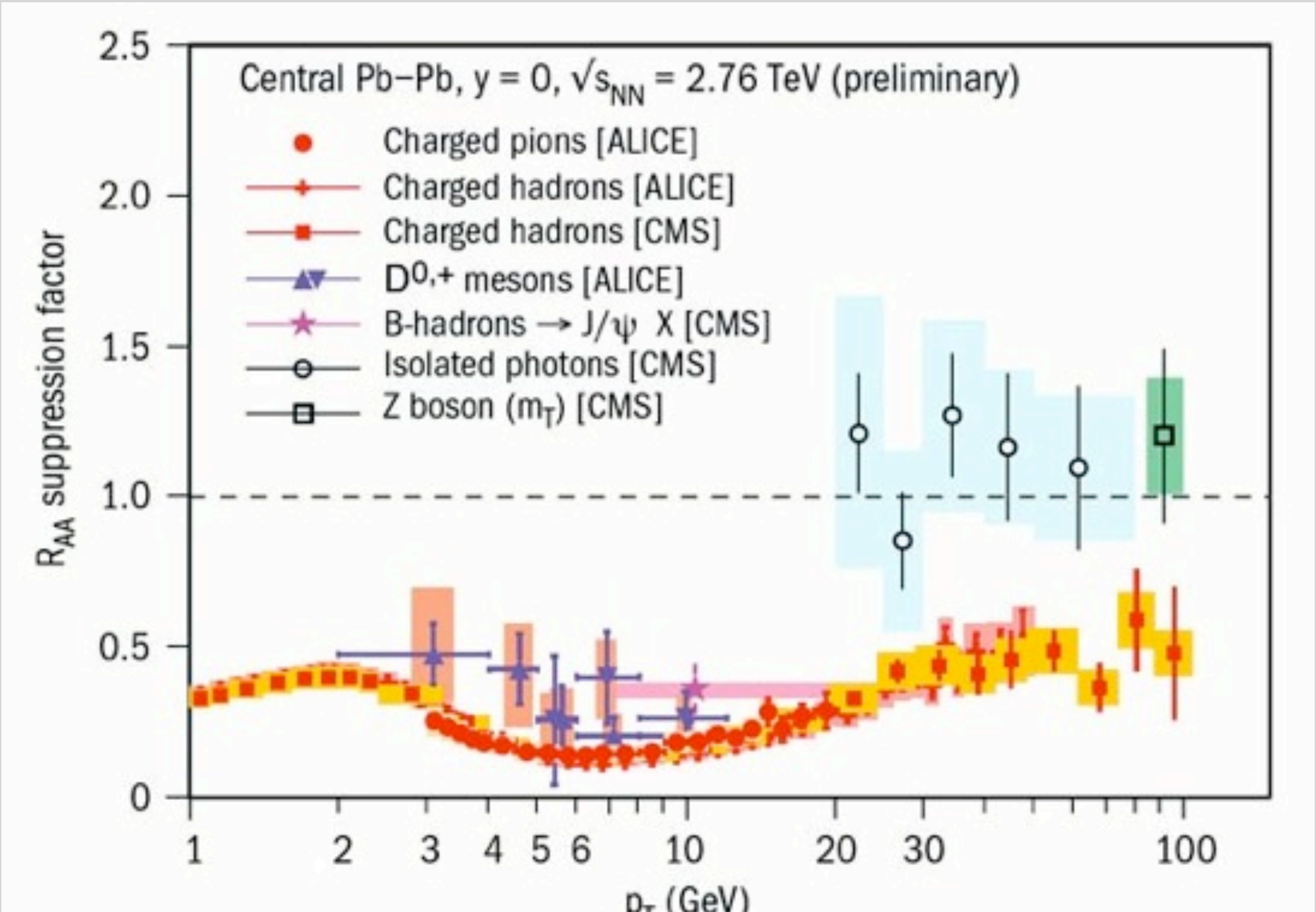

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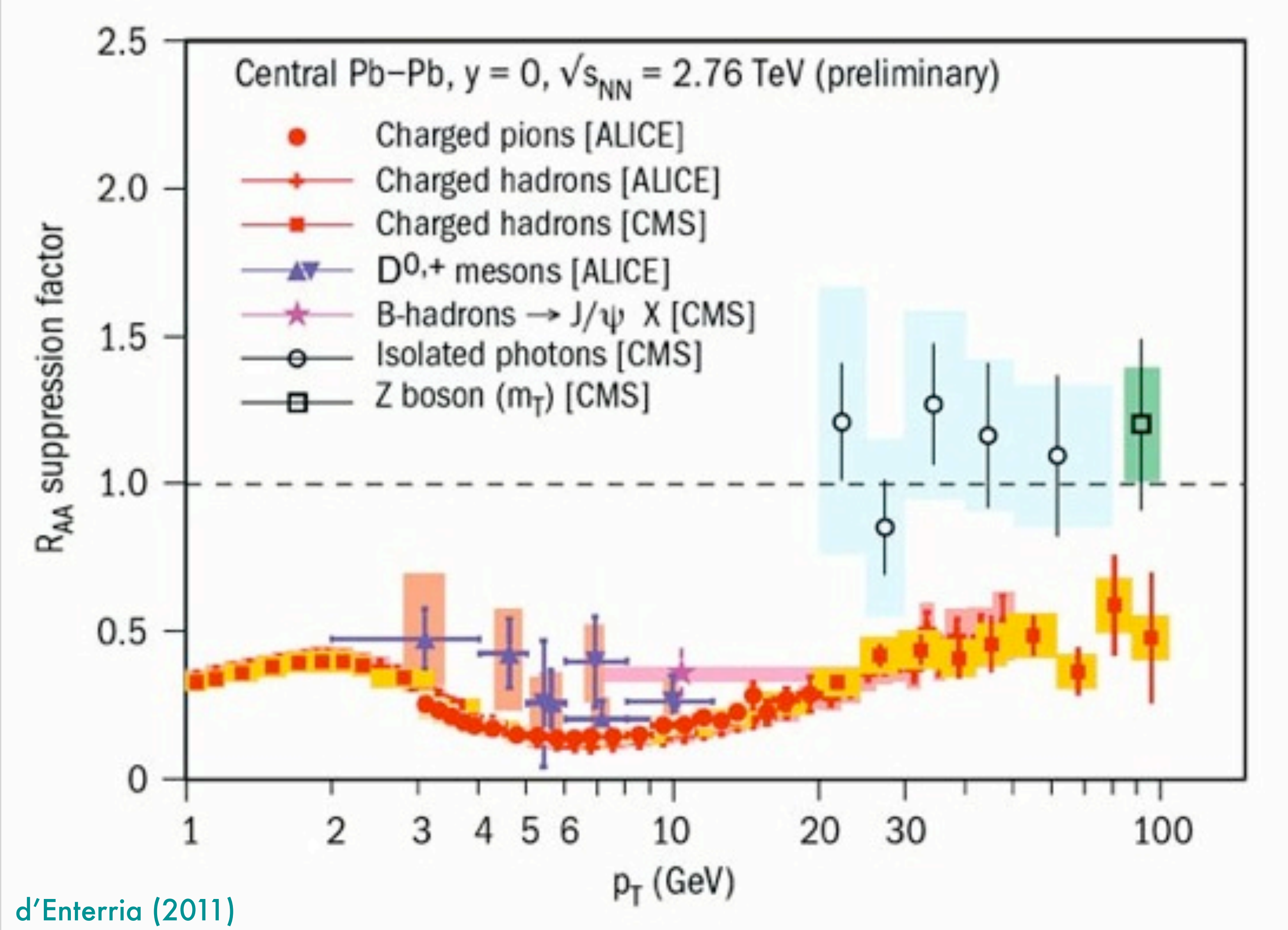

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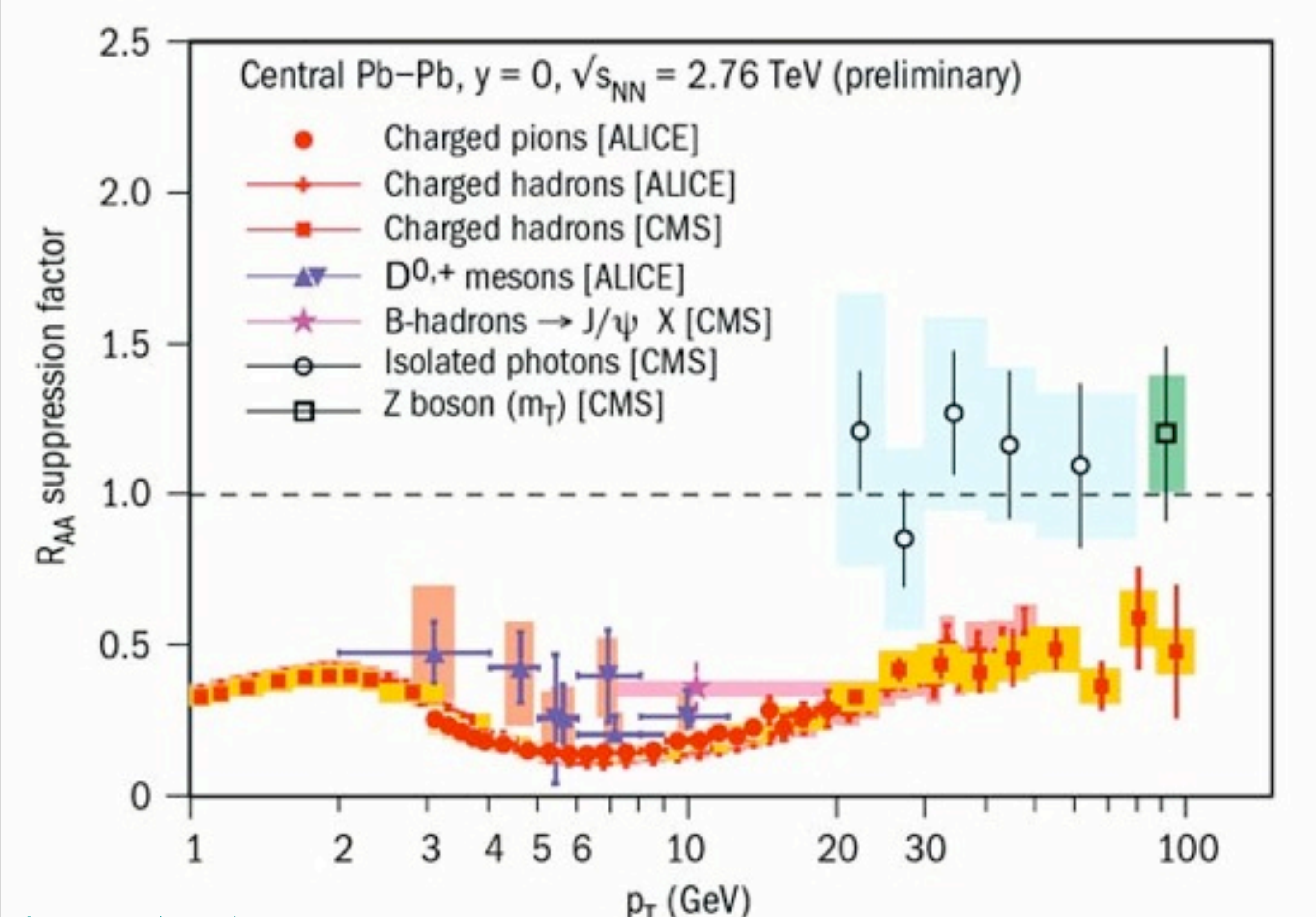

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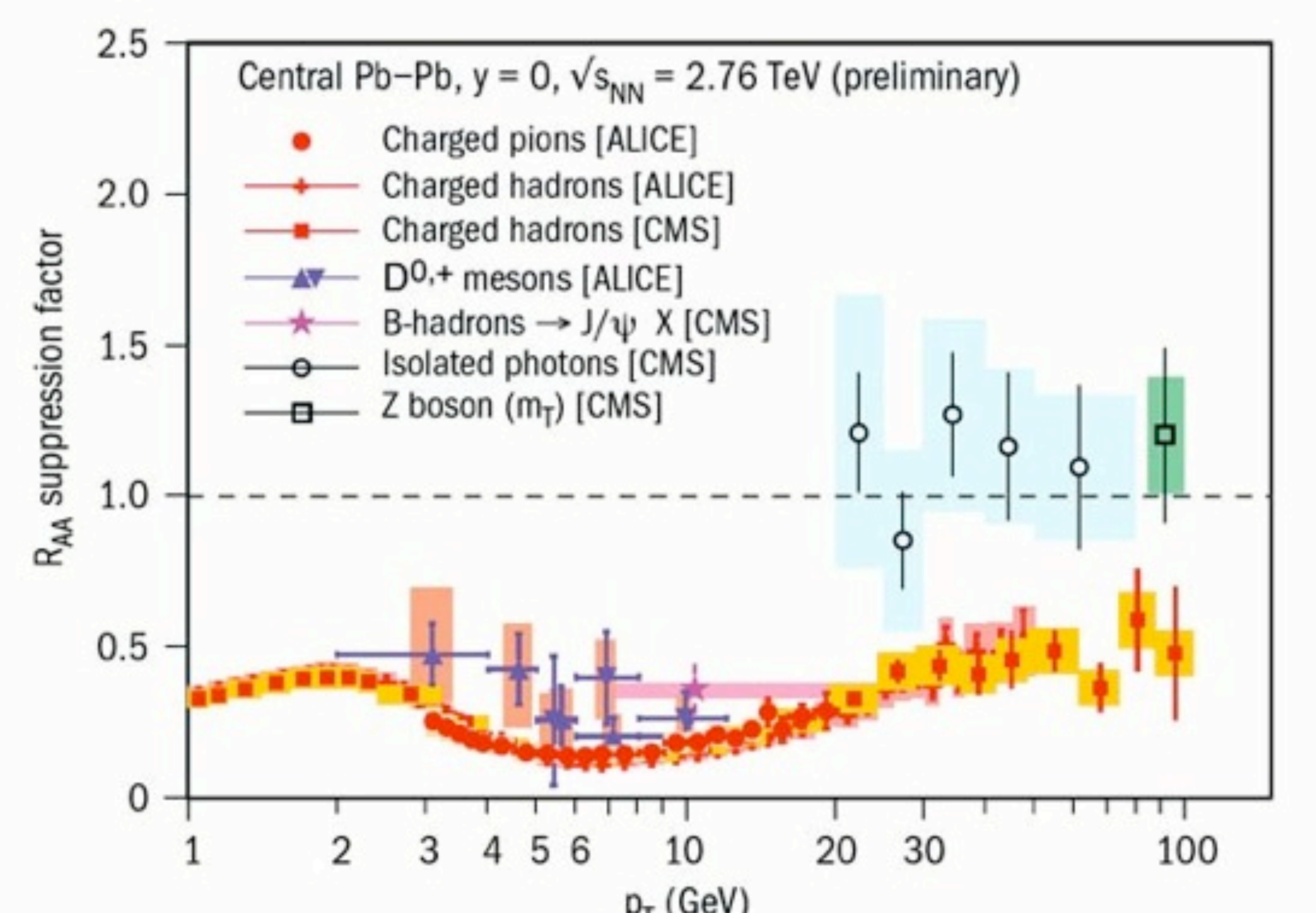

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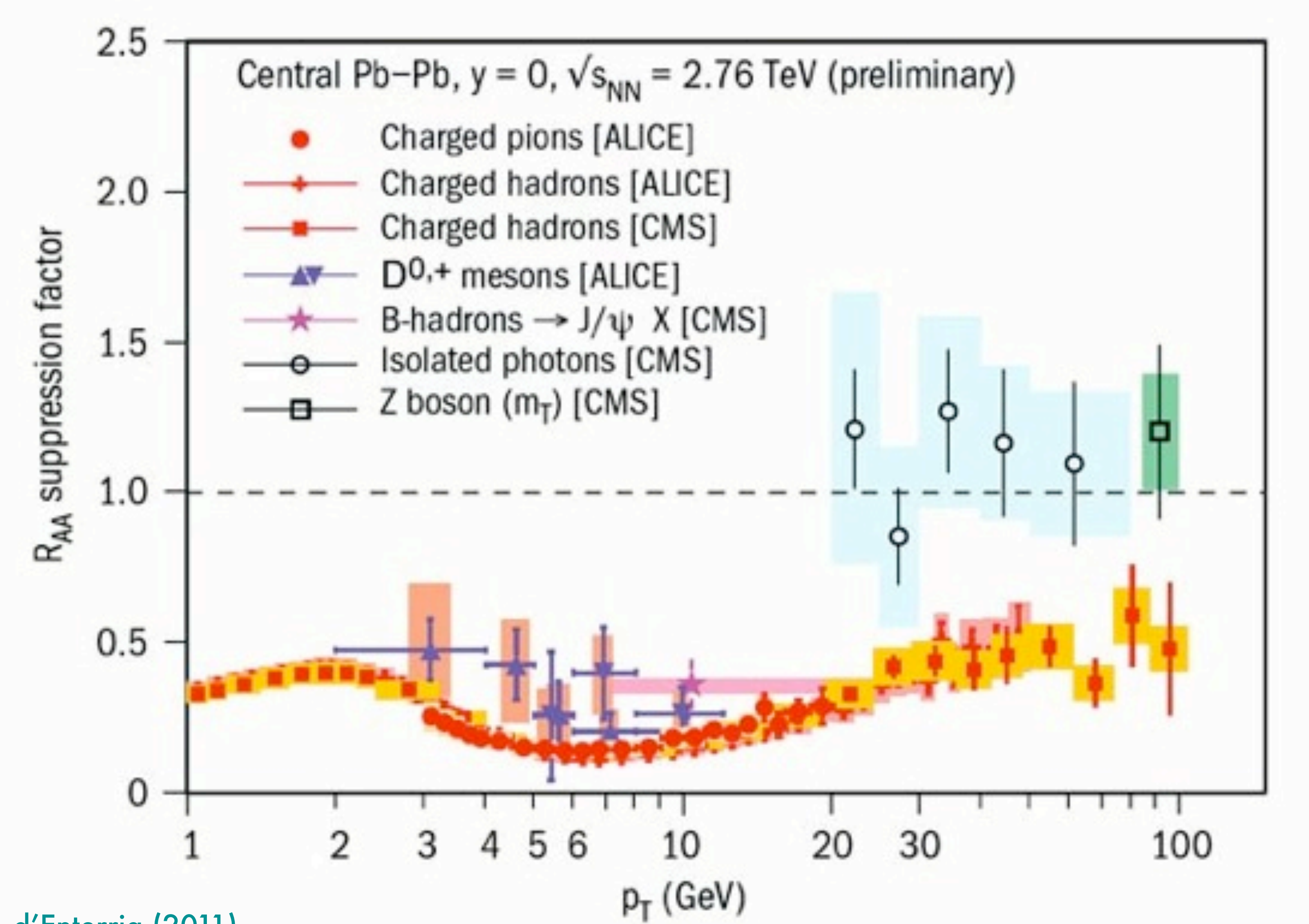
    - further complexities due to colour-talk with medium affecting hadronization

A. Beraudo, JGM, U. Wiedemann & Aurenche, Zakharov (2011)



d'Enterria (2011)

jet quenching without jets insufficient to effectively constrain details of underlying dynamics

jet quenching with jets

di-jet asymmetry

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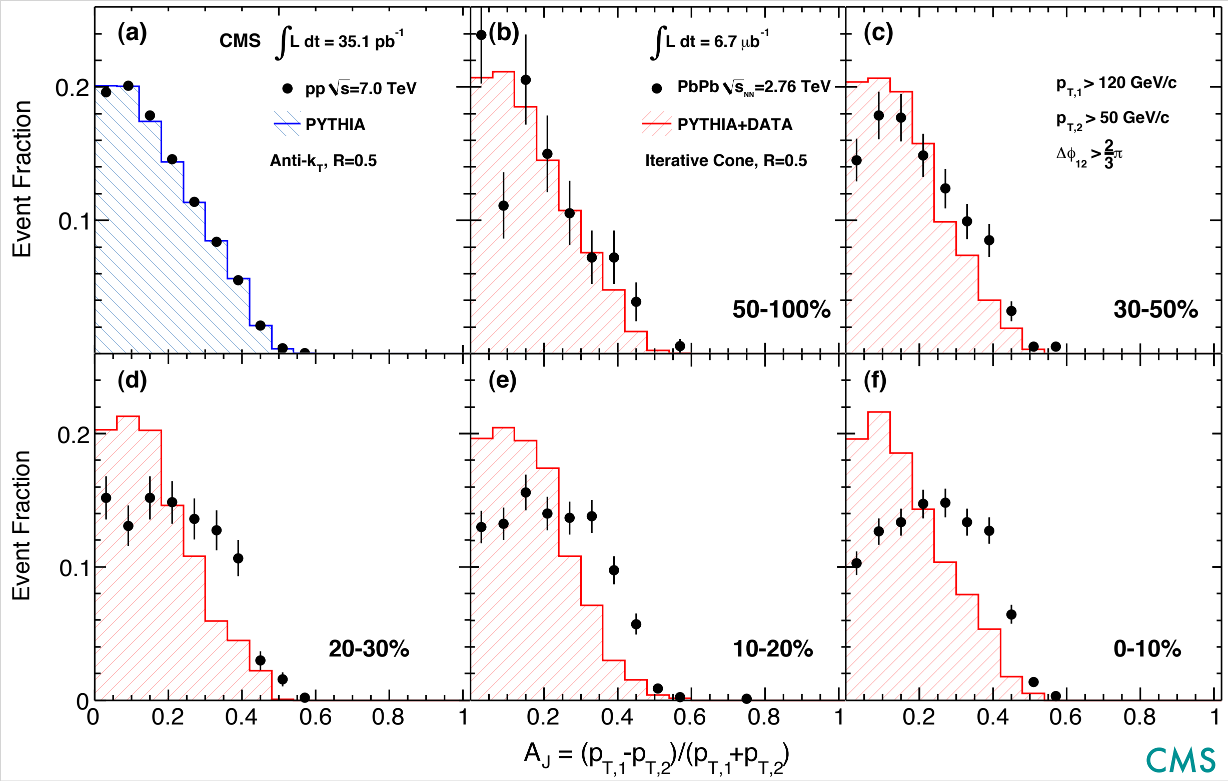

