

IS2021: CGC Discussion Session (I)

- CGC effects in the currently accessible kinematic range in x and Q^2 could be subtle (10-20% level)
 - ▶ do experiments have the needed precision? Will HL-LHC help?
 - ▶ do models have the needed precision?
 - ▶ pA: are final state effects understood on this level?
- Smoking gun would be to show the “breakdown” of DGLAP. This requires comparisons at small- x and moderate Q^2 where DGLAP is valid. Many current measurements (e.g., UPC) cover rather small Q^2 .
 - ▶ do current experiments have the kinematic access into this region?
 - ▶ what measurements need to be conducted?
 - ▶ do LHC experiments put enough emphasis (detector coverage) on forward region. Is LHCb the only game in town for the near and mid-term future?
 - ALICE Focal? ATLAS, CMS: Totem, Castor?

IS2021: CGC Discussion Session (II)

- DGLAP and small- x evolution: complementarity or competition?
 - Is it possible to unify DGLAP and small- x evolution into one master evolution equation? (e.g., the paper by Balitsky and Tarasov, 2015)
 - Would the sub-eikonal corrections calculations help?
 - Perhaps resummations of small- x corrections in the DGLAP kernel or large- x corrections in the BK/JIMWLK kernel would be better?

IS2021: CGC Discussion Session (III)

- Do we put enough emphasis on pp? Do we need to?
 - ▶ $Q_s(x)$ smaller compared to pA but also negligible (?) final state effects, cleaner
 - ▶ Comparison with models avoids large uncertainty of nPDF and use higher precision PDFs.
 - ▶ Do we have to wait for FCC/HE-LHC for that or is HL-LHC enough?
- Given limited resources, what should we focus on? What's the most promising path forward?
 - ▶ single particle spectra and ratios (forward)?
 - ▶ correlations (e.g. h-h, jet-jet, ...)?
 - ▶ theory guidance?

IS2021: CGC Discussion Session (IV)

- UPCs

- ▶ Elastic J/psi production in UPCs: Are all the curves overlaid with the data based on consistent theoretical models, grounded in diagrammatic calculations in QCD?
- ▶ Are ALICE fwd and midrapidity & LHCb consistent with each other?
- ▶ With Q^2 near zero, is the role of non-perturbative effects important? Even when producing heavy mesons like J/psi?
- ▶ Can one disentangle those non-perturbative effects to learn something about theory?

