

DIS2022 WG4 Experiment Summary

Maria Vittoria Garzelli, Universitaet Hamburg

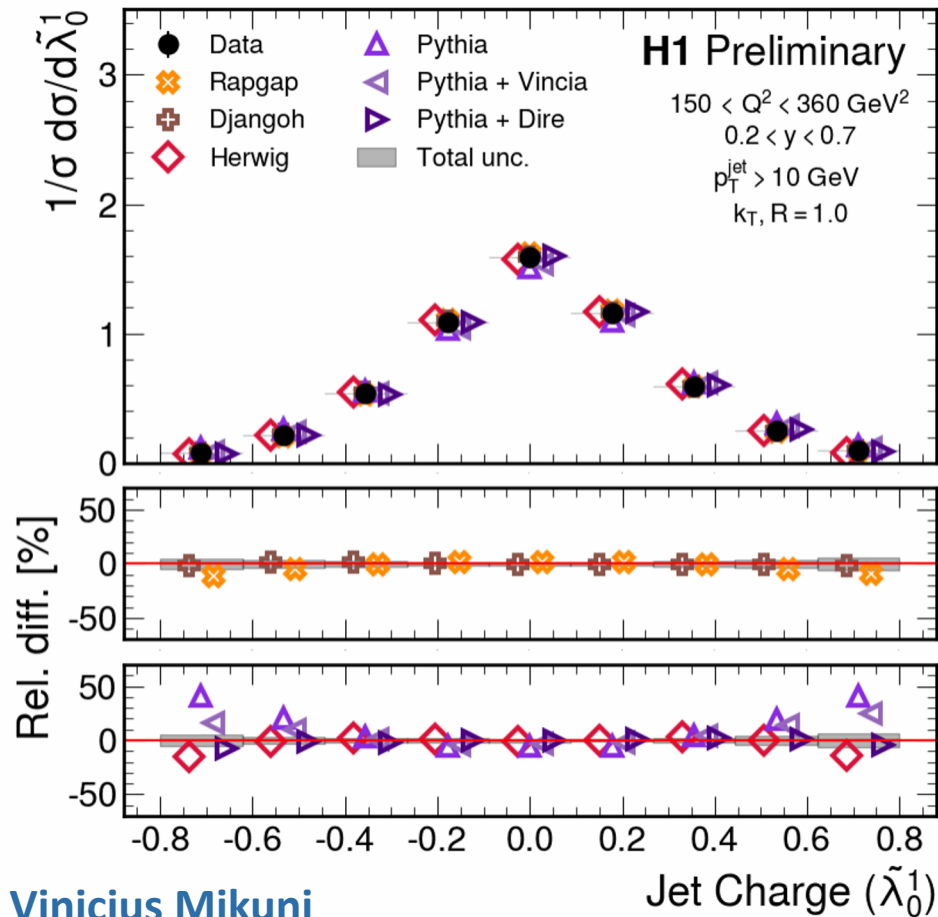
Olga Evdokimov, University of Illinois Chicago

Xuan Li, Los Alamos National Laboratory

*XXIX International Workshop on Deep Inelastic Scattering and
Related Subjects (DIS 2022)*

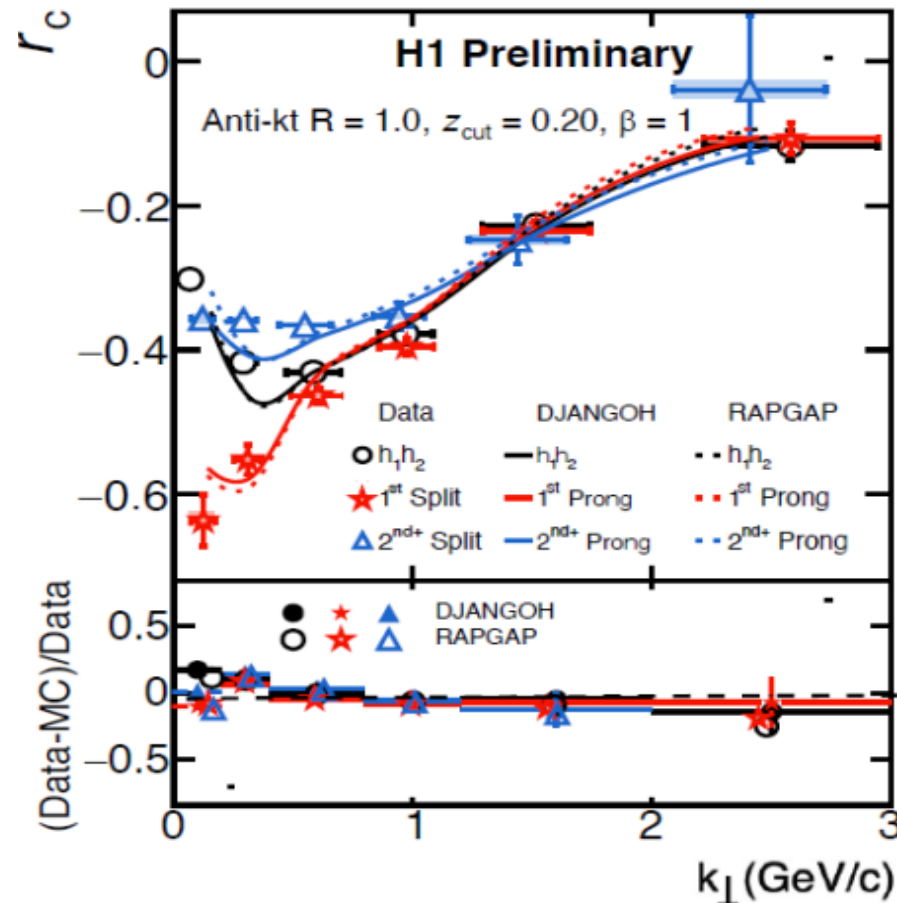
Santiago de Compostela, Spain May 2-6, 2022