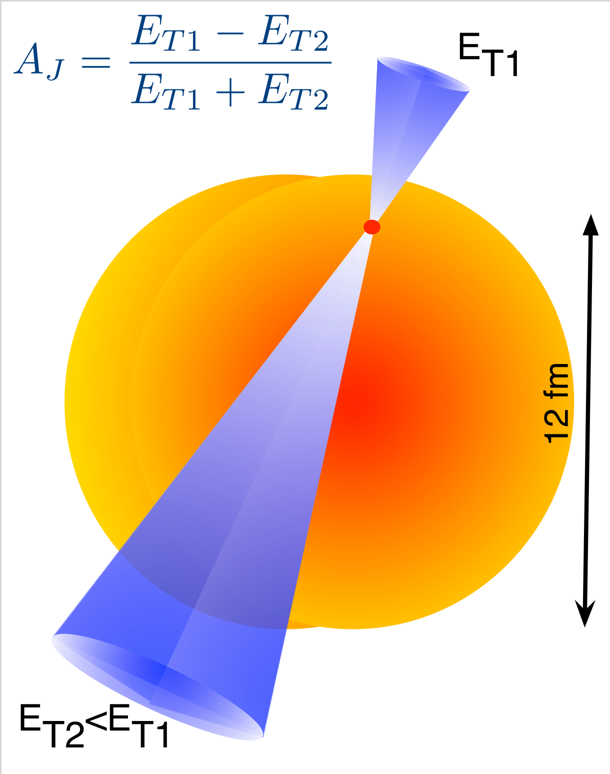

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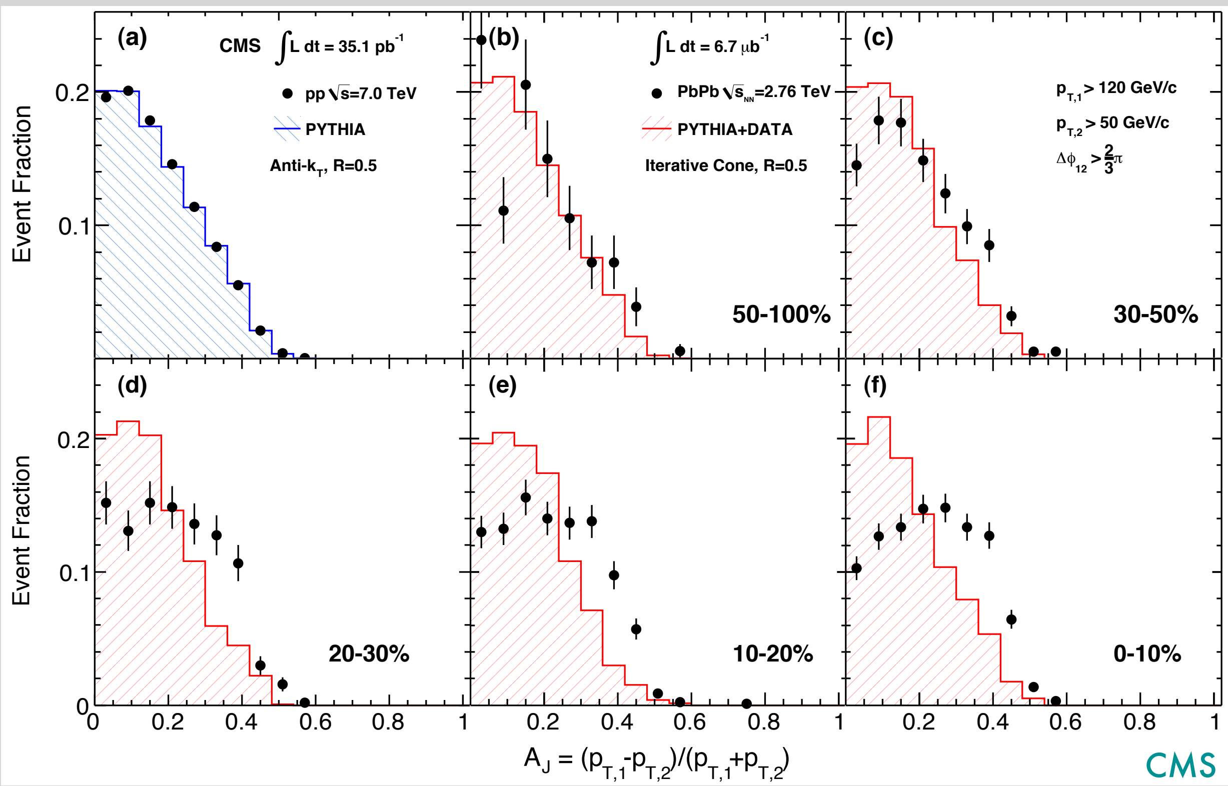

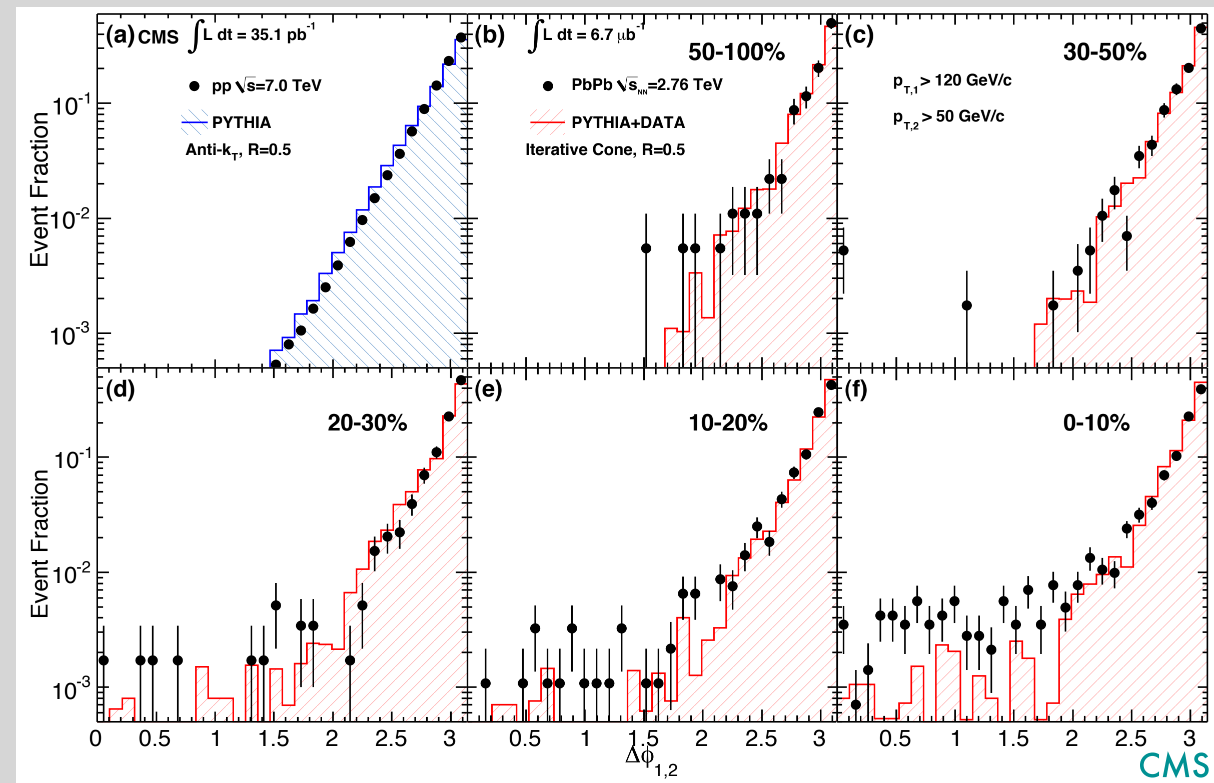

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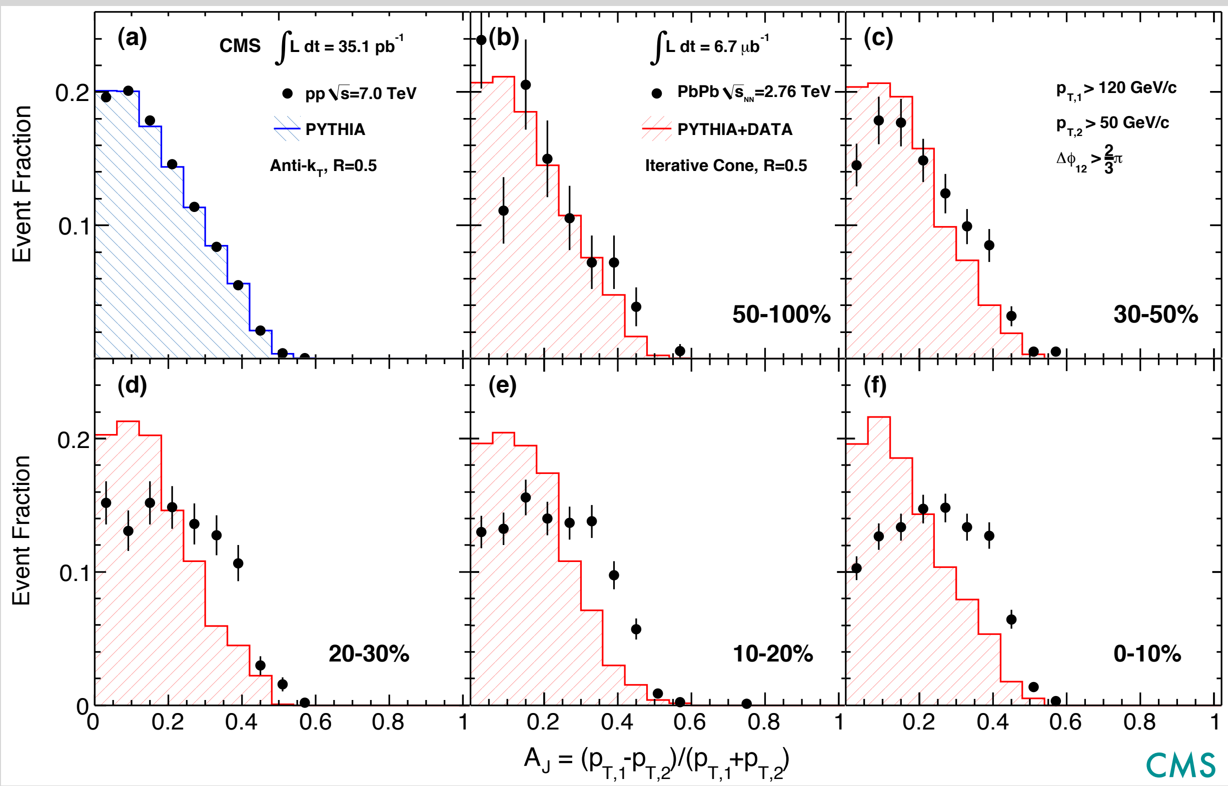

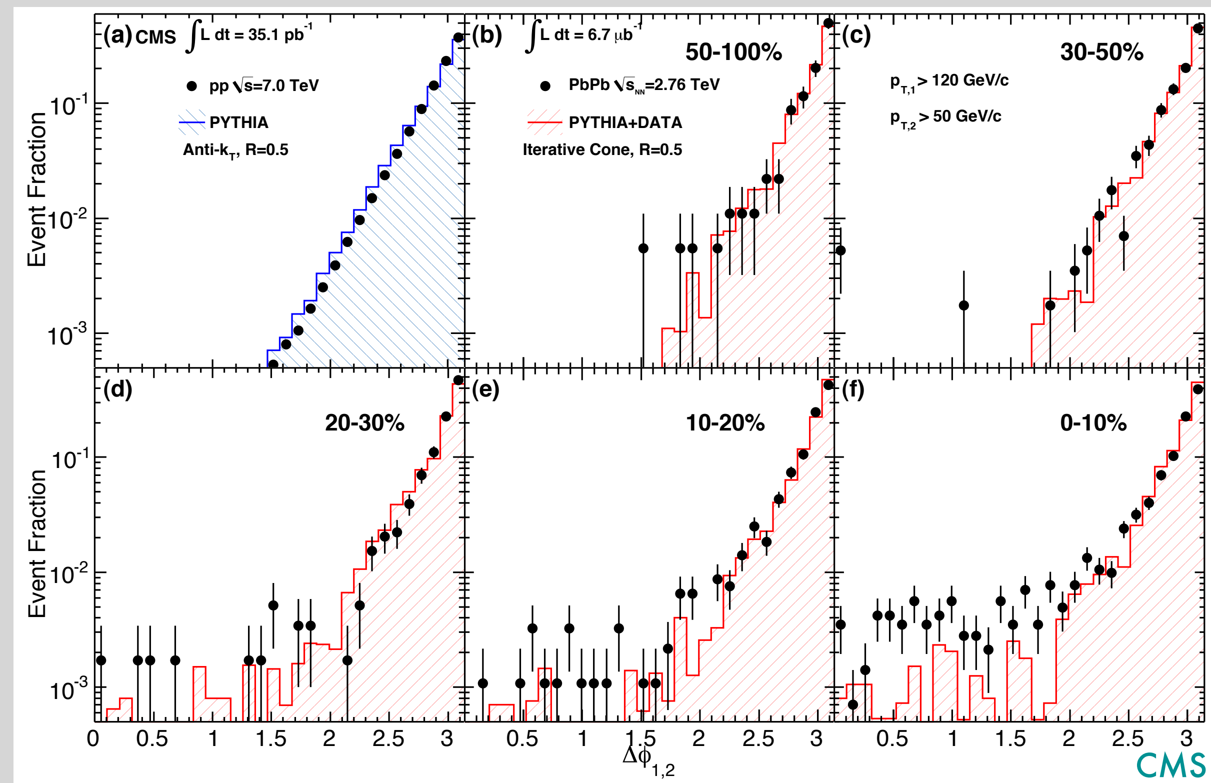

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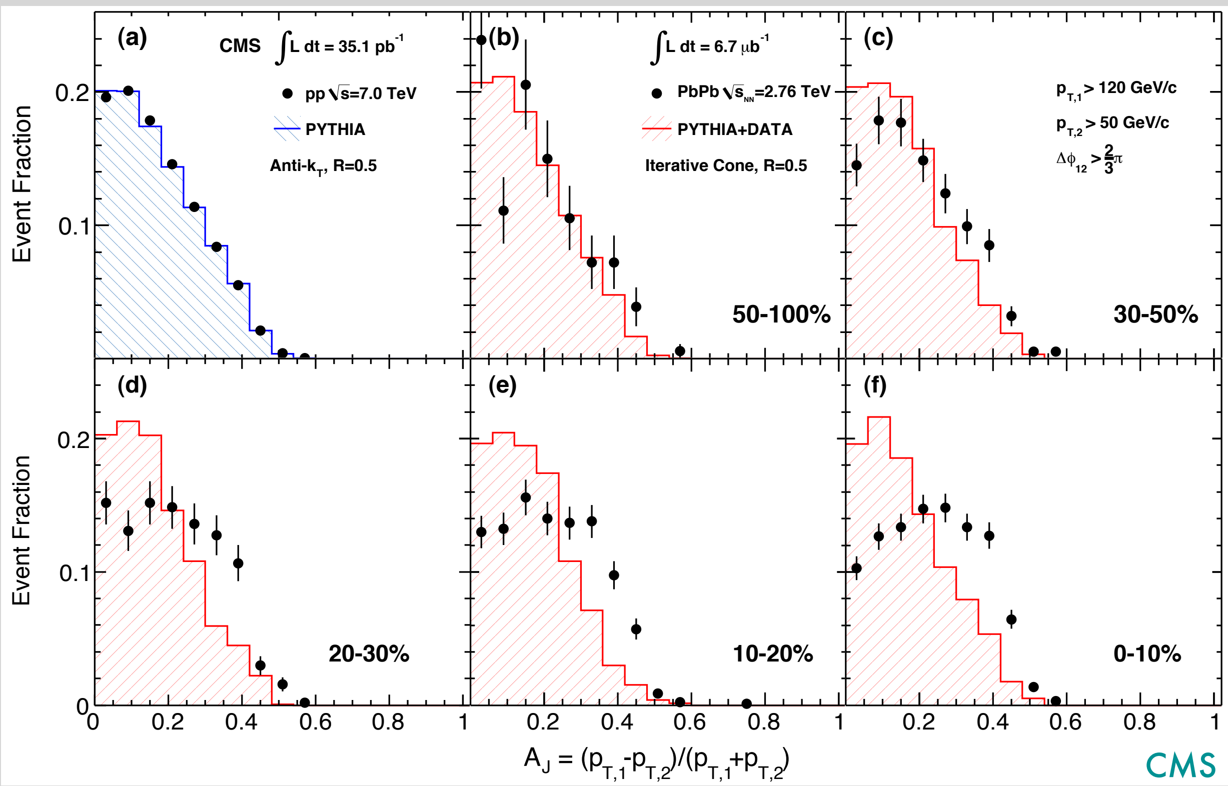