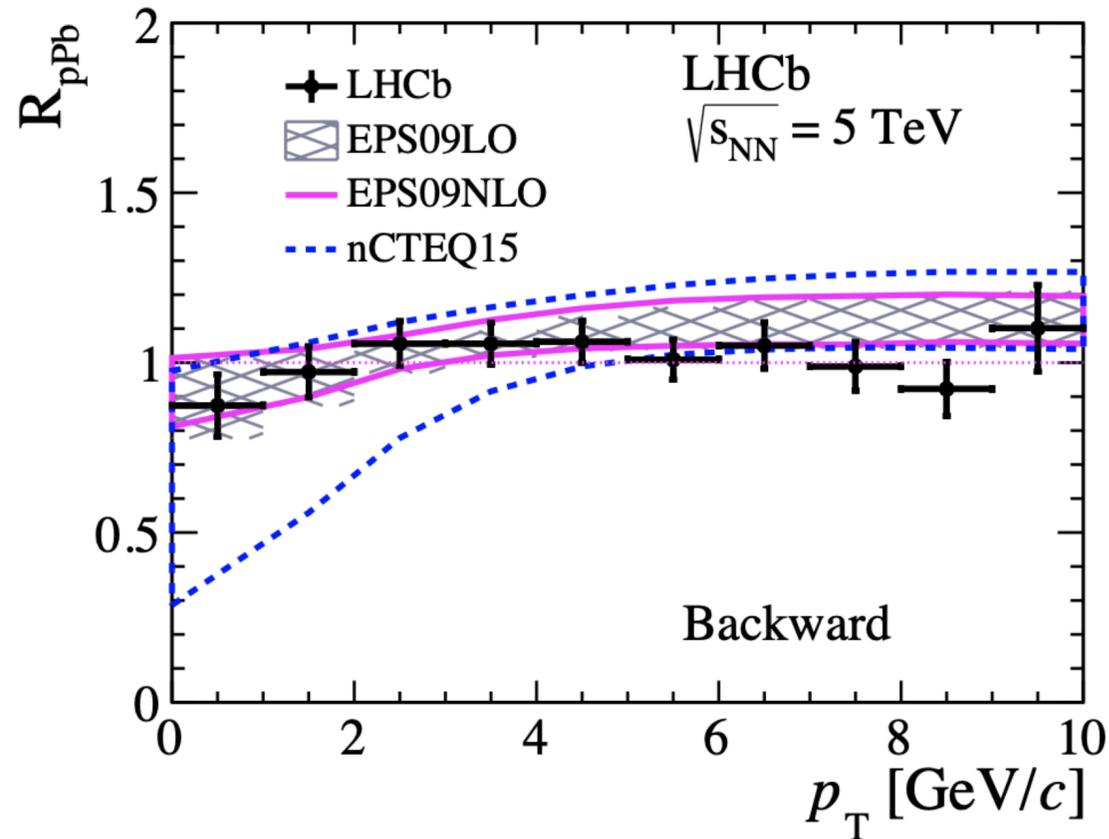
- Entanglement

- ▶ Is there solid evidence of parton entanglement?
- ▶ If yes, what do we learn?

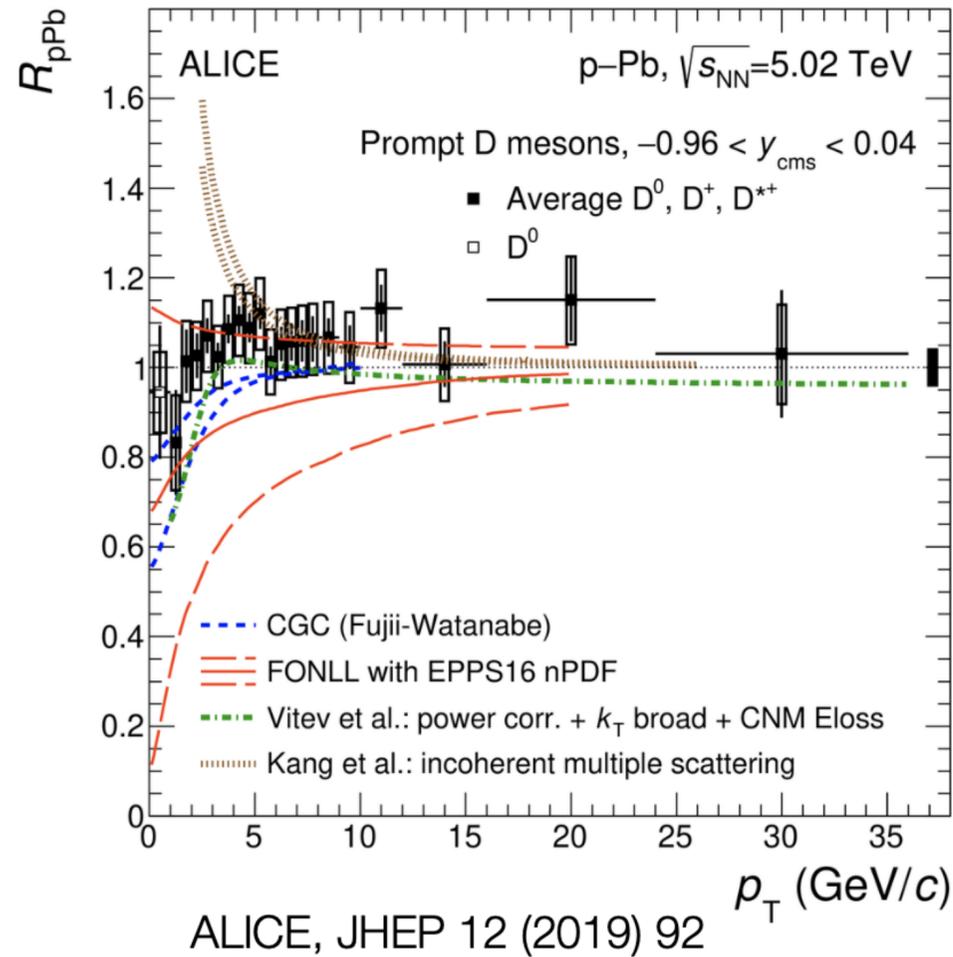
Open charm production vs rapidity at LHC