Jet Highlights: 319 GeV e+p collisions



Vinicius Mikuni

- Energy scale evolution for several jet observables in Q² intervals from 150 to 5000 GeV²
- Good agreement for dedicated DIS generators



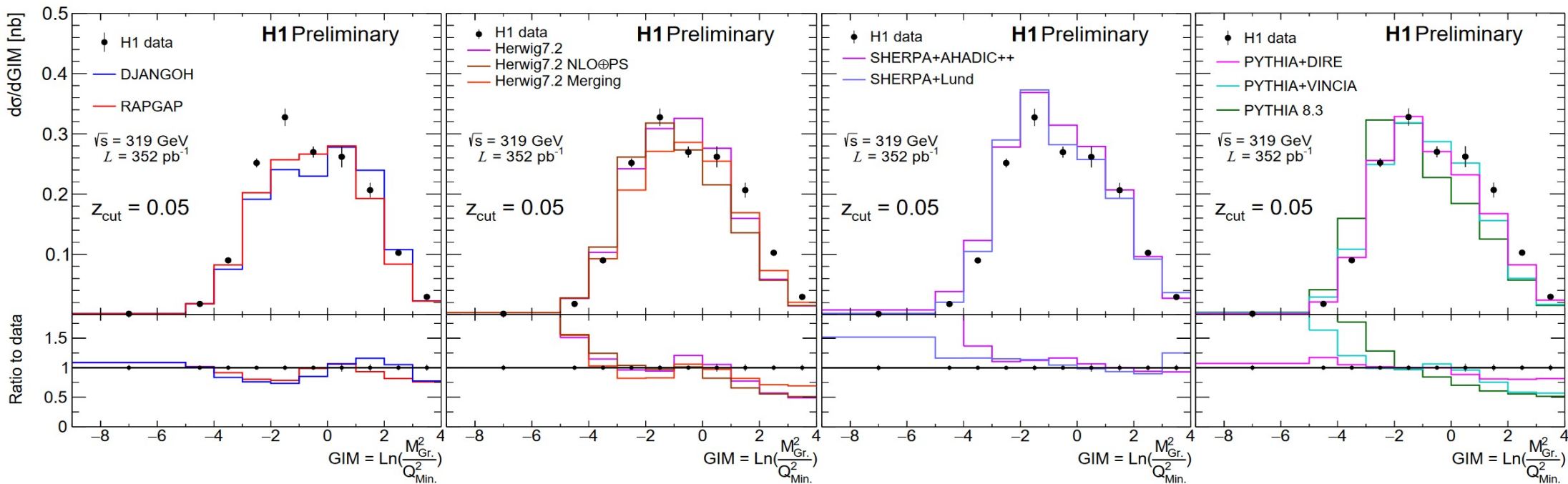
$$r_c \equiv \frac{N_{CC} - N_{C\bar{C}}}{N_{CC} + N_{C\bar{C}}}$$

Phys. Rev. D **105**, L051502

Mriganka Mondal

- Charge-momentum correlation (r_c) for jets with leading particles & prong kinematics
- Small r_c in perturbative region/ large in nonperturbative one