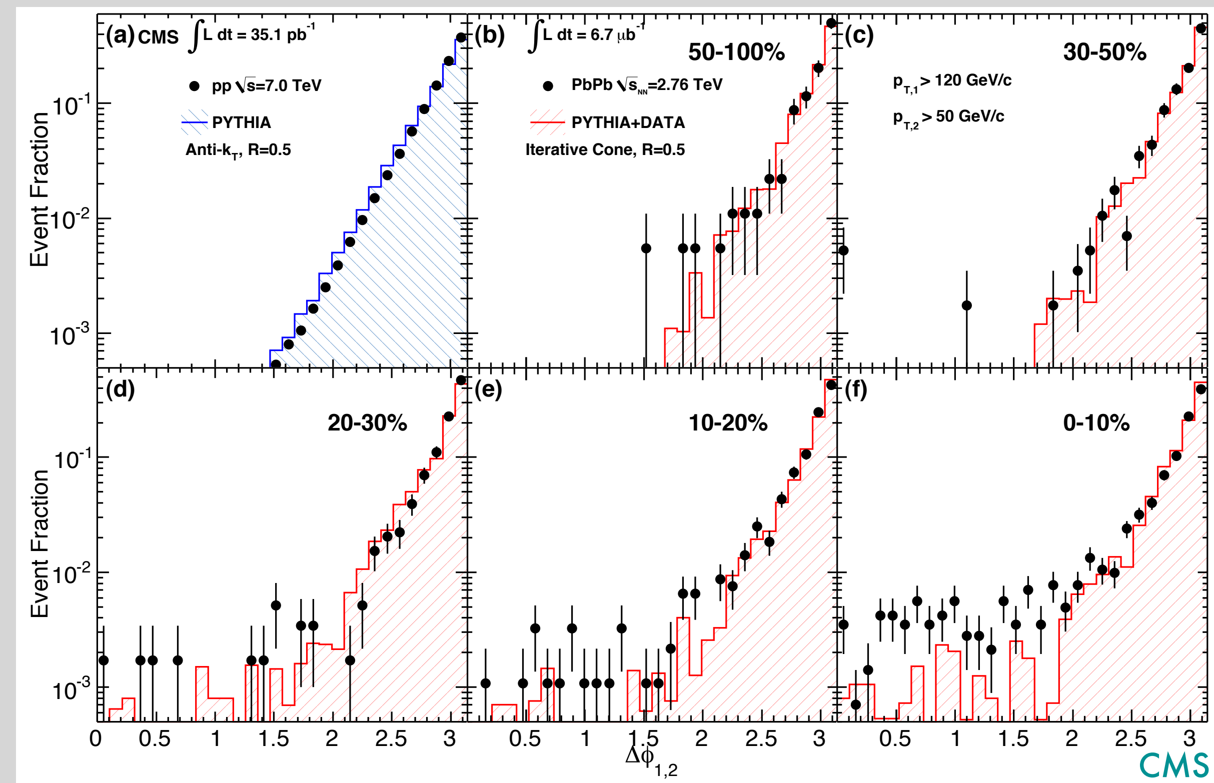

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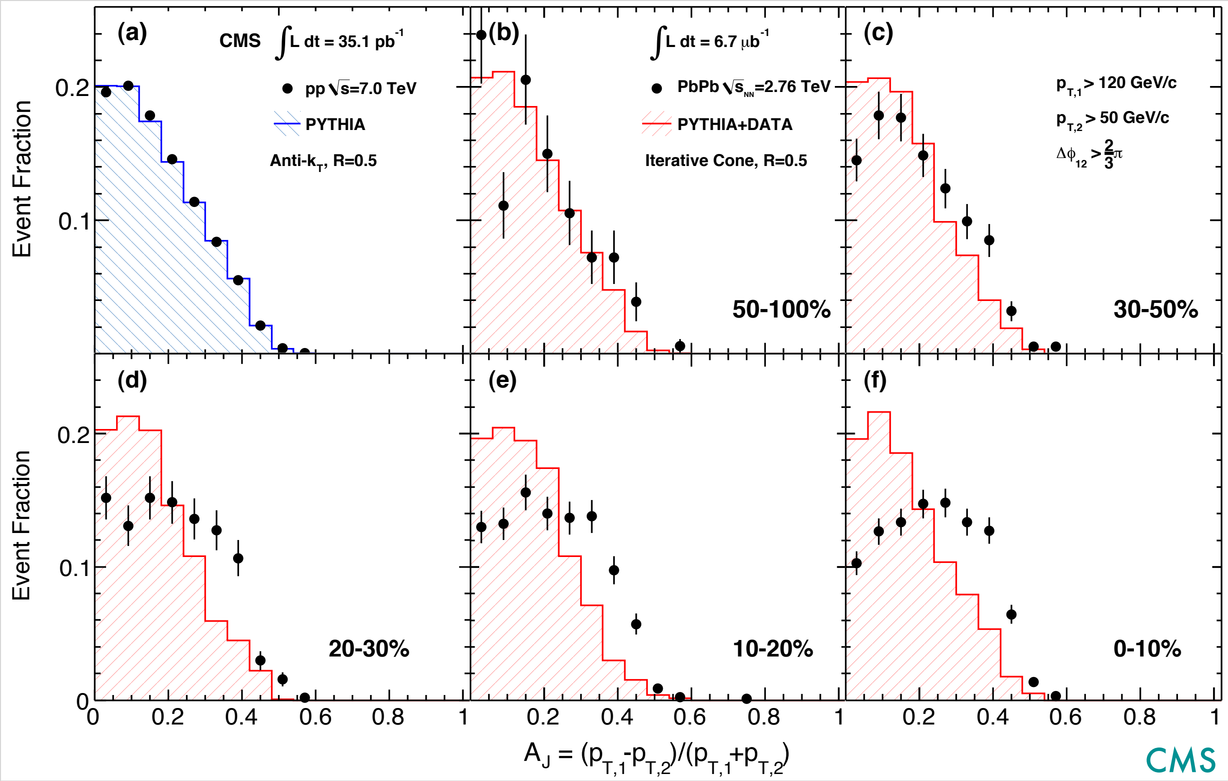

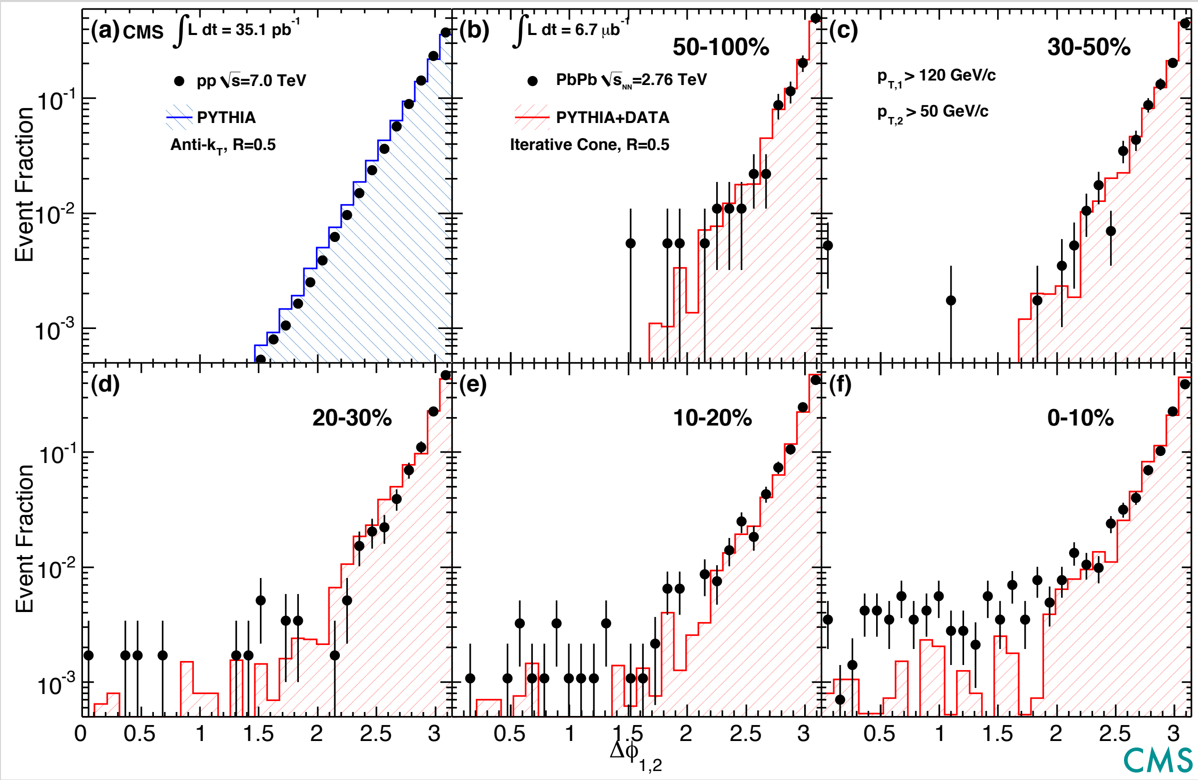

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  - ↪ background subtraction rather non-trivial

    M. Cacciari, G. Salam, G. Soyez

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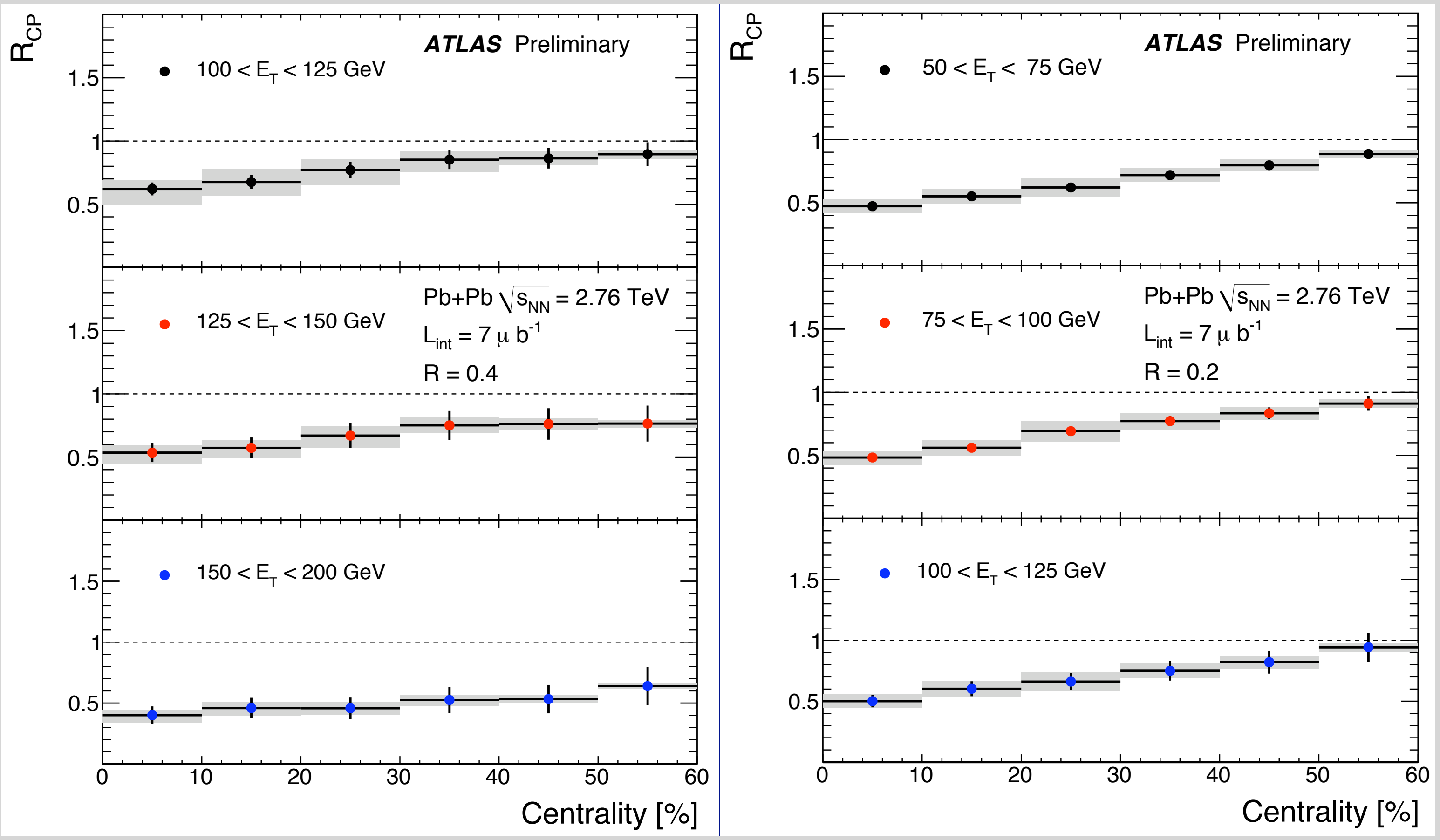
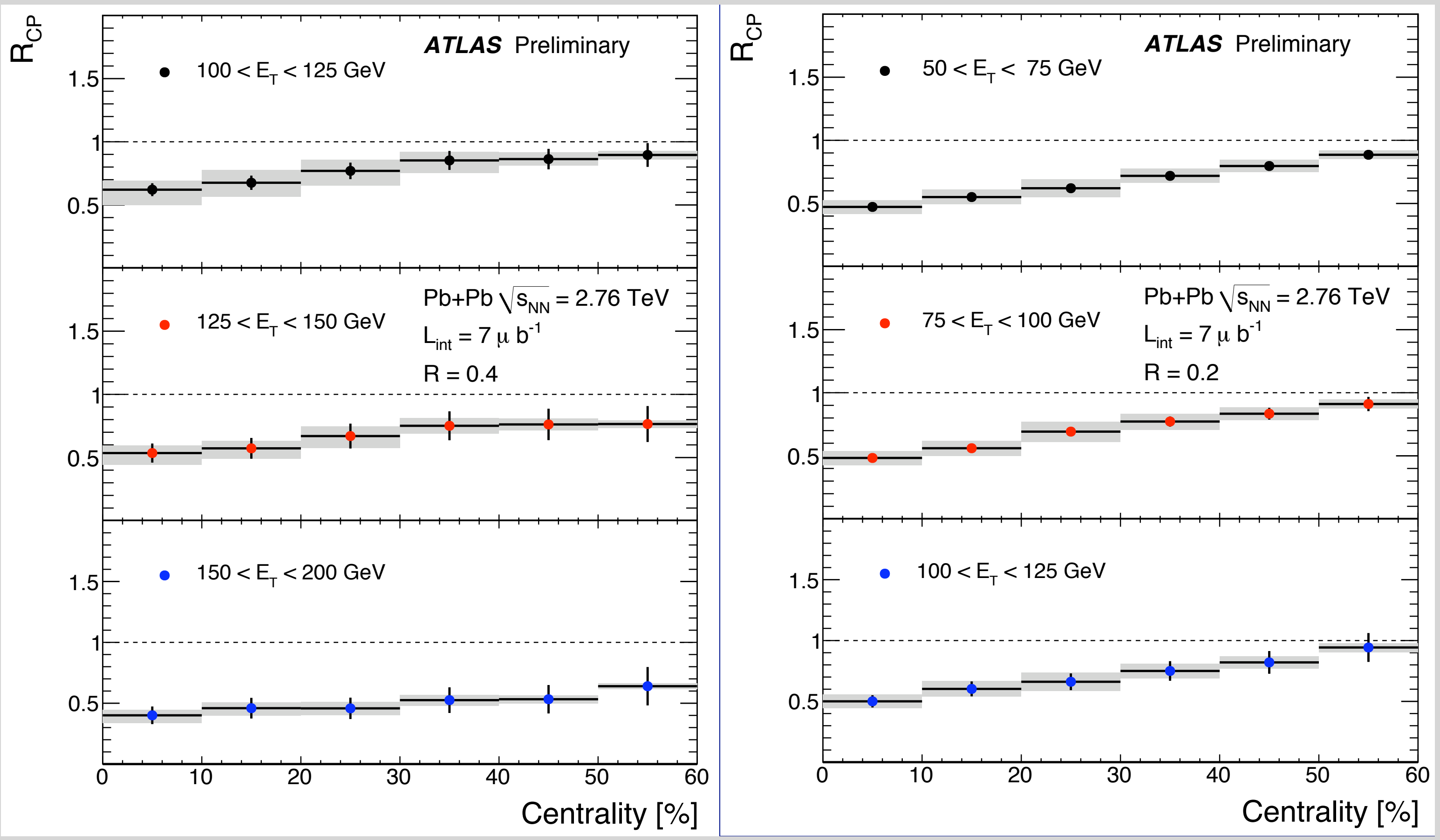


strong jet suppression

jet quenching with jets



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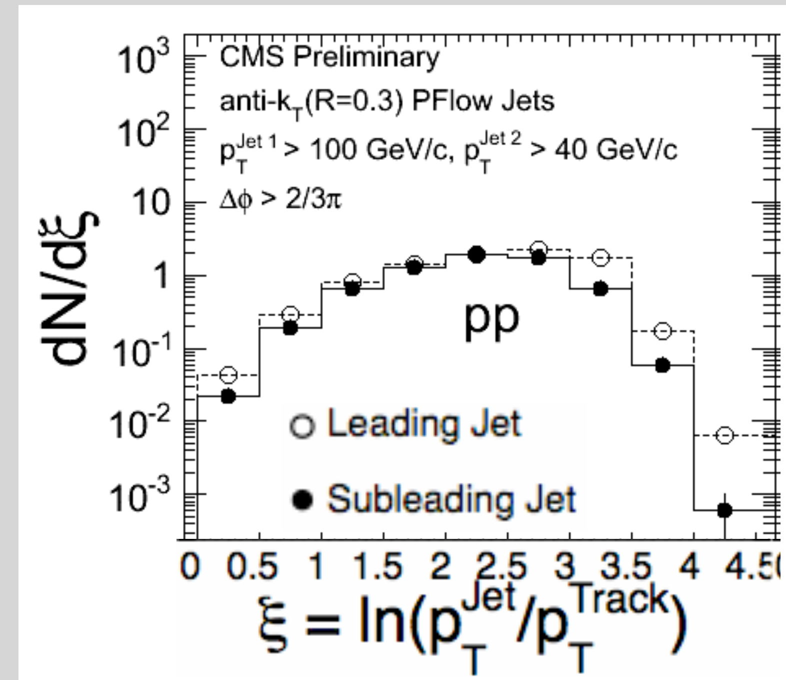
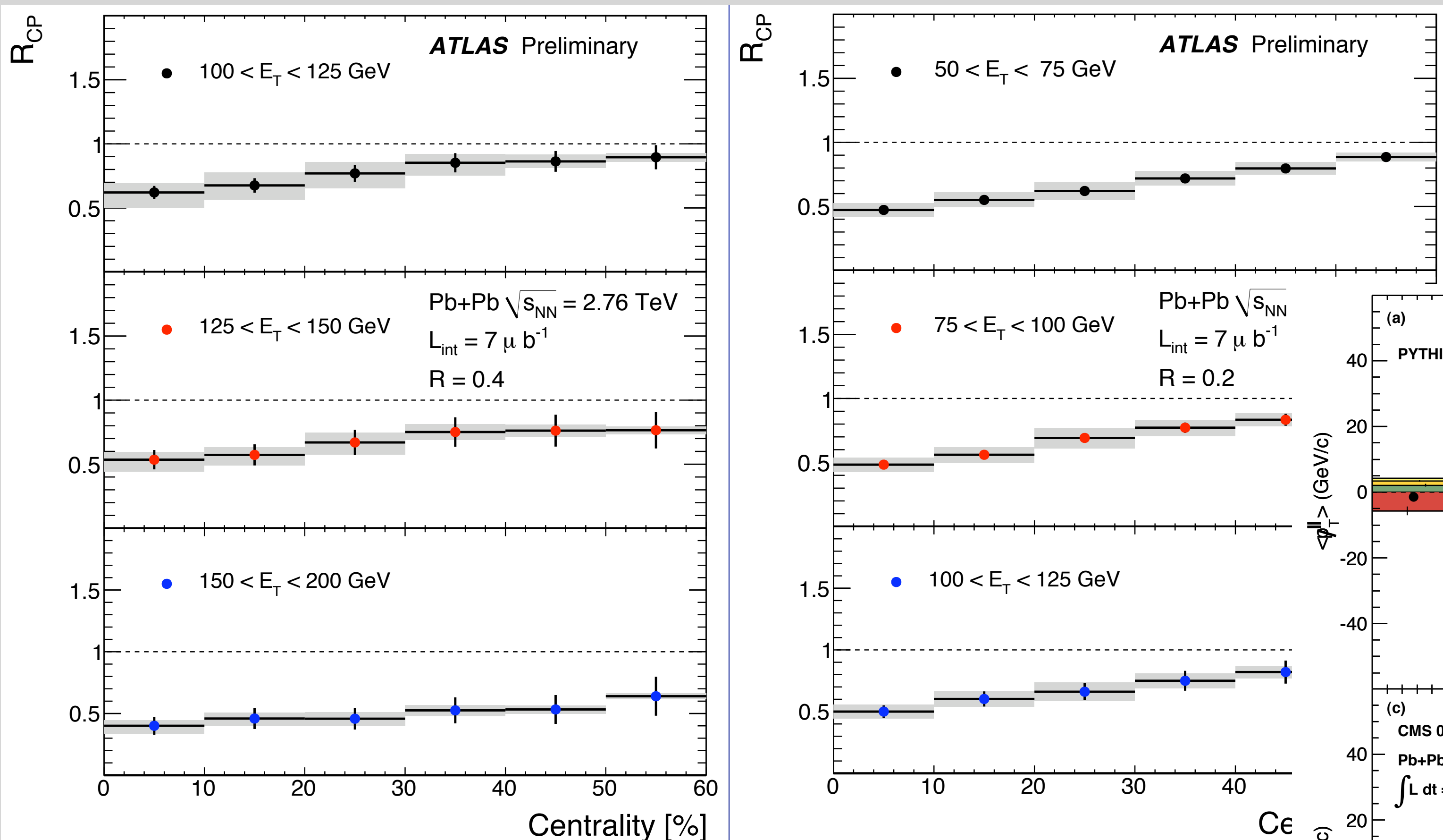