Marco Van Leeuwen's talk, Monday

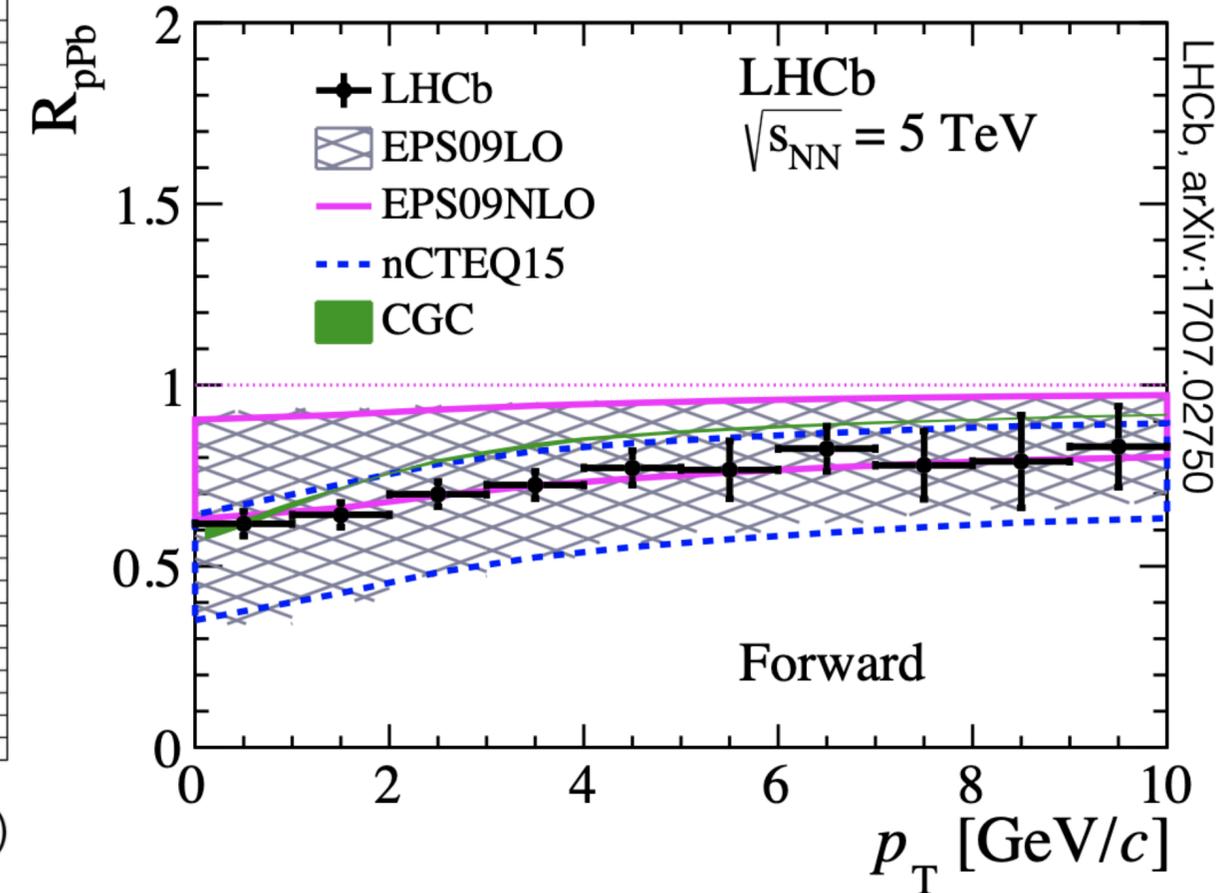
Backward rapidity: large x



Mid-rapidity



Forward rapidity: small x

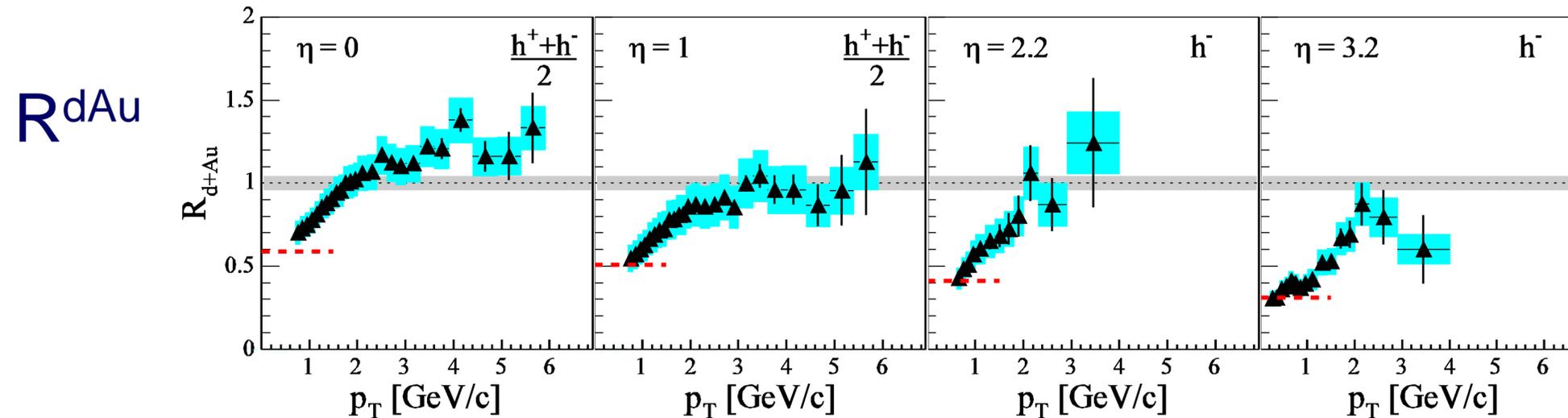