Jet Highlights: 319 GeV e+p collisions

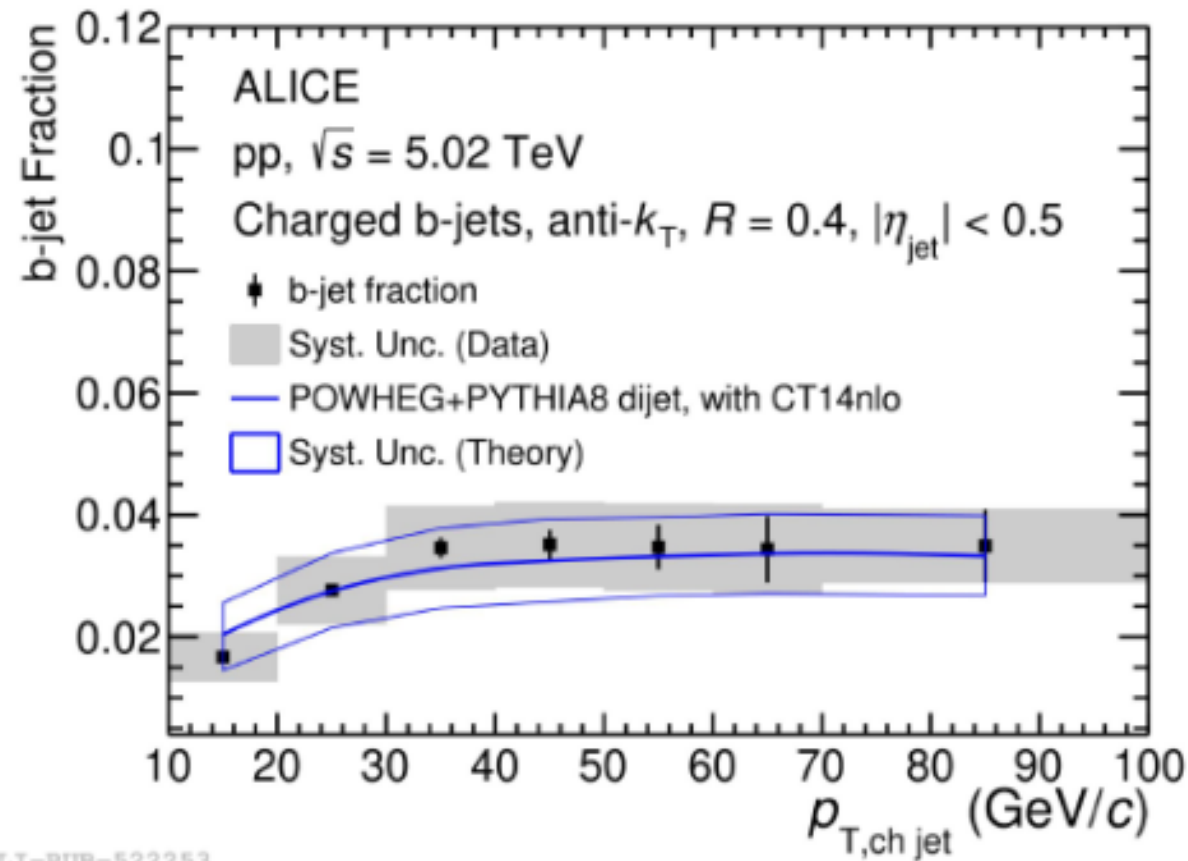
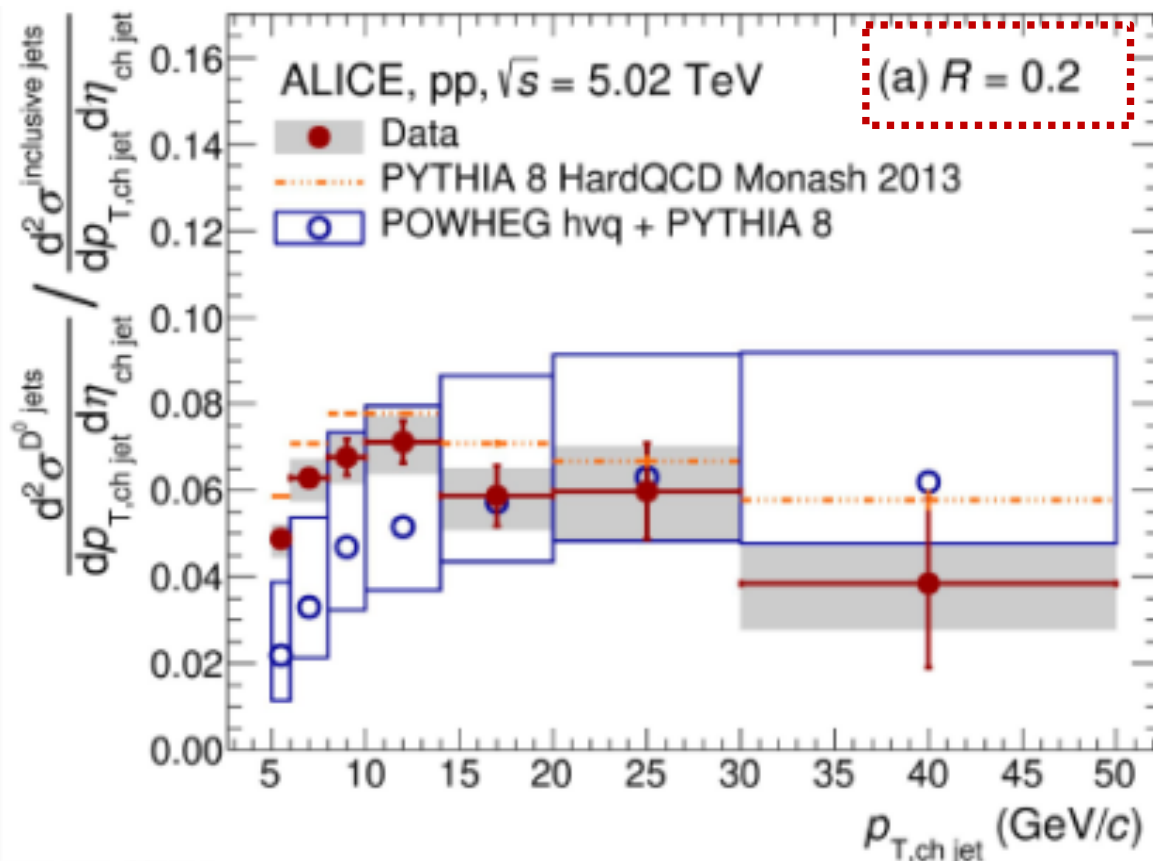


$$M_{Gr.}^2 = \left(\sum_i p_i^\mu \right)^2$$

Henry Klest

- First measurement of groomed event shapes in DIS (Groomed Invariant Mass (GIM, 1-jettiness))
- Data has been compared to a variety of MC predictions from SHERPA, PYTHIA, HERWIG, DJANGO, RAPGAP, as well as analytic predictions from SCET
- None of the models studied here agree completely with data within uncertainties