unmodified fragmentation

jet quenching with jets



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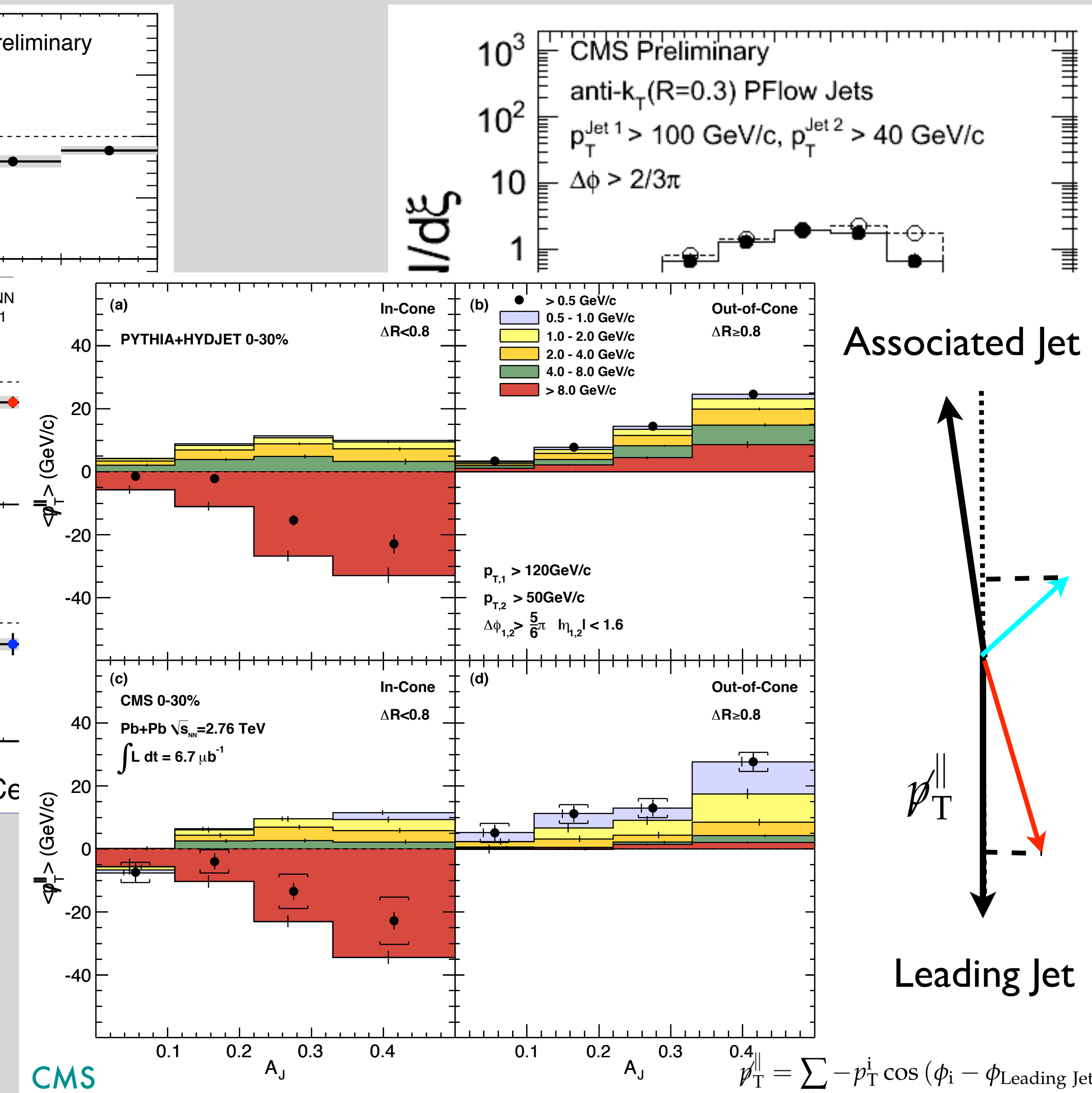
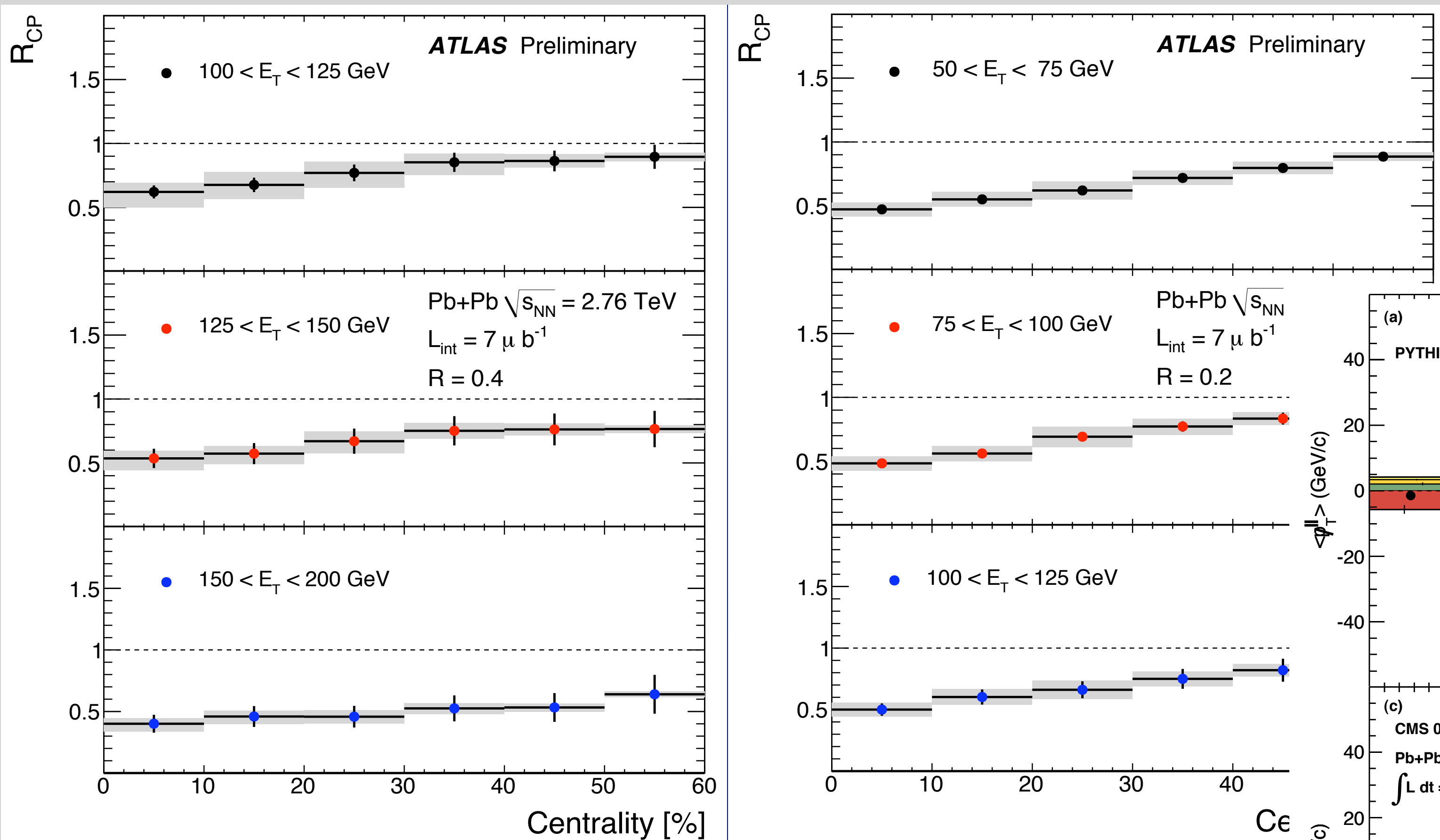


angular energy distribution

jet quenching with jets



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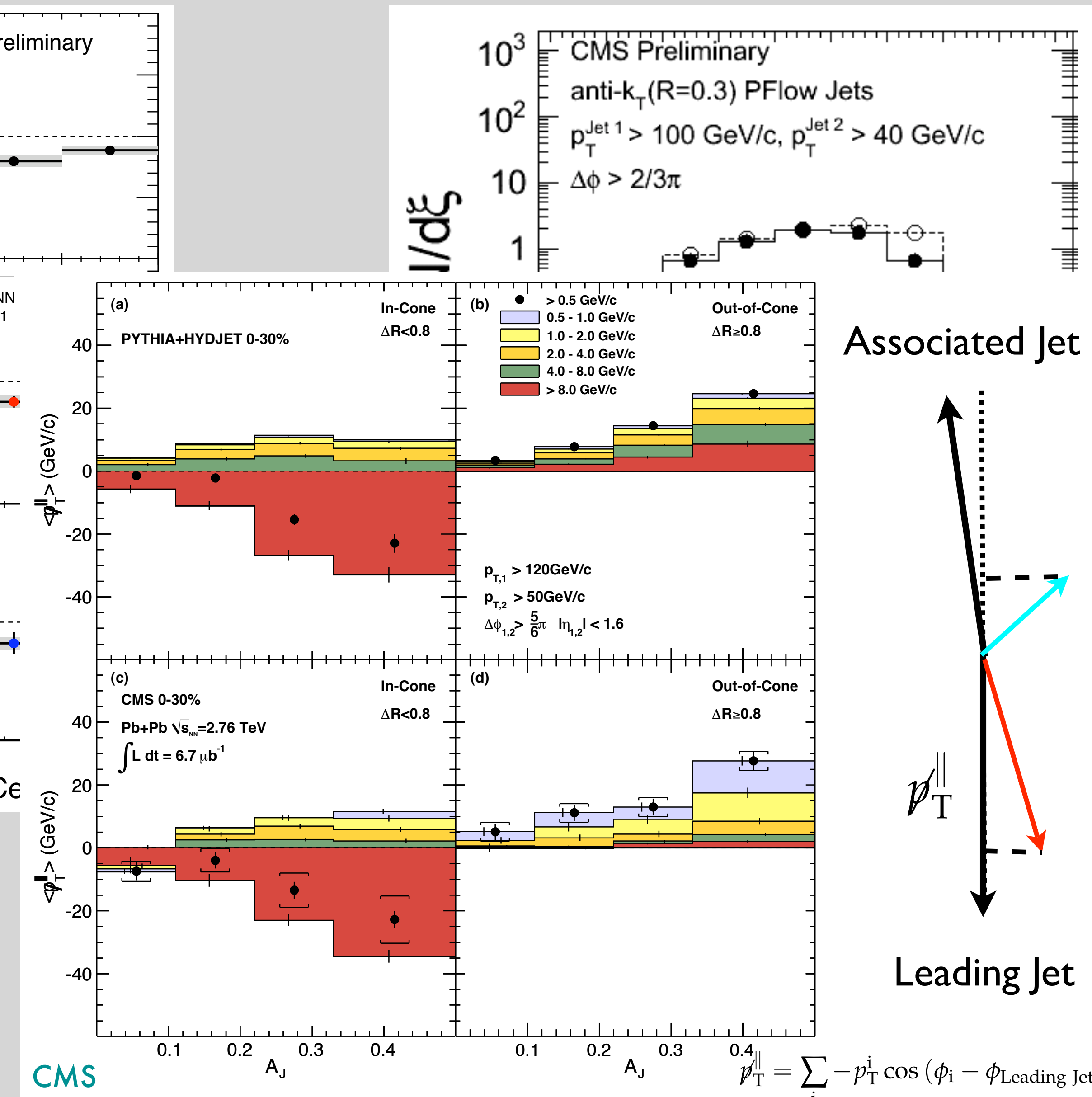

$$\not{p}_{\mathrm{T}}^{\parallel} = \sum_{\mathrm{i}} -p_{\mathrm{T}}^{\mathrm{i}} \cos\left(\phi_{\mathrm{i}} - \phi_{\mathrm{Leading\ Jet}}\right)$$

angular energy distribution

- clear jet energy loss, energy recovered in soft components at large angles, apparent no modification of fragmentation, ...
  - ↪ many questions...

high p_t measurements in pA [d-Au, p-Pb]

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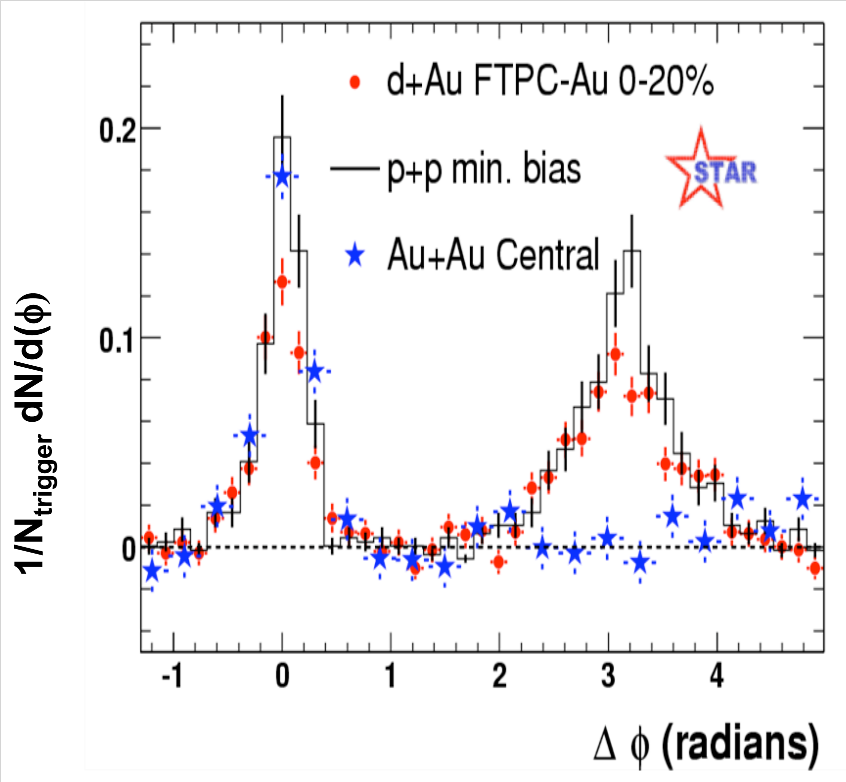

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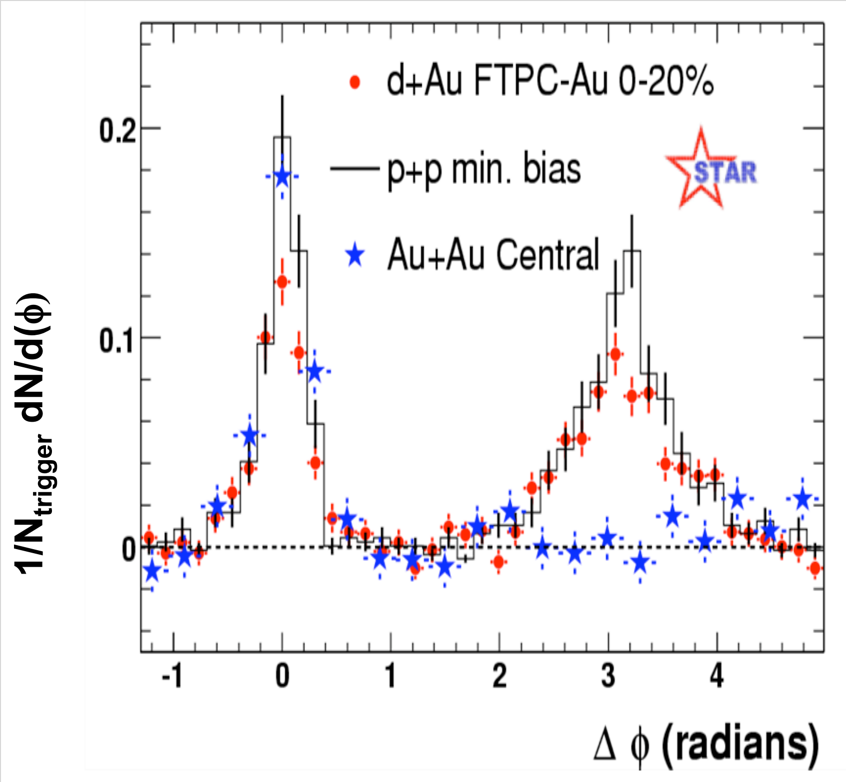

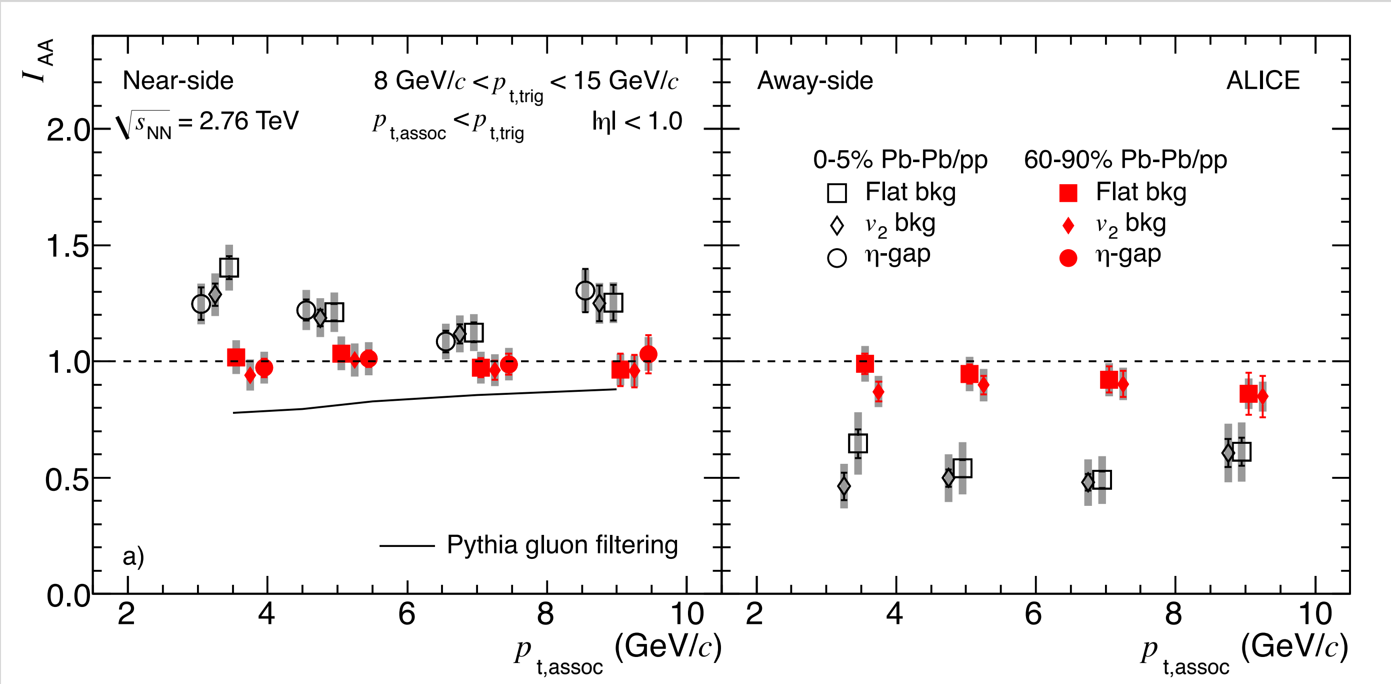

pPb calibration?

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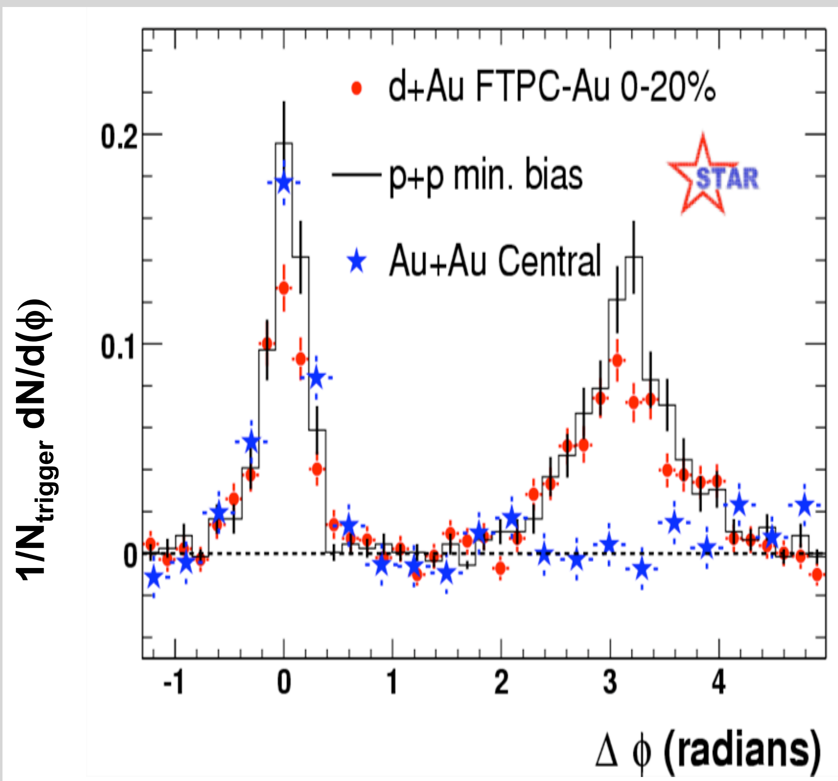

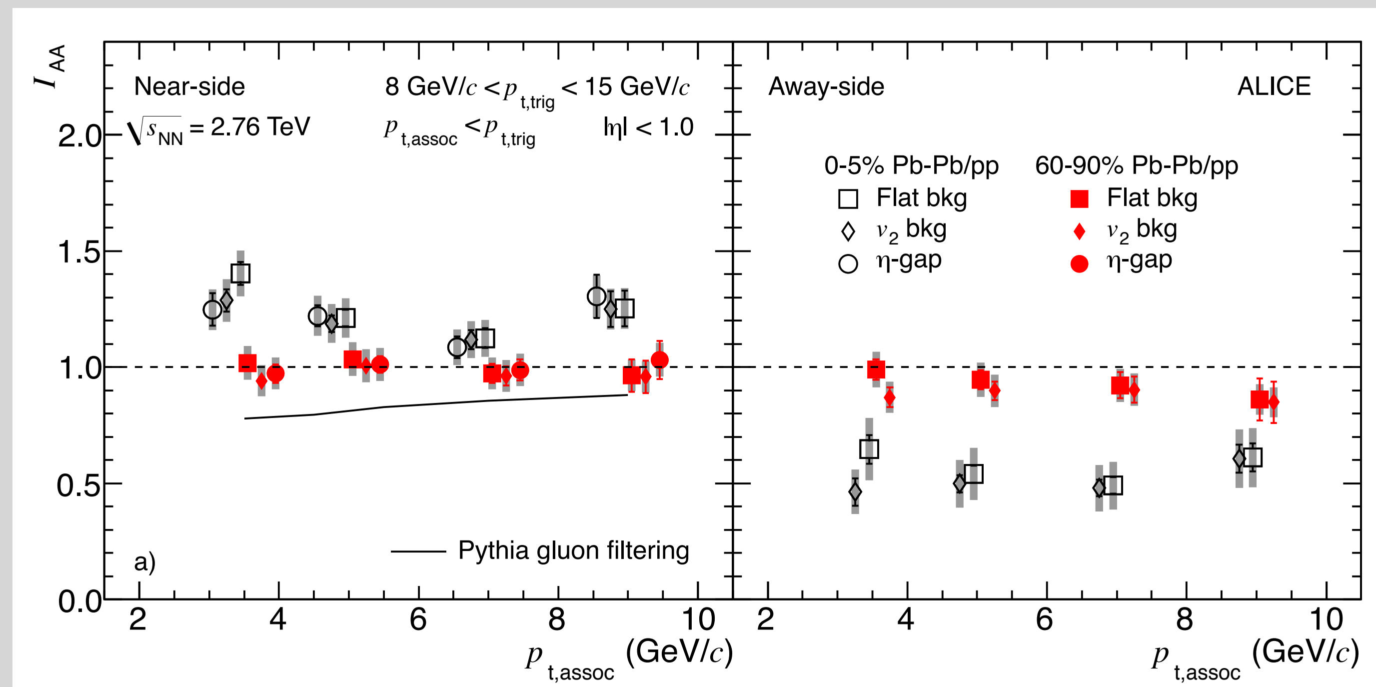

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  - but, some 'mysterious' data...