$R_{pPb} \sim 1$ at backward and mid-rapidity; below 1 at forward rapidity

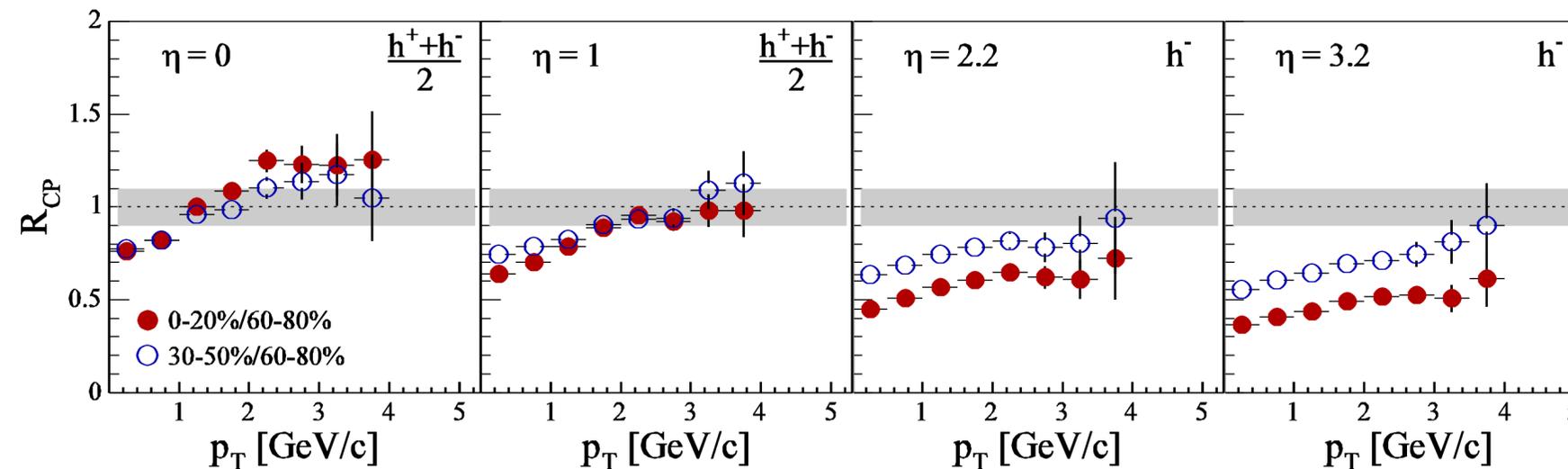
Suppression mainly at small-x compatible with nuclear PDFs (shadowing) and CGC calculations