Jet Highlights: 5 TeV p+p collisions



ALICE-PUB-522253

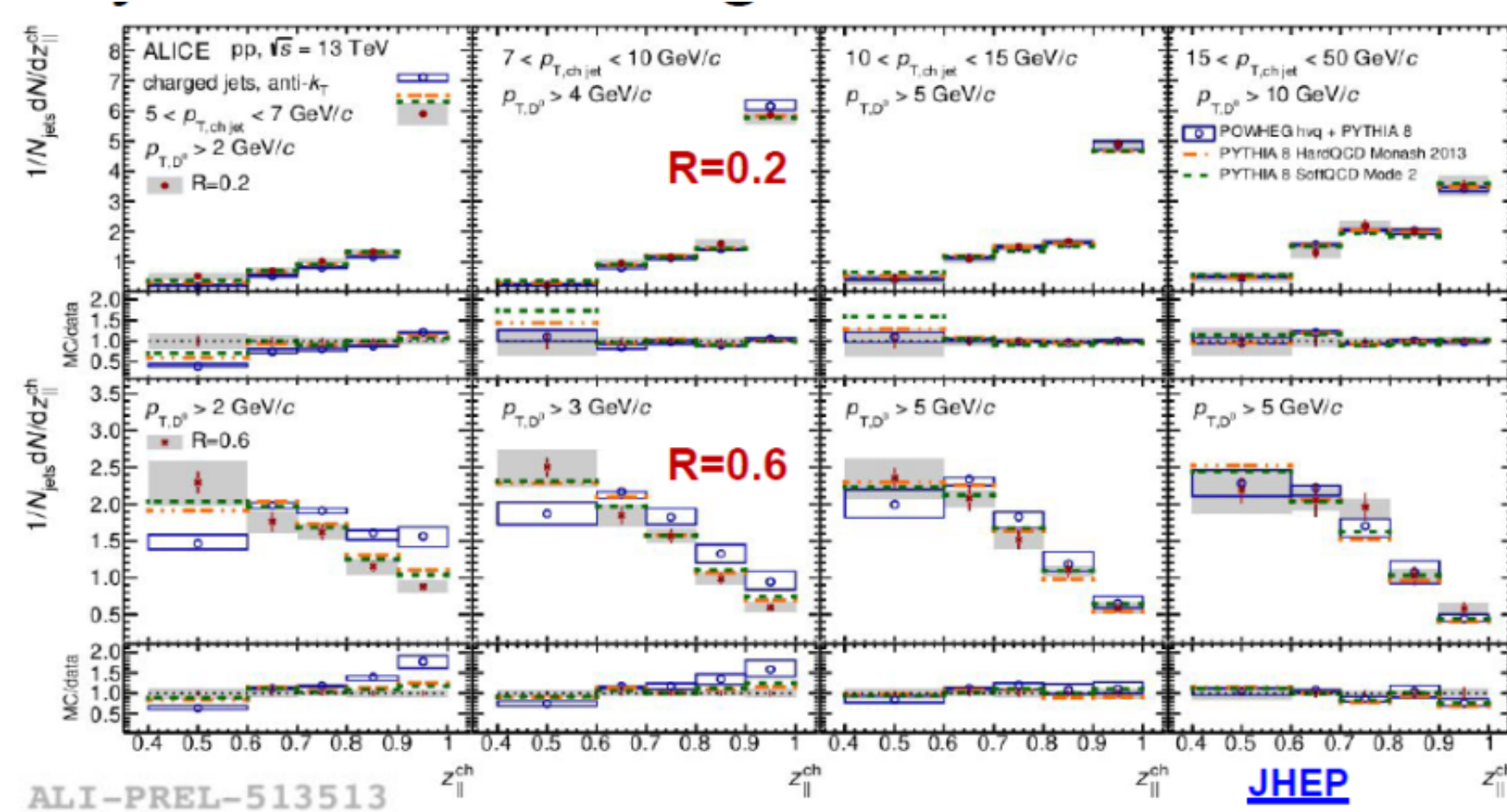
Sebastian Bysiak

- HF-tagged jet measurements from 5 TeV pp collisions
- Some tensions with model predictions (POWEG) at low p_T for D^0 -tagged jets
- Fraction of b-jets is well captured by MC