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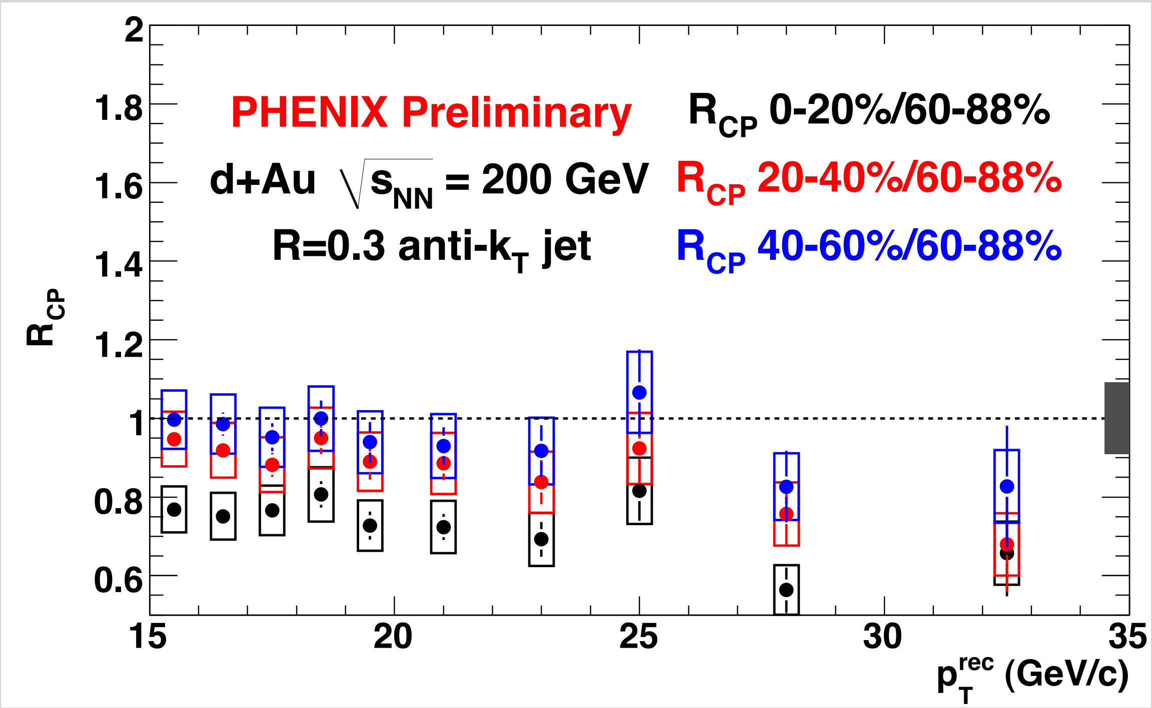

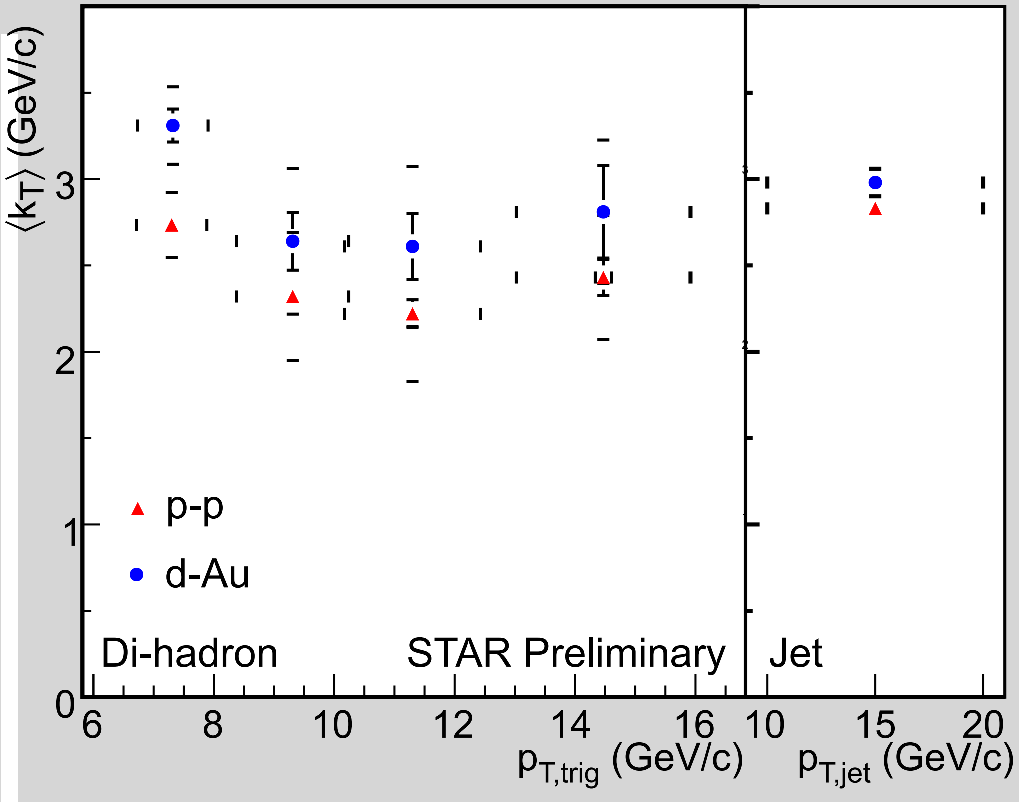

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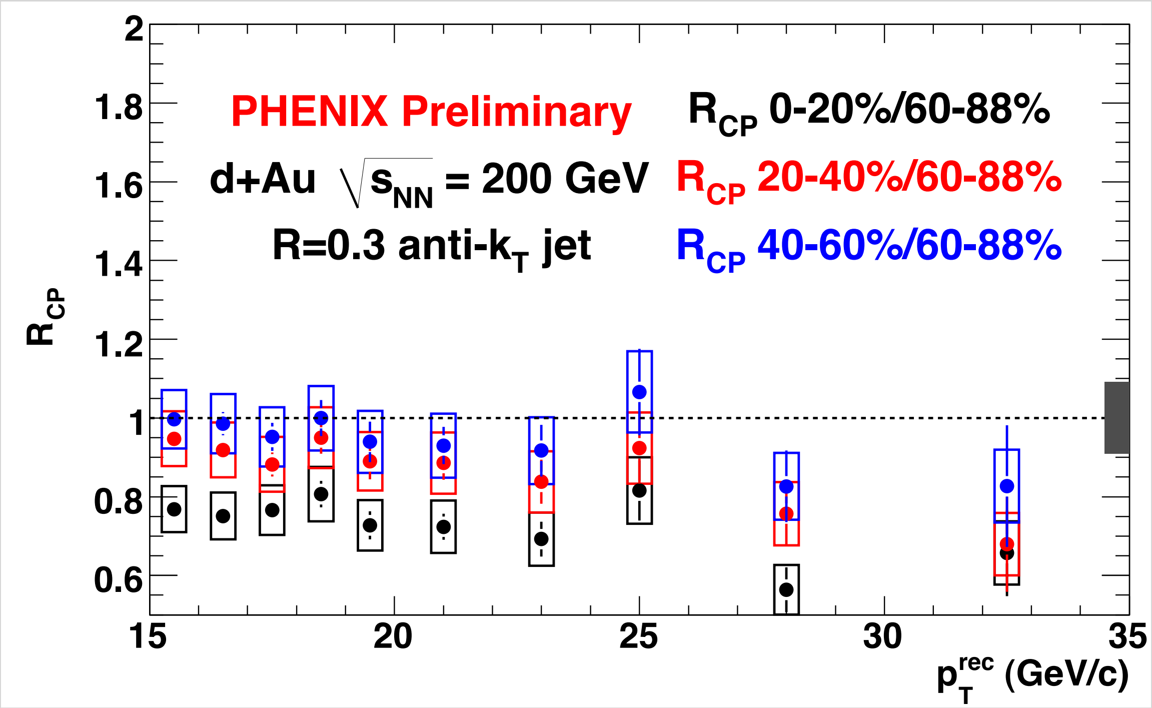

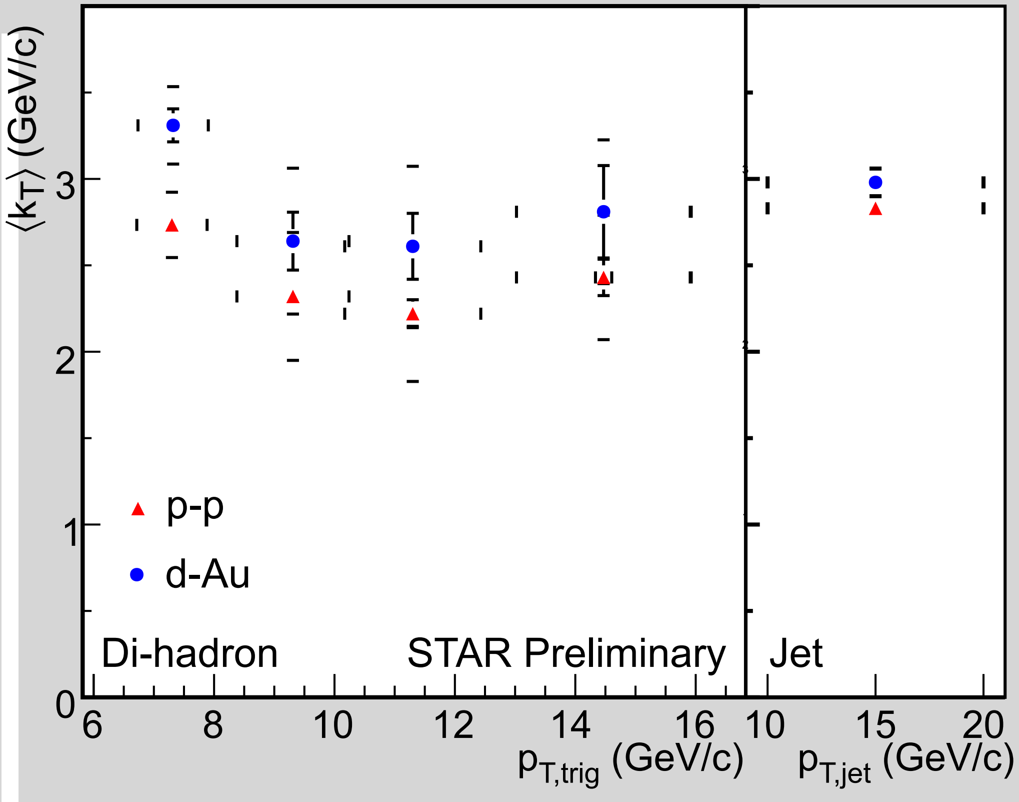

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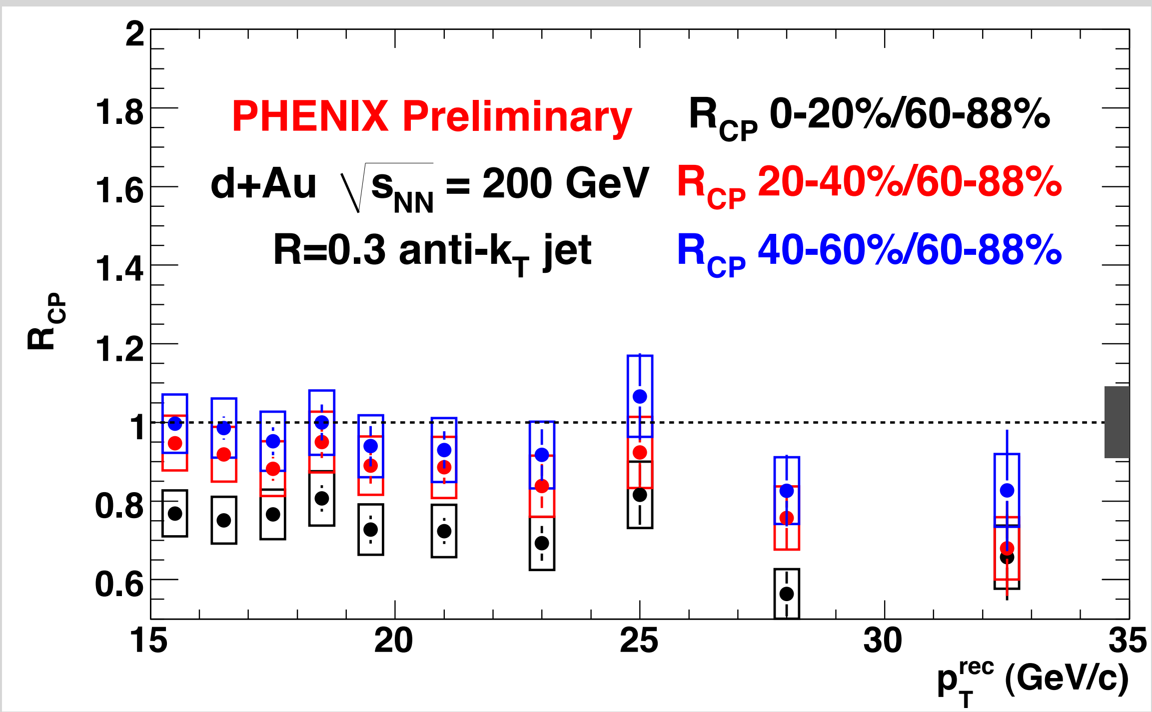

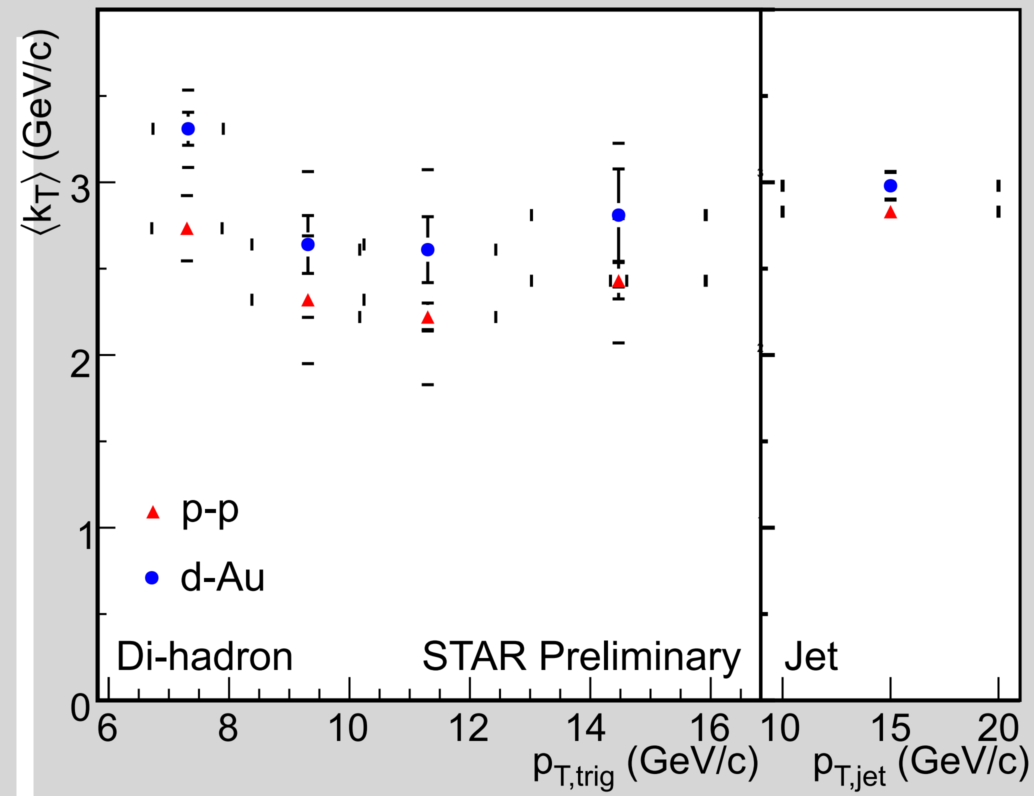

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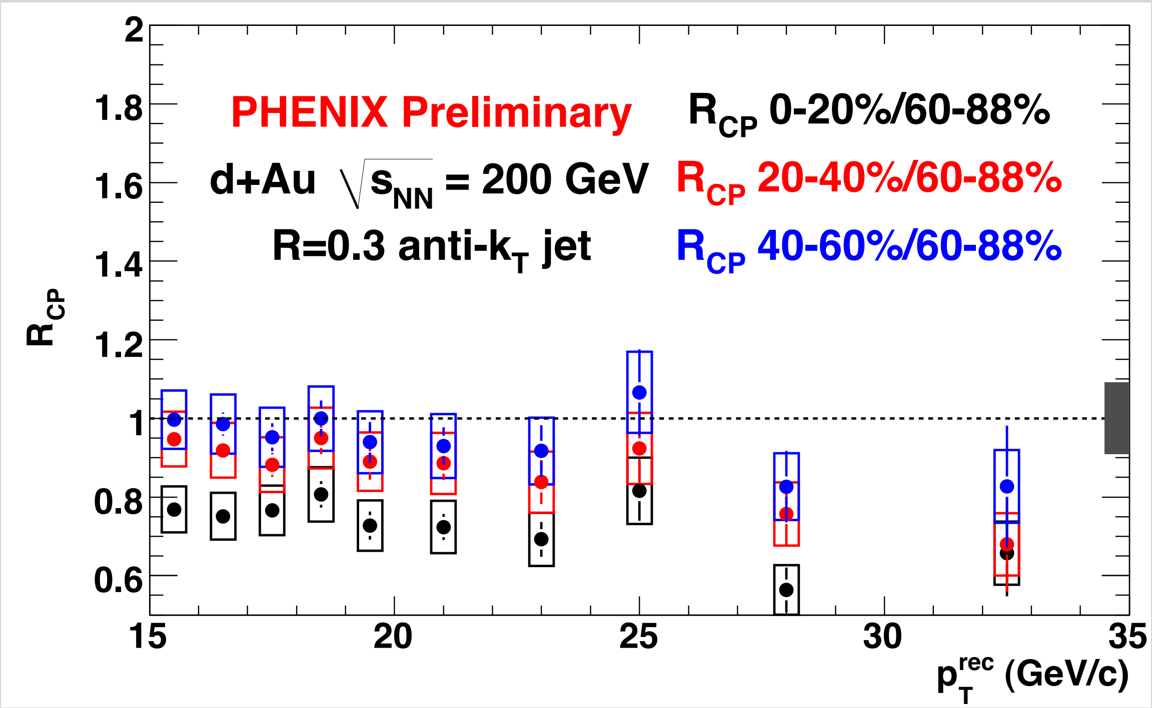