CGC: DeCloue et al, PRD 91, 114005

R_{dAu} at different rapidities



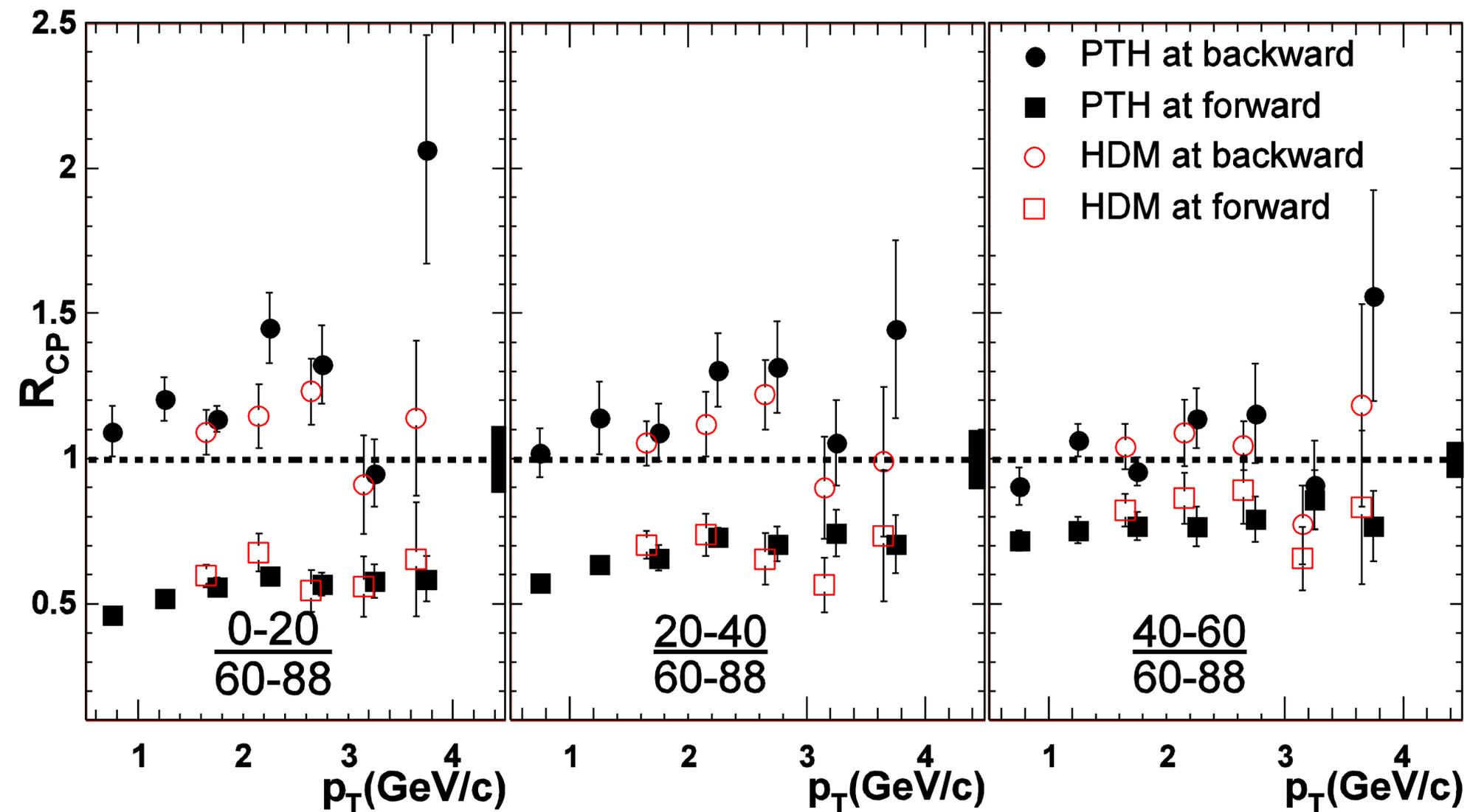
R_{CP} – central
to peripheral
ratio



Most recent data from BRAHMS