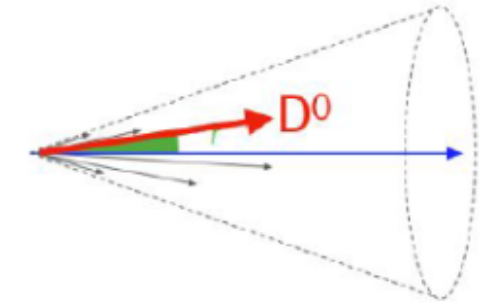
Jet Highlights: 13 TeV p+p collisions



ALICE



$$Z_1^{ch} = \frac{\vec{p}_{ch jet} \cdot \vec{p}_{HF}}{\vec{p}_{ch jet} \cdot \vec{p}_{ch jet}}$$



Ravindra Singh

HF - tagged jets fragmentation studies in 13 TeV p+p collisions:

- General agreement with MC on cross-sections; Softer fragmentation at low p_T^{ch}
- Also: No discernable CNM effects in pPb vs pp

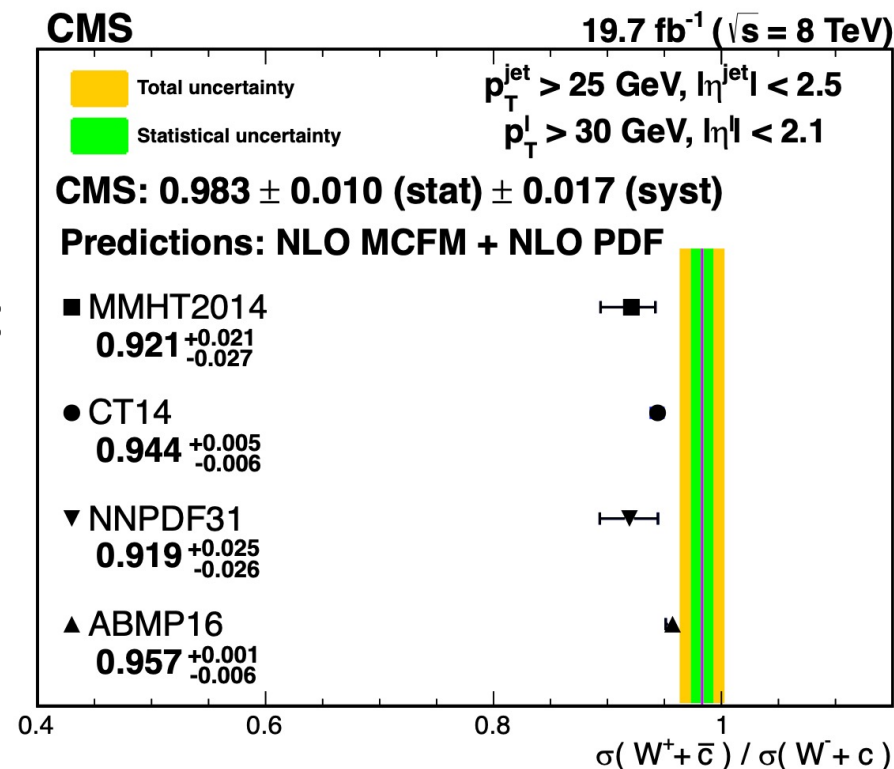
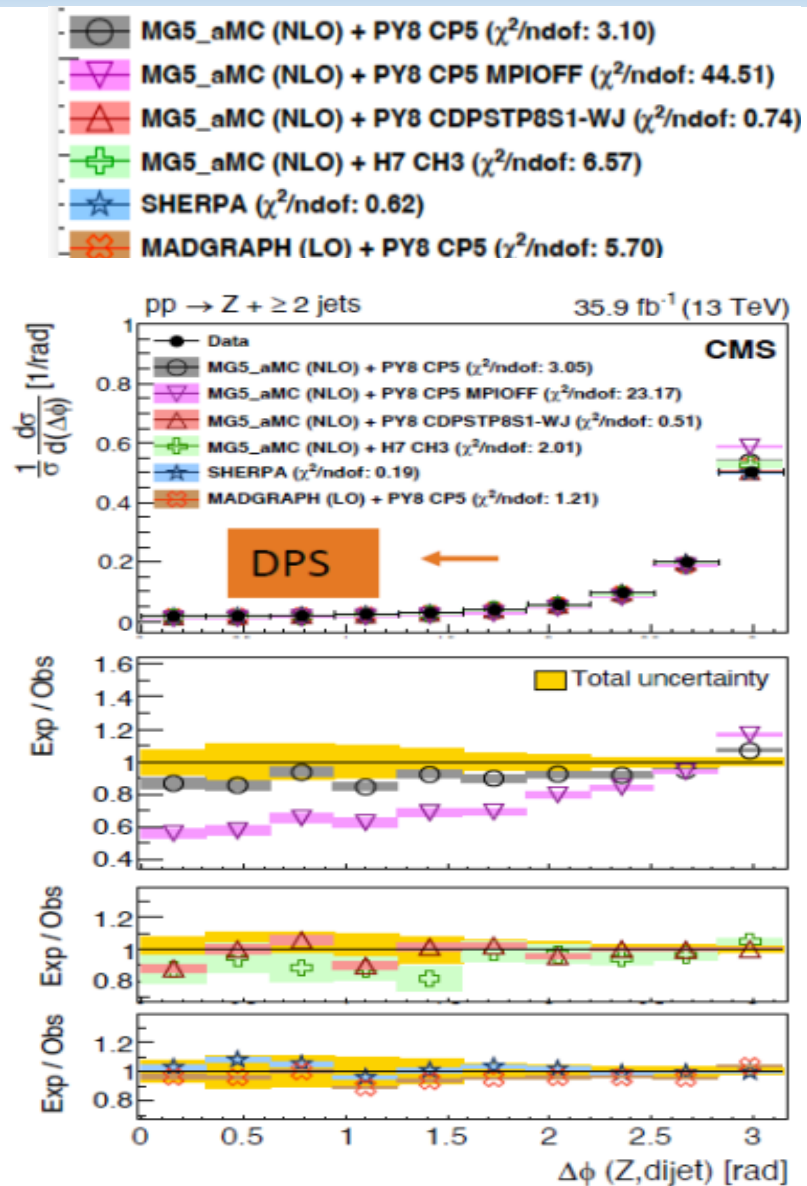
Jet Highlights: 13 TeV p+p collisions