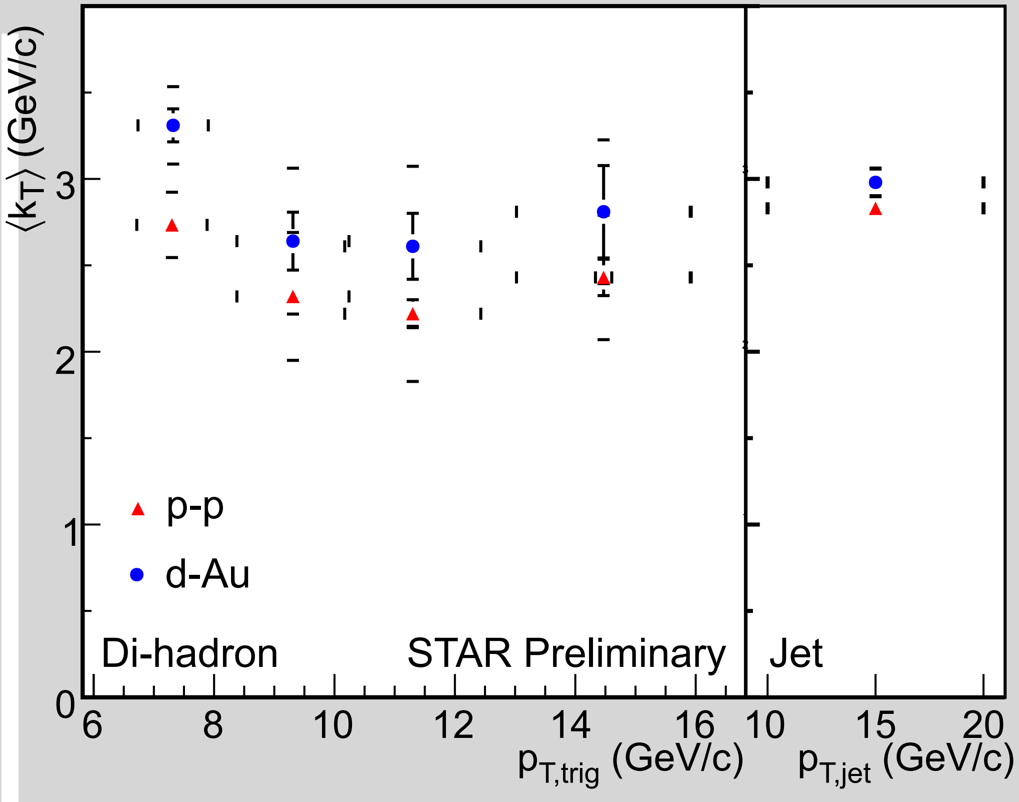

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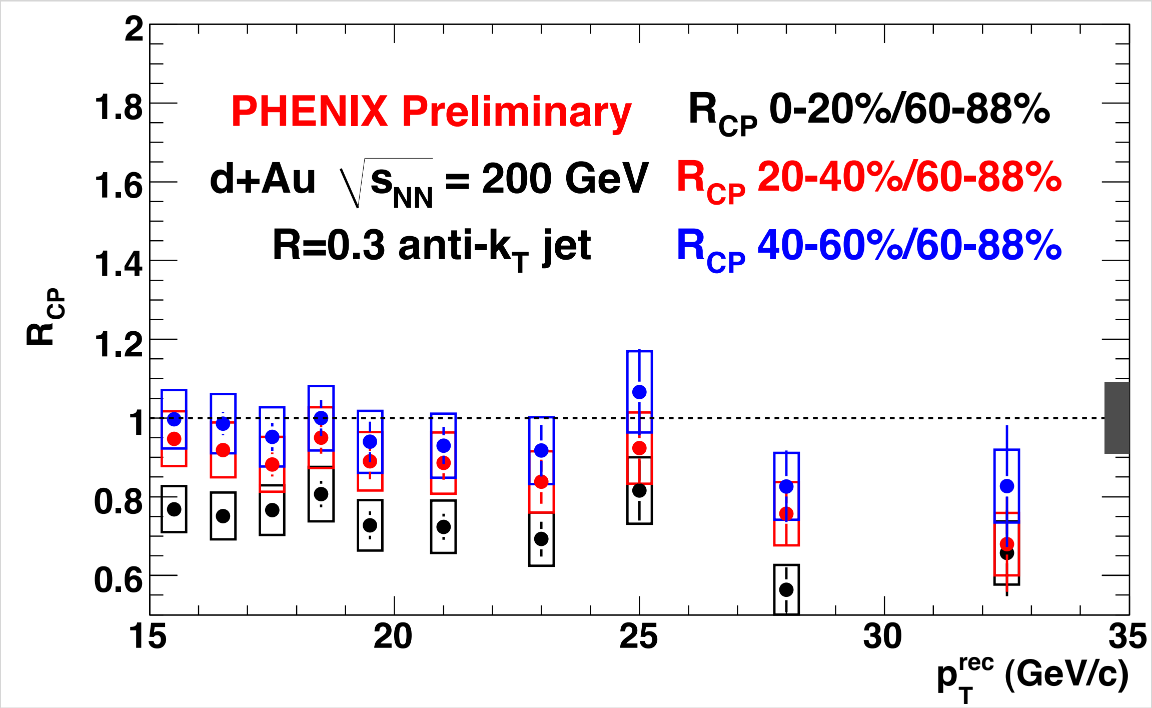

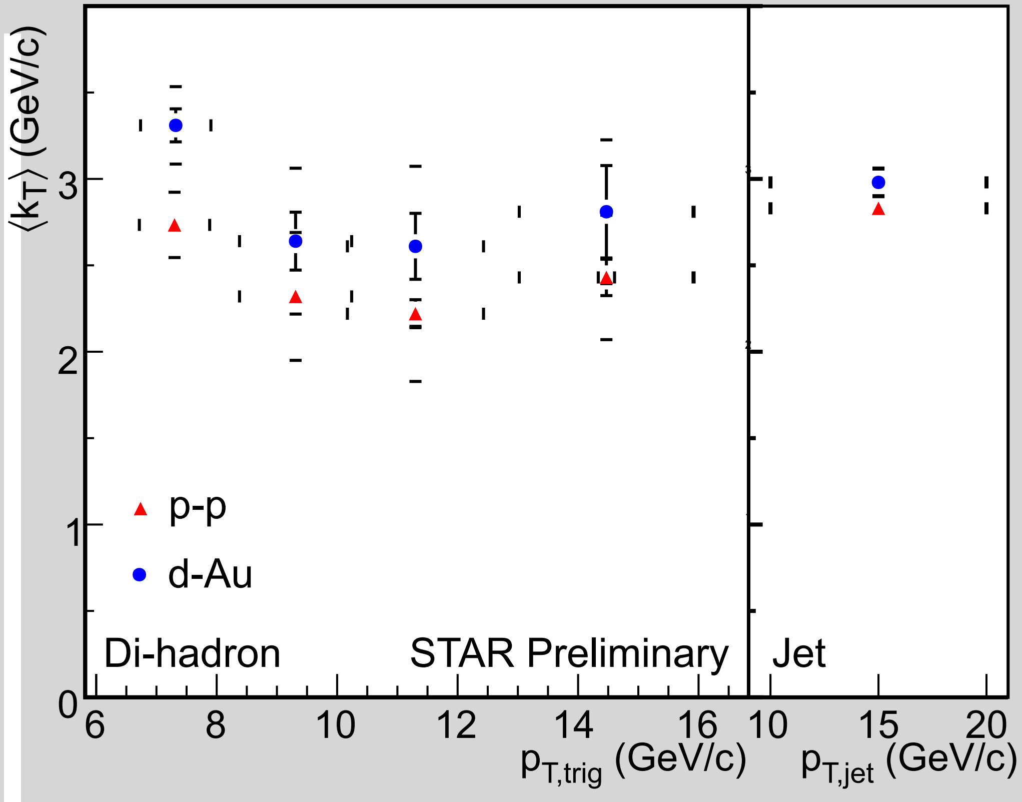

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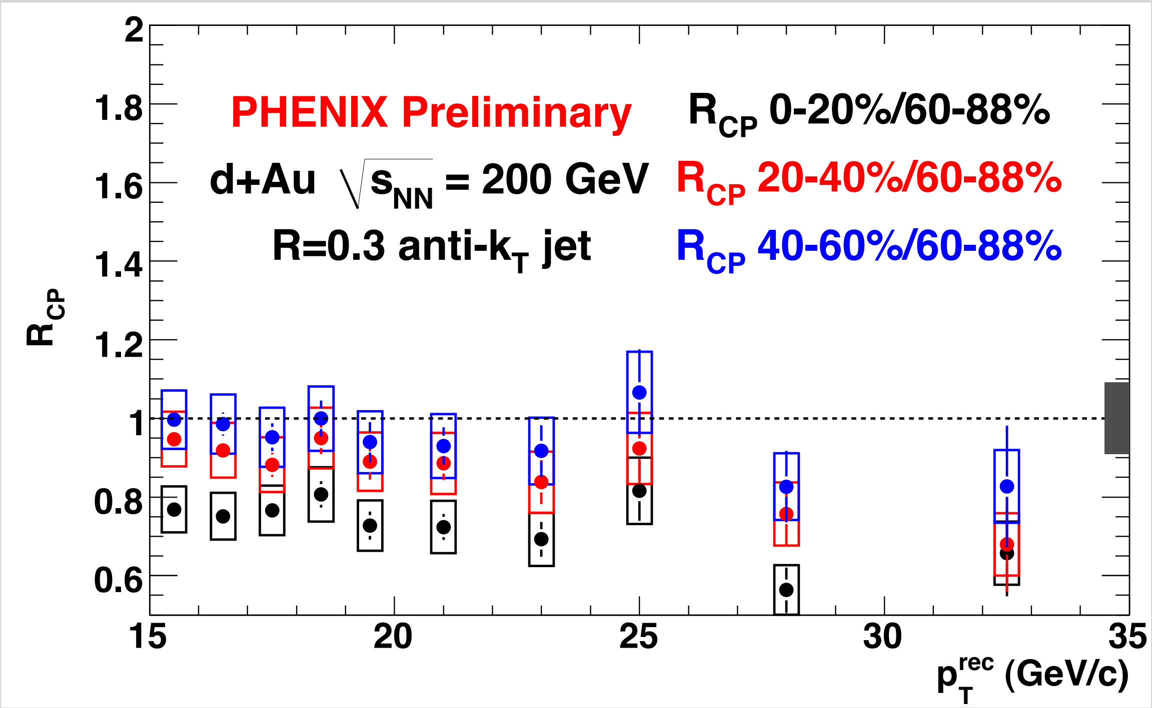

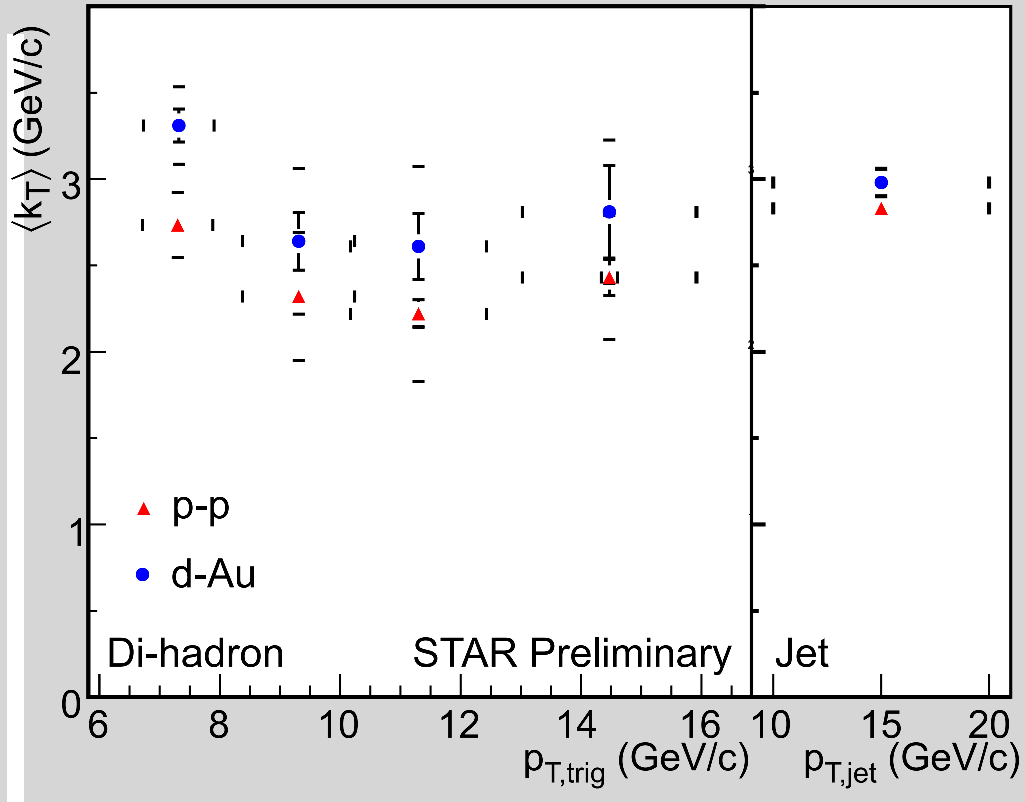

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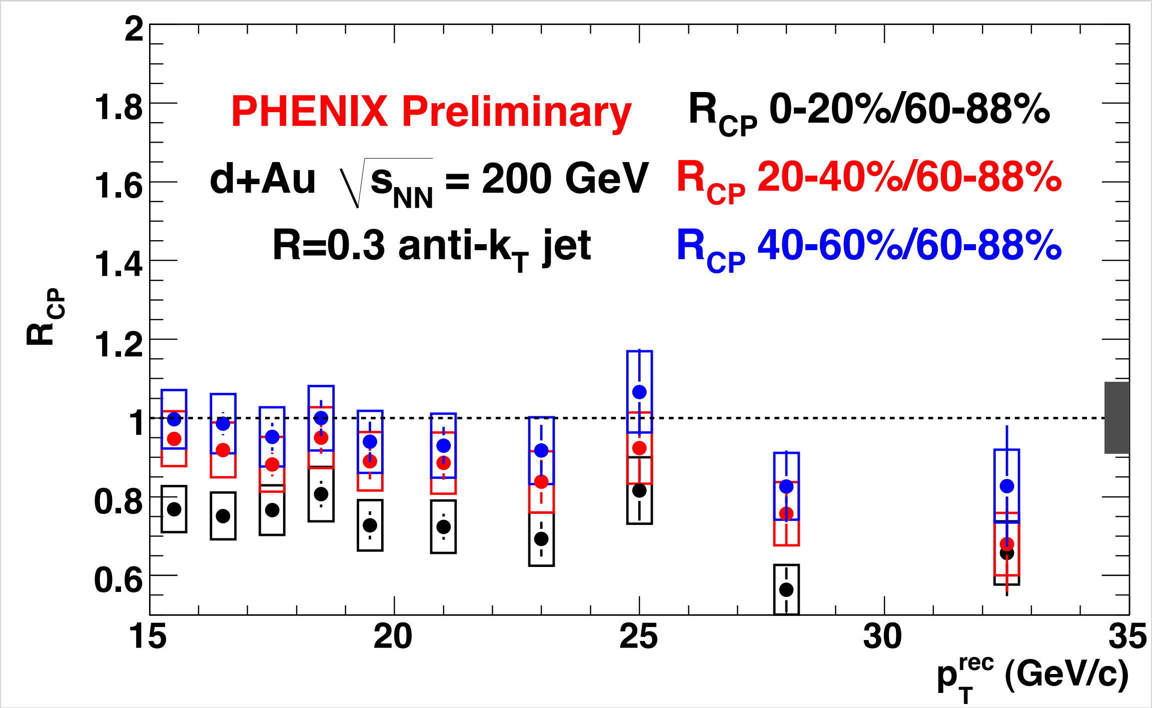