Collaboration nucl-ex/0403005

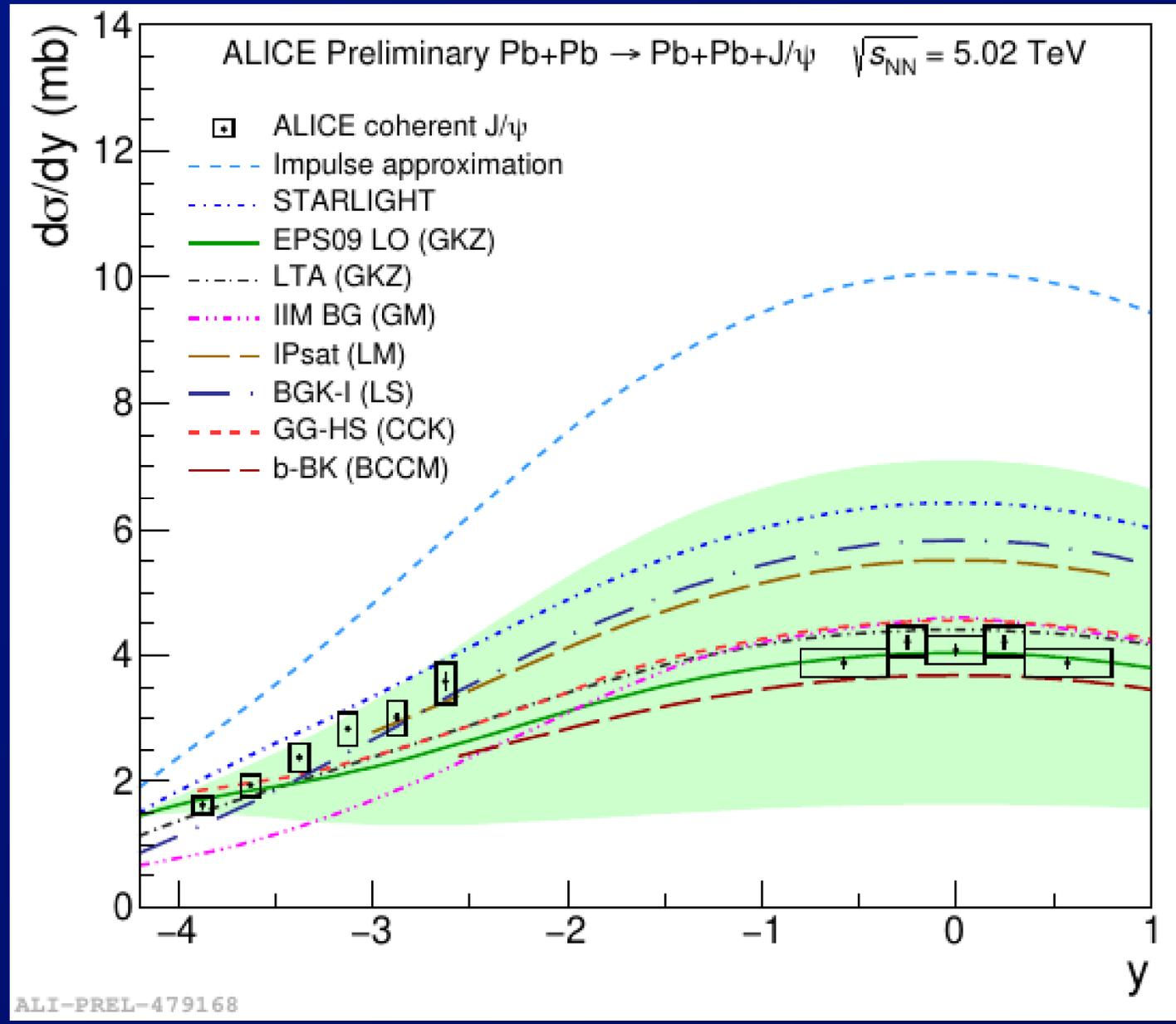
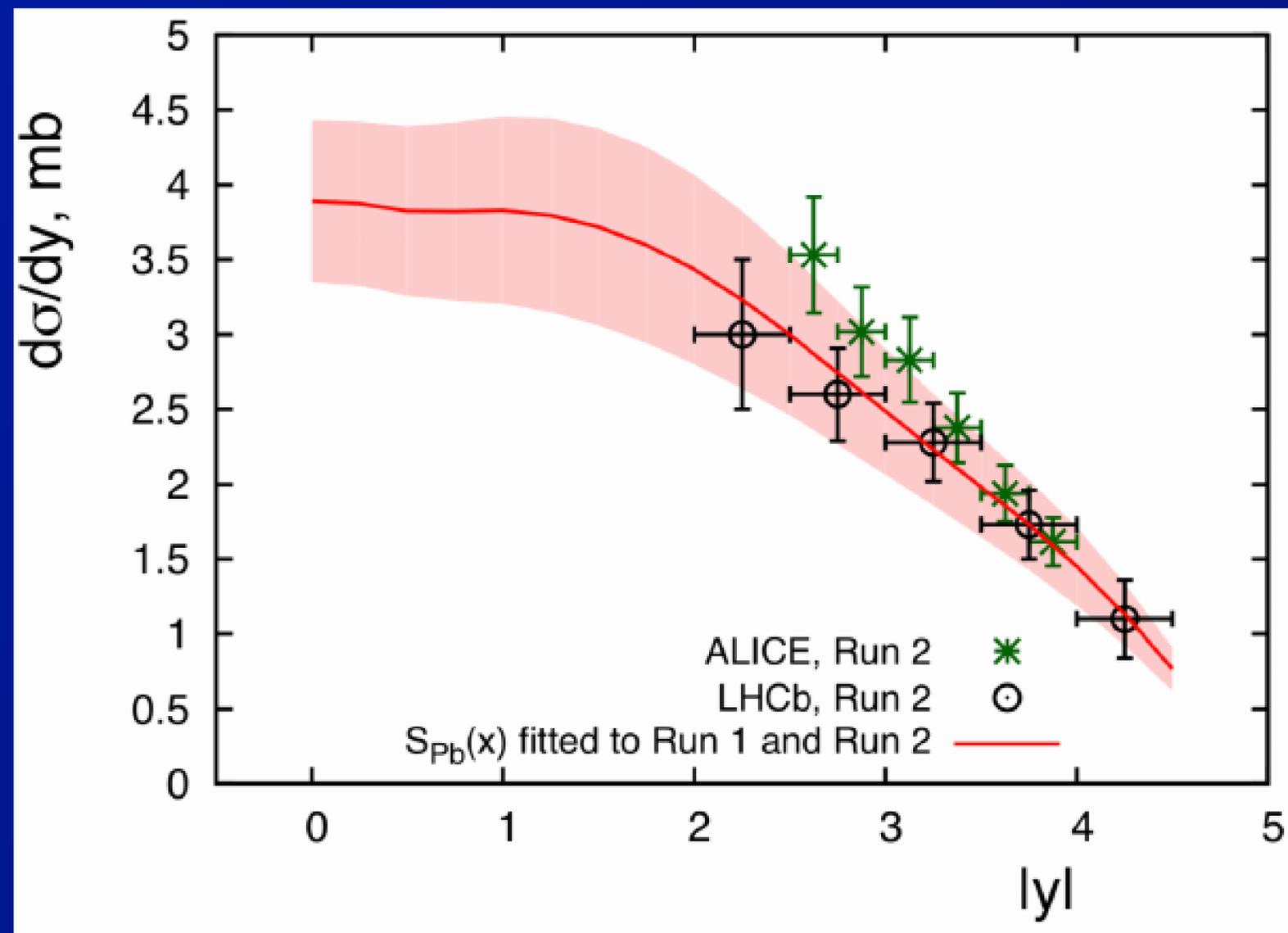
Our prediction of suppression was confirmed!

R_{d+Au} at forward and backward rapidities



PHENIX data, nucl-ex/0411054

New UPC results (slide: Brian Cole Tue)



Guzey et al, arXiv: 2008.10891

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