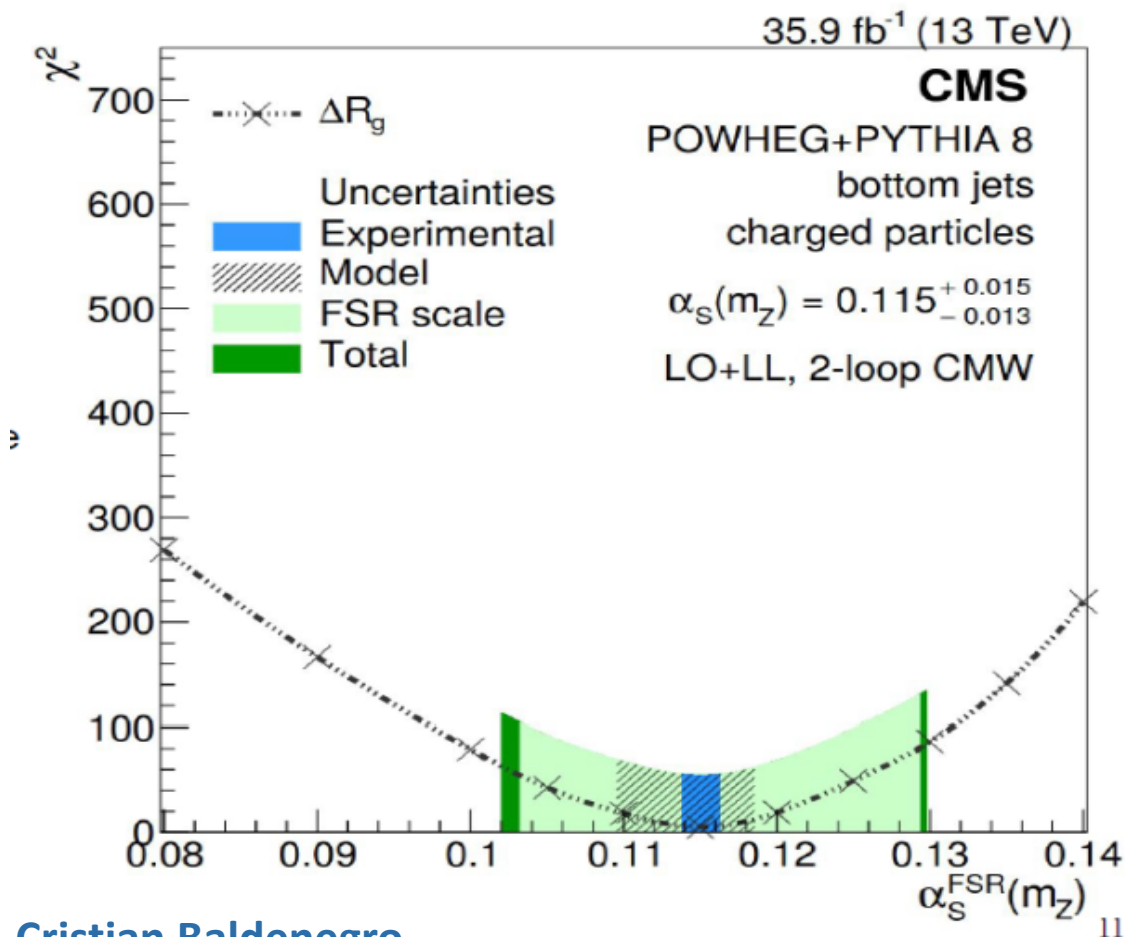
Elisabetta Gallo

- Selection of newest results from CMS on precise studies of V+jets at the LHC was presented

- Important on many fronts:
 - input to MC and pQCD calculations
 - JEC calibration and background for many processes
 - input for PDF



Jet Highlights: 13 TeV p+p collisions

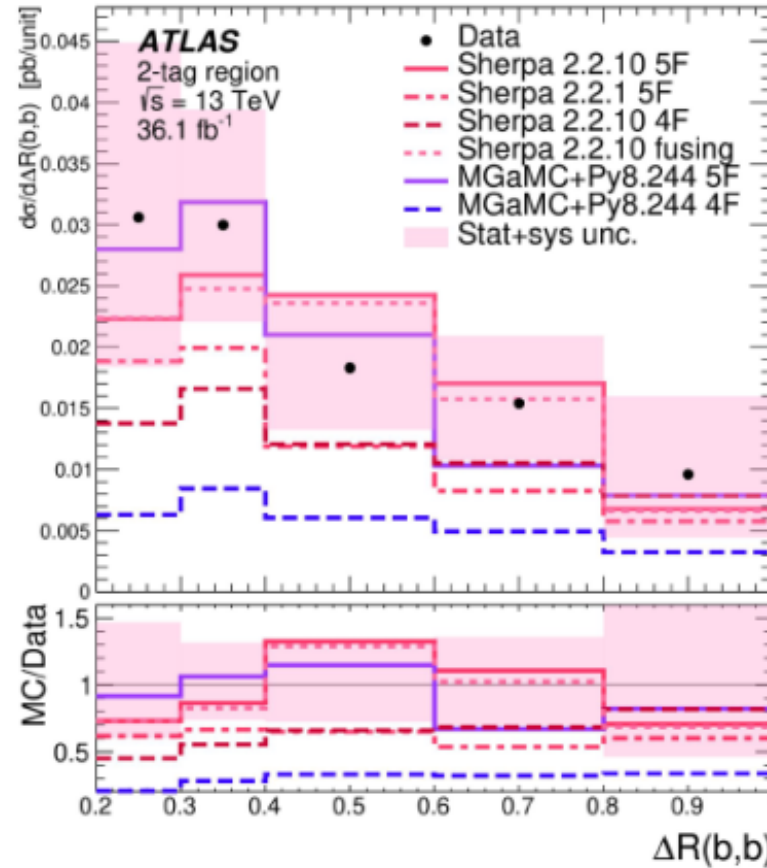
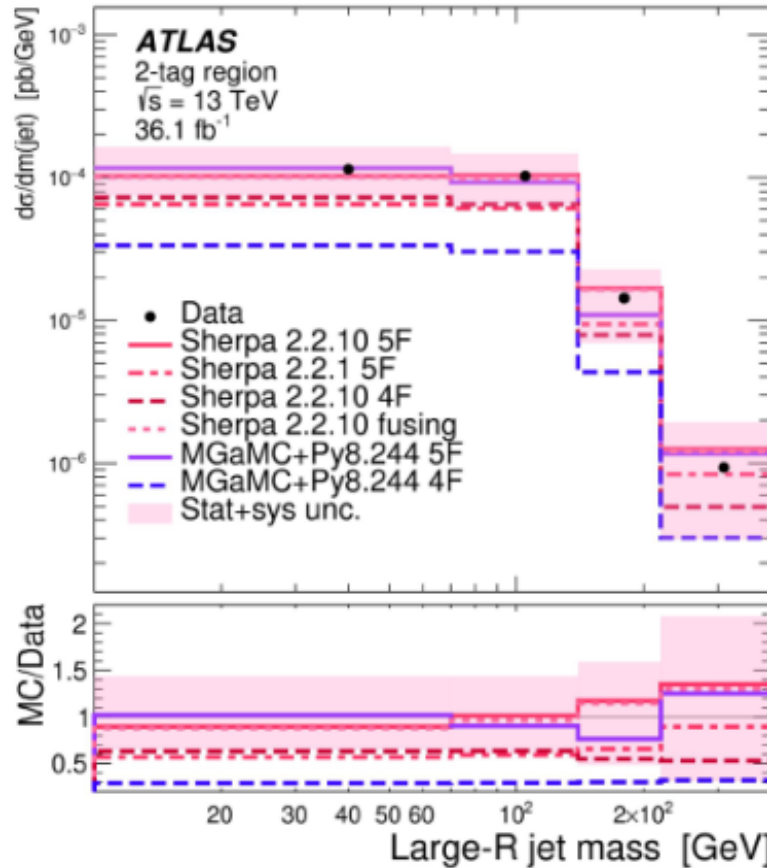


Cristian Baldenegro

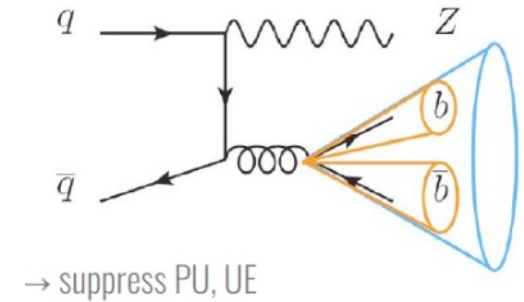
$$\alpha_S(m_Z) = 0.115^{+0.015}_{-0.013}$$

- Measurements of jet substructure in Z+jet, dijet, and ttbar pair production
- Precision QCD (α_S)
- Valuable input for a better understanding of quark-jet and gluon-jet substructure
- Complimentary input to:
 - quark/gluon jet discriminators
 - V/H/t /light-quark jets discriminators

Jet Highlights: 13 TeV p+p collisions



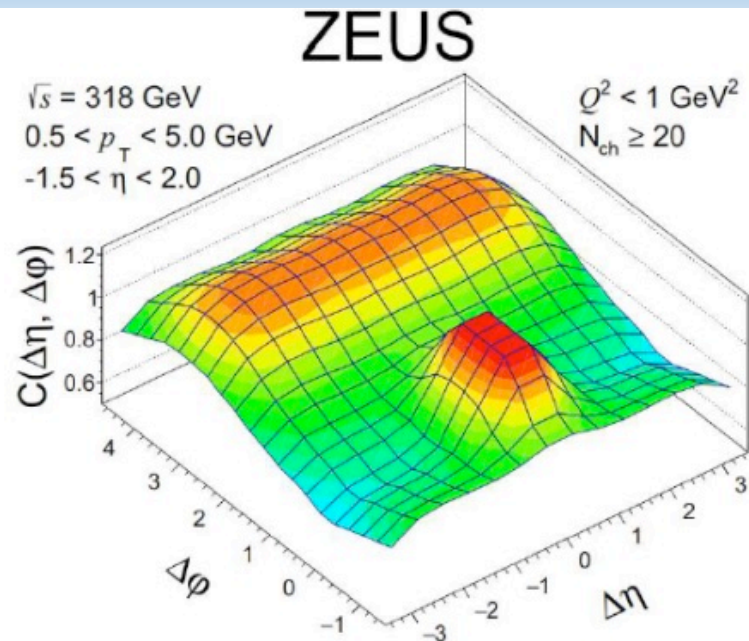
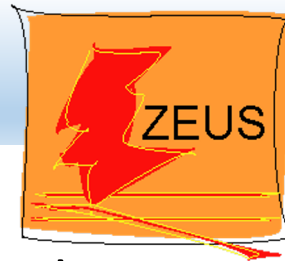
Add resummation to improve the consistency?



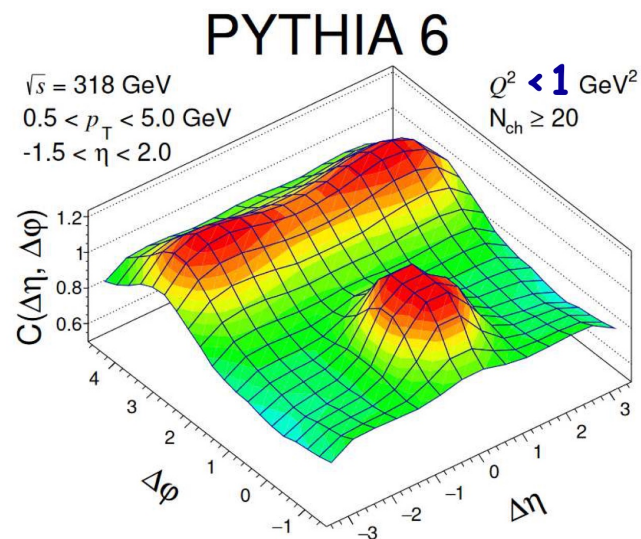
Federico Sforza

- Z production in association with jets: high- p_T , boosted, colored object, w/ or w/o 2 b-jets
- First Z+b(b)-jets measurement with 36 fb^{-1} testing MC modeling of HF jets
- Substantial differences with MC depending on Flavor Number Scheme of simulation

Correlation Highlights: 318 GeV e+p collisions



- Long range correlations in γp (and ep) at HERA/ZEUS:
 - Measurements consistent with “conventional” MC
 - Remaining differences are confirmed to link to MPI
 - Room for further model improvements!

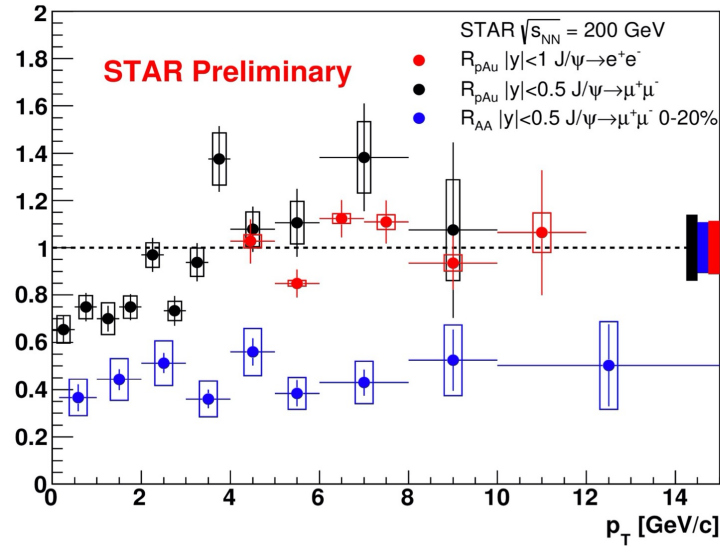


- No evidence for the occurrence of heavy-ion-like hydrodynamic ridge
 - Multiplicity reach?

Achim Geiser

Quarkonia Highlight: p+p, p+A, A+A at RHIC