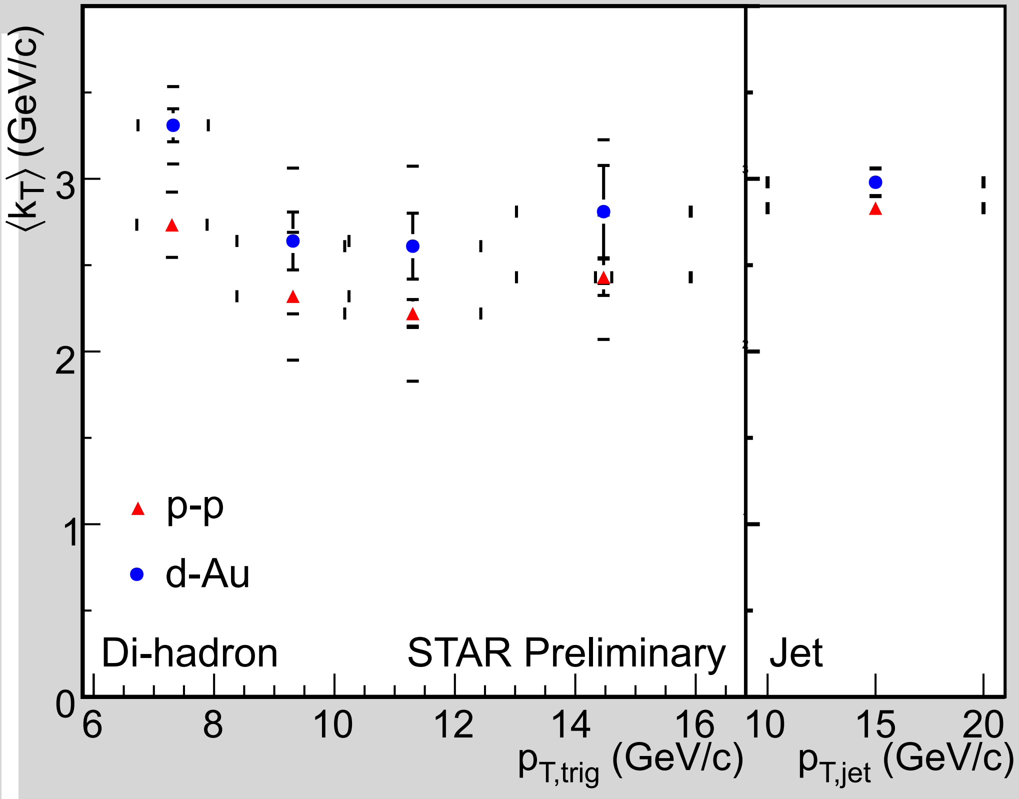

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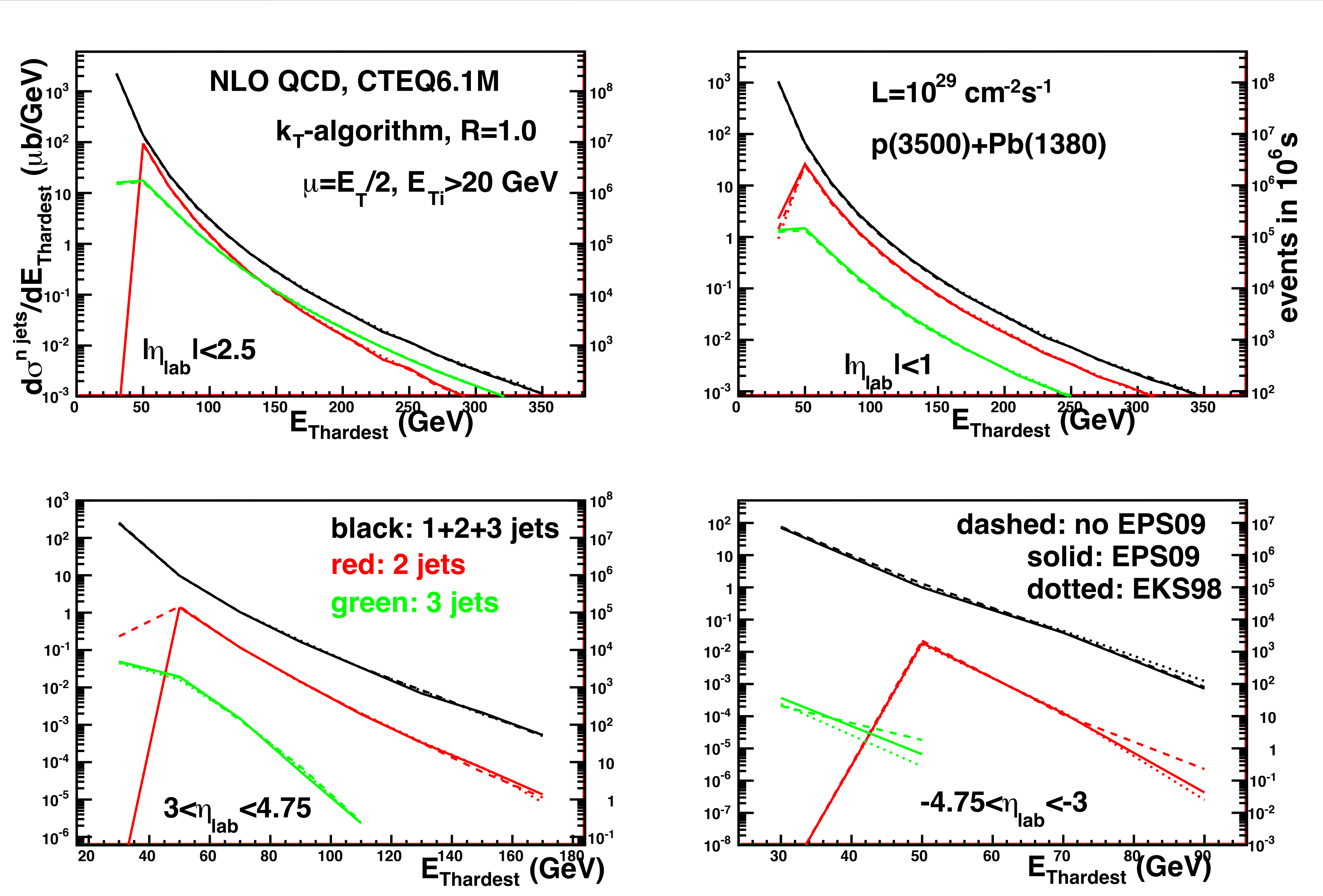
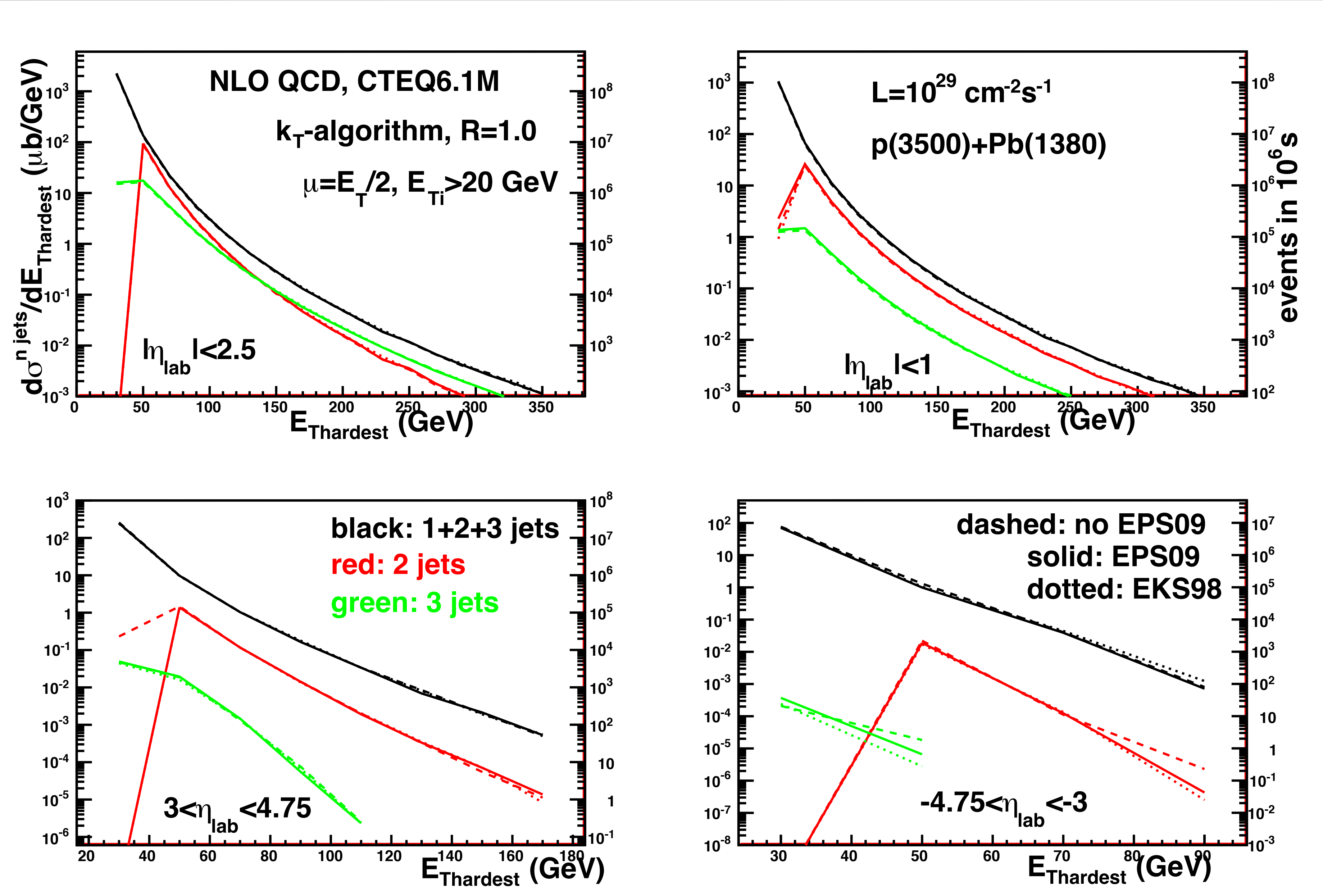
pA@LHC will clarify the situation

jets in pA@LHC



jets in pA@LHC



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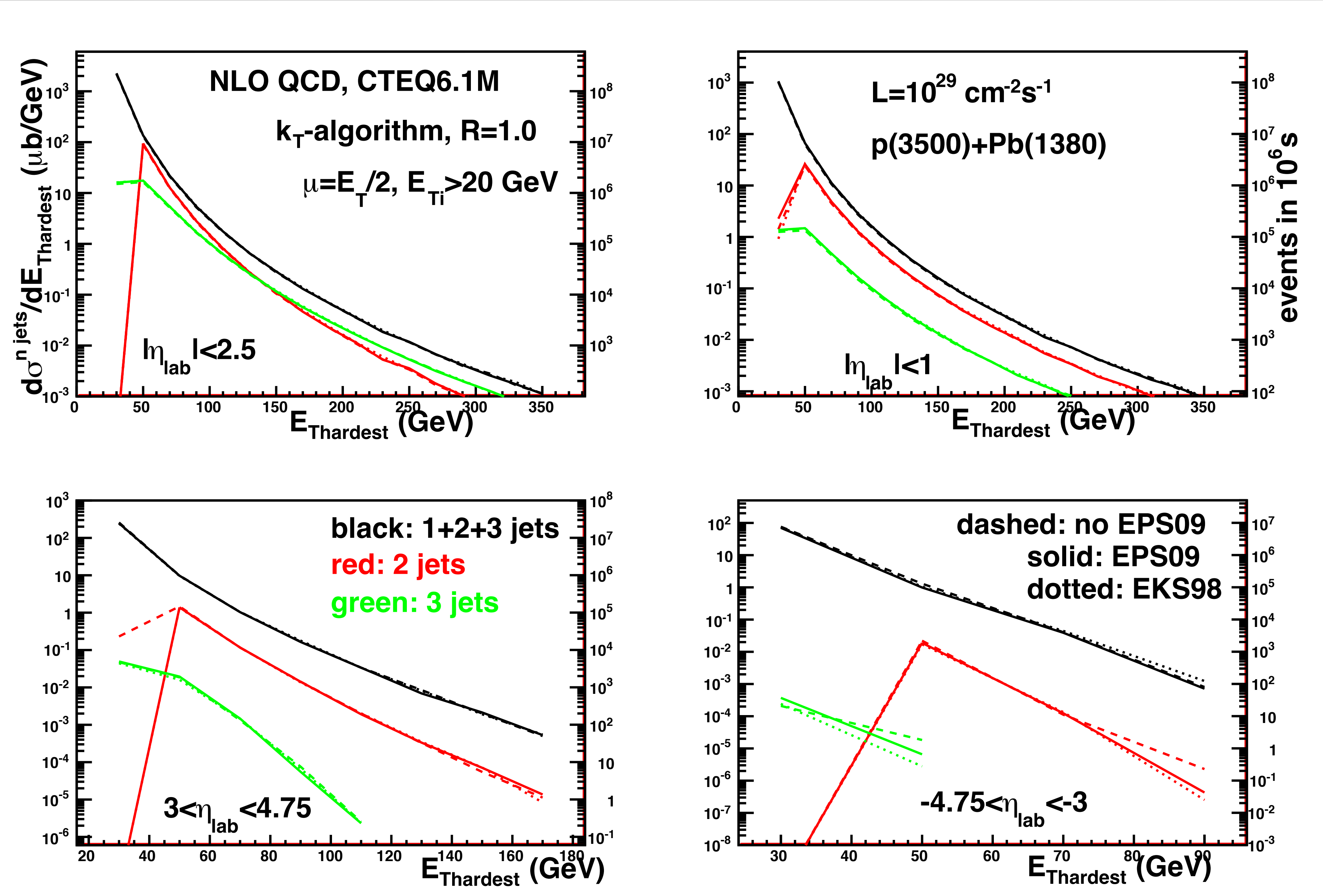

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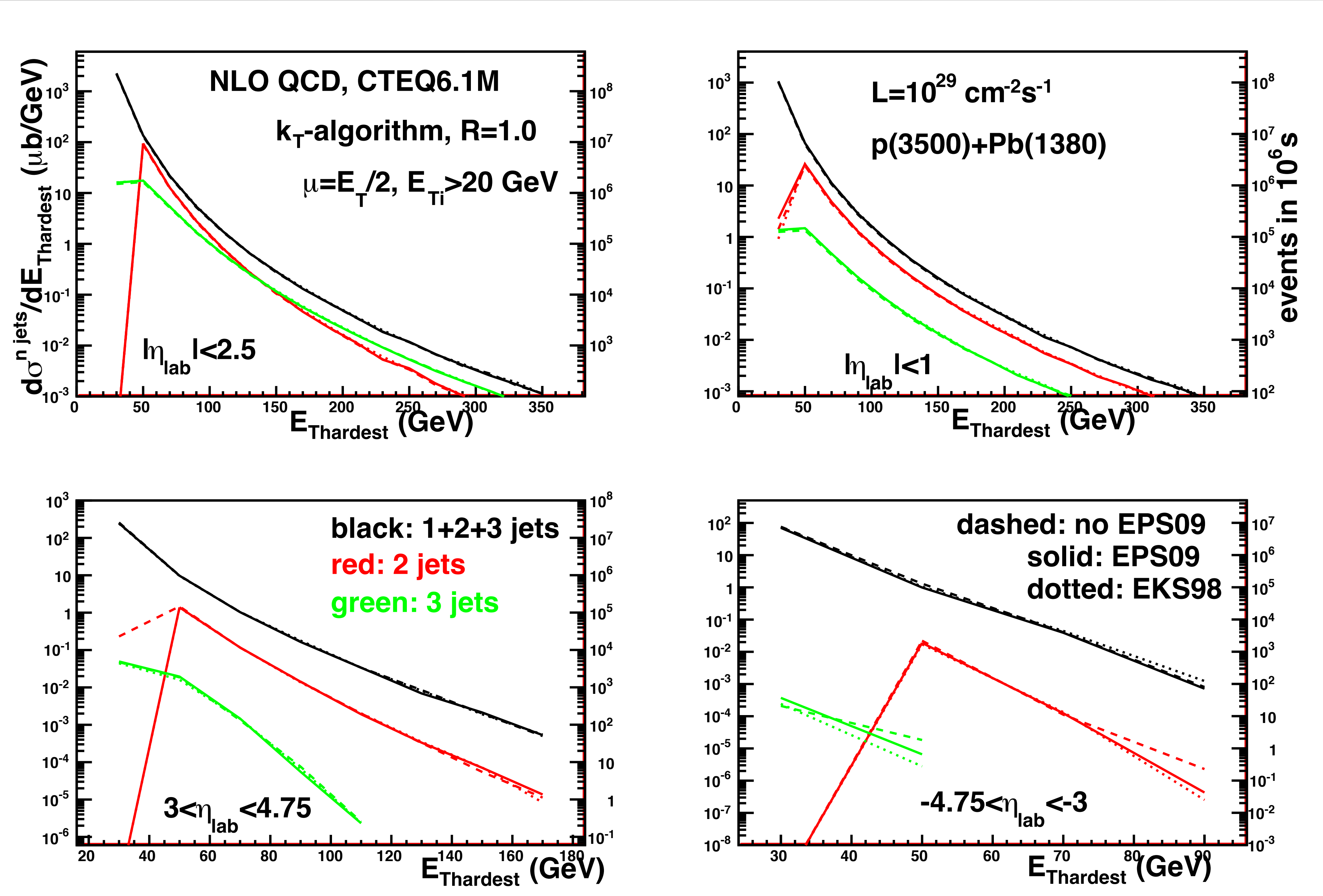

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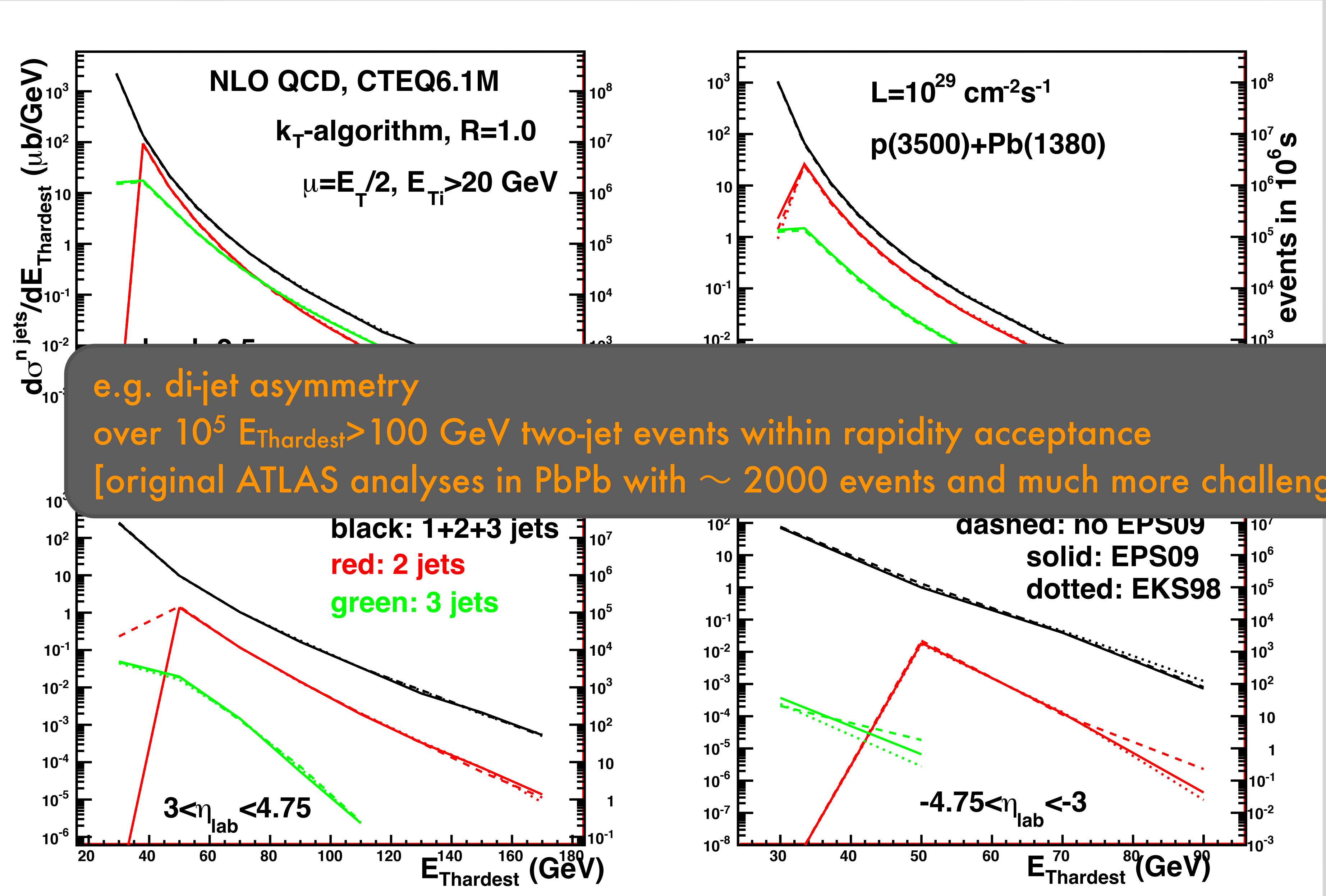

e.g. di-jet asymmetry
over 10^5 $E_{Thardest}$>100 GeV two-jet events within rapidity acceptance
[original ATLAS analyses in PbPb with ~ 2000 events and much more challenging background subtraction]

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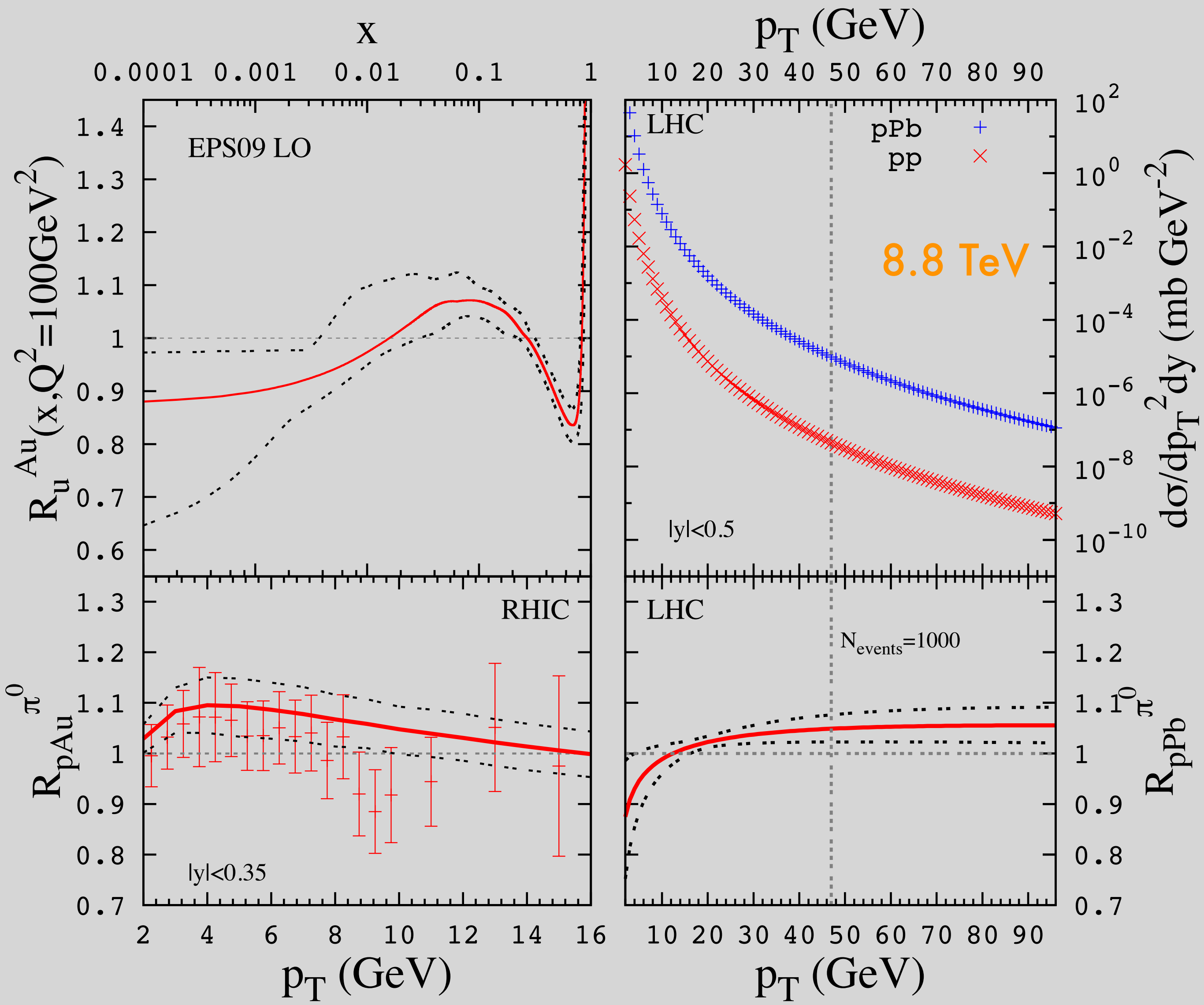

P. Quiroga-Arias, JGM, U. Wiedemann & Sassot, Zurita, Stratmann

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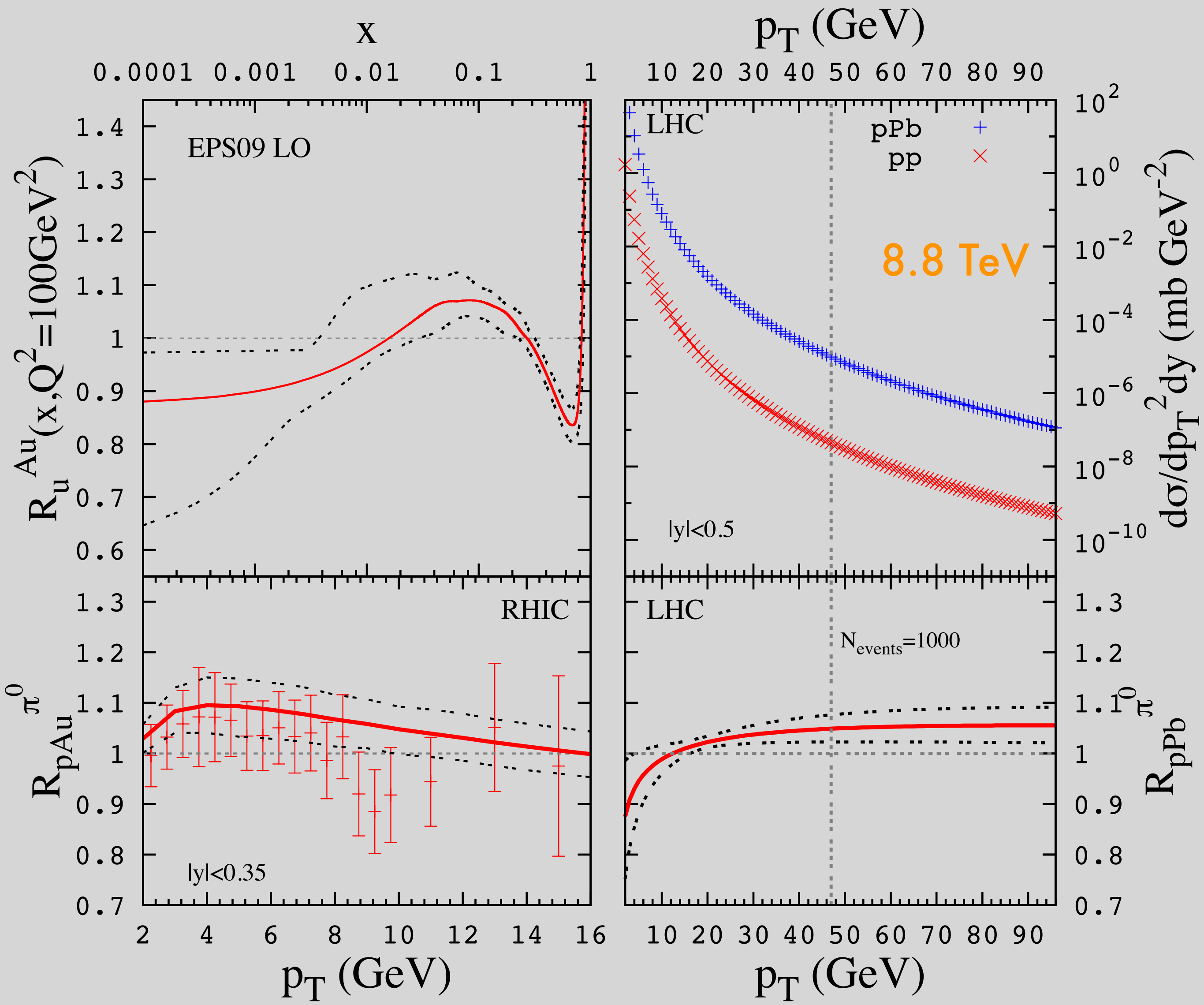

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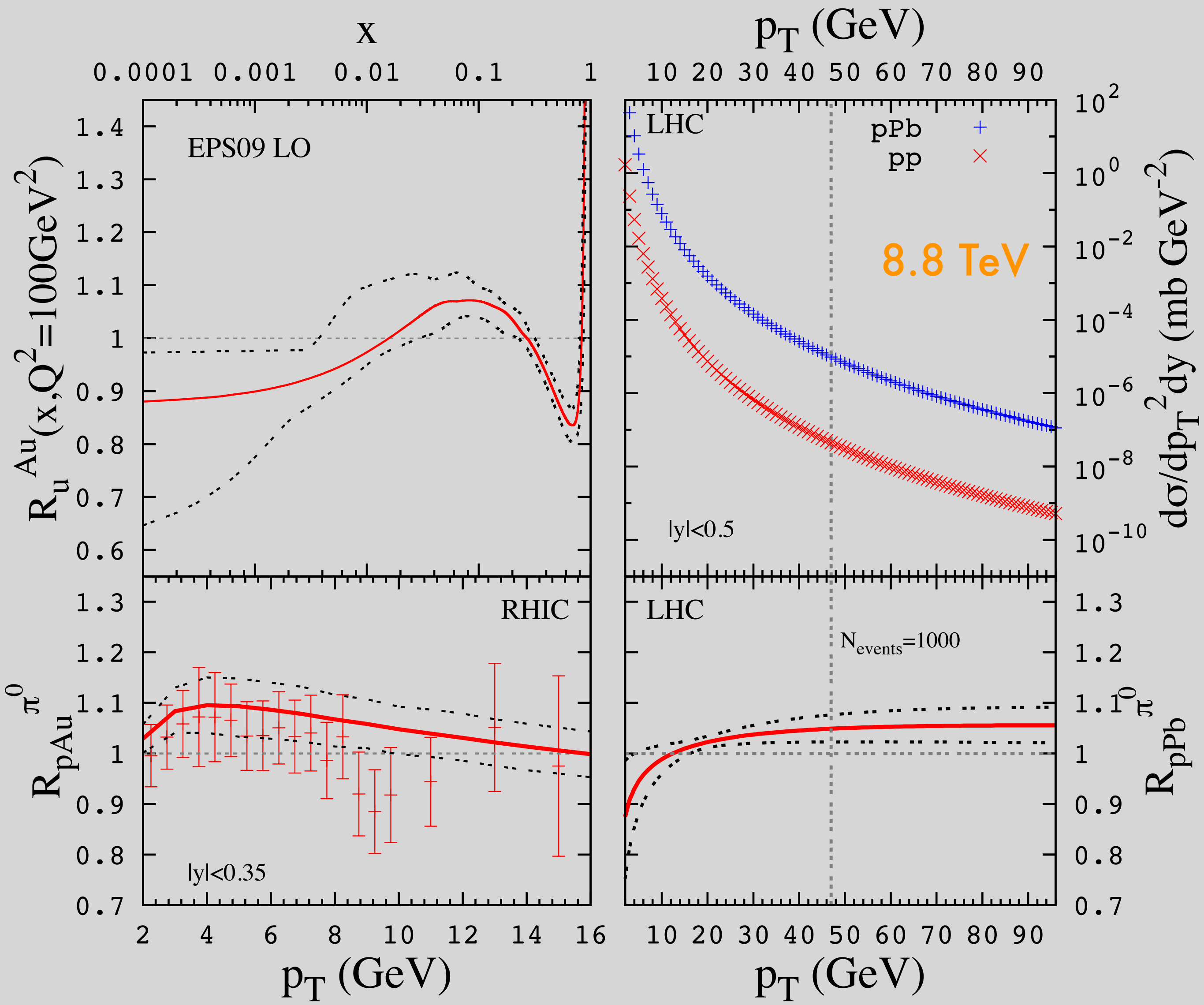

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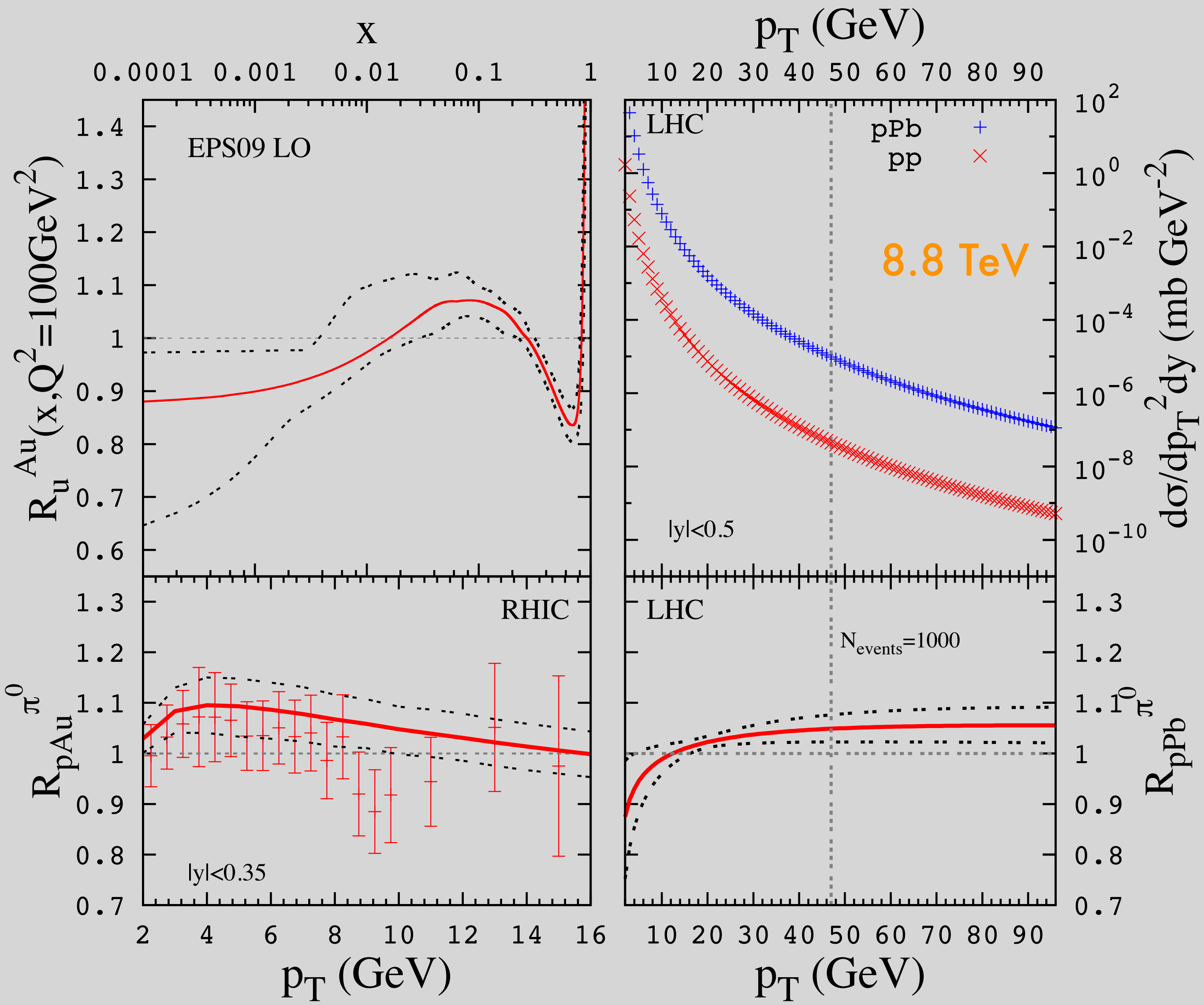

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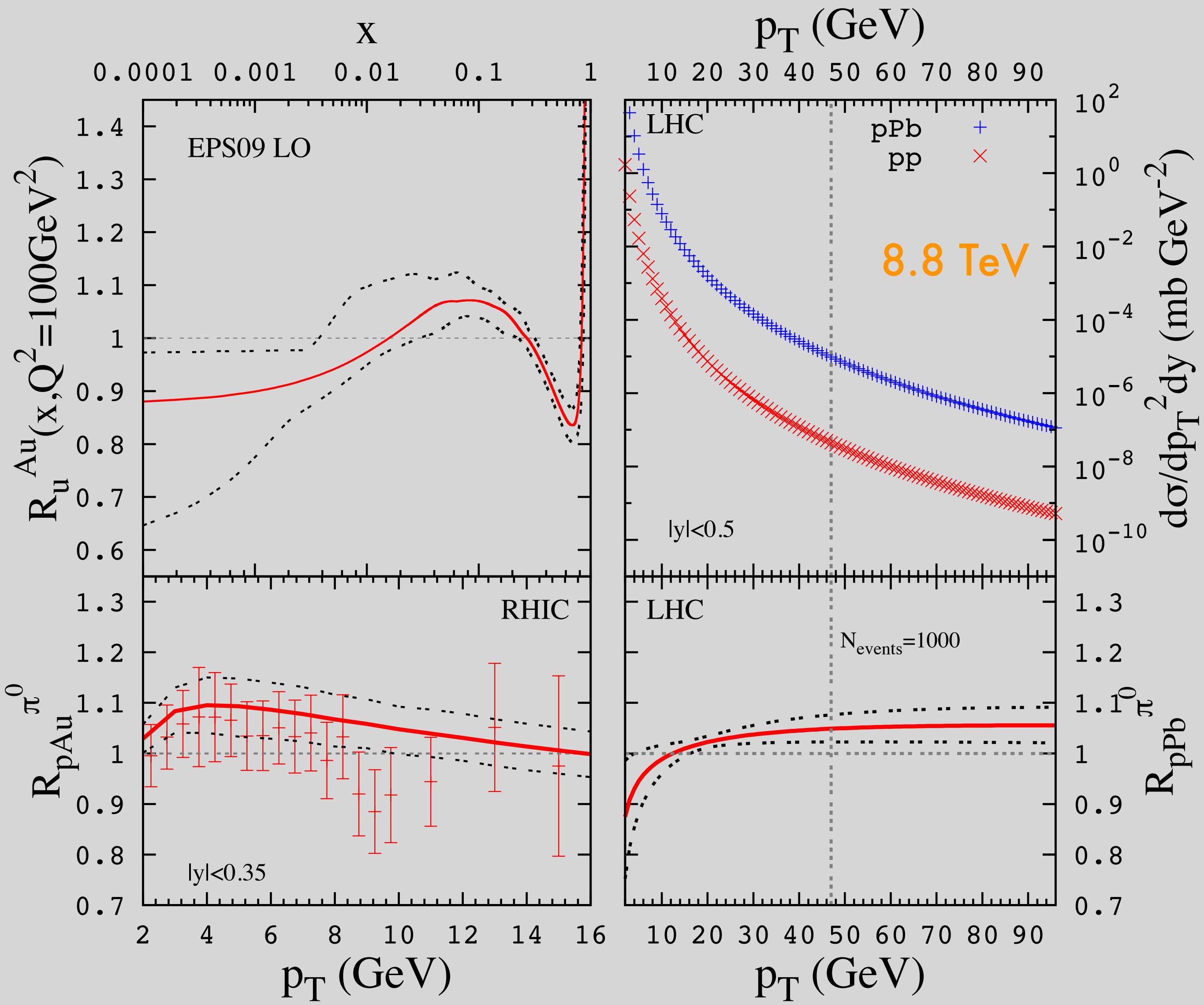

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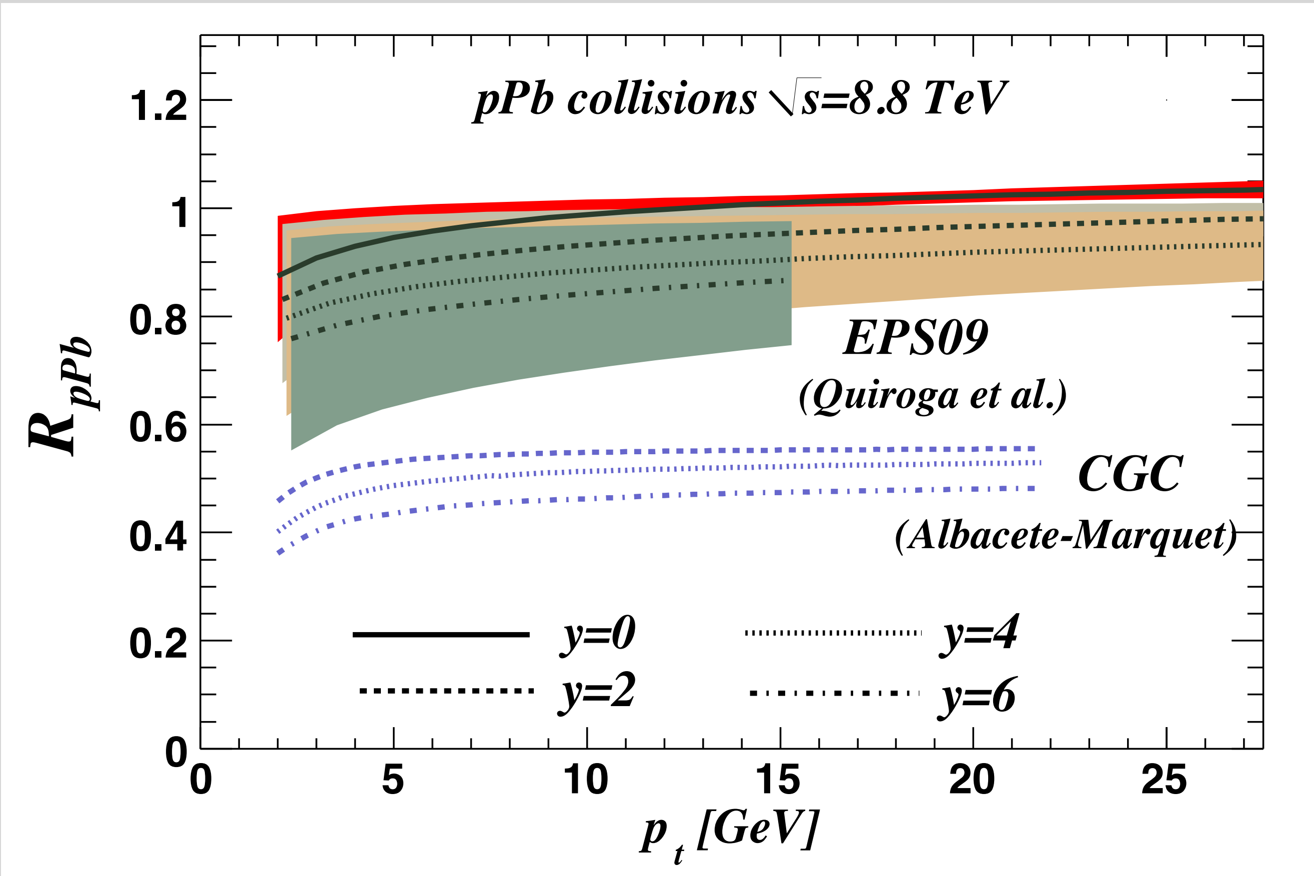

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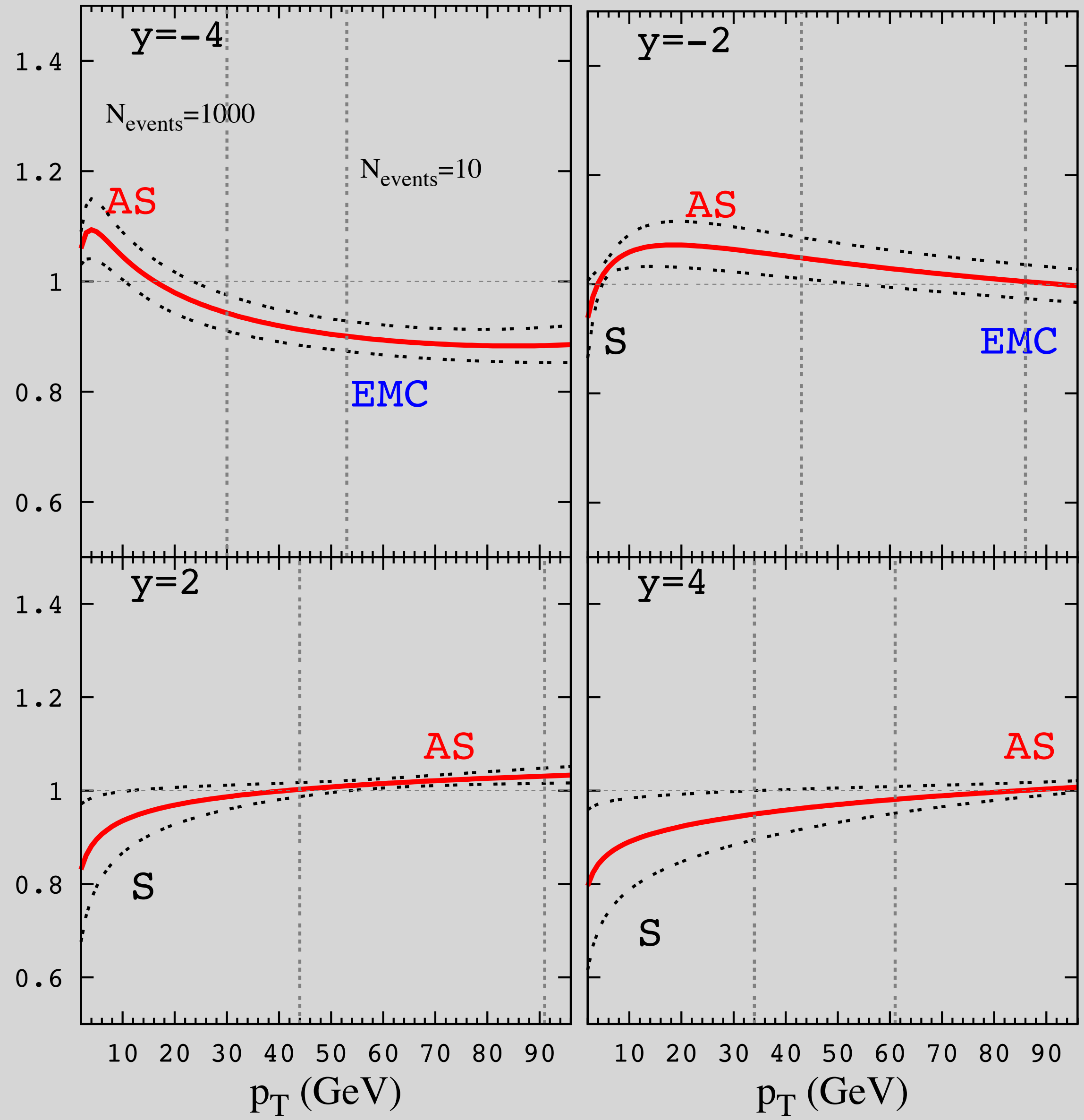

further factorization tests from rapidity scan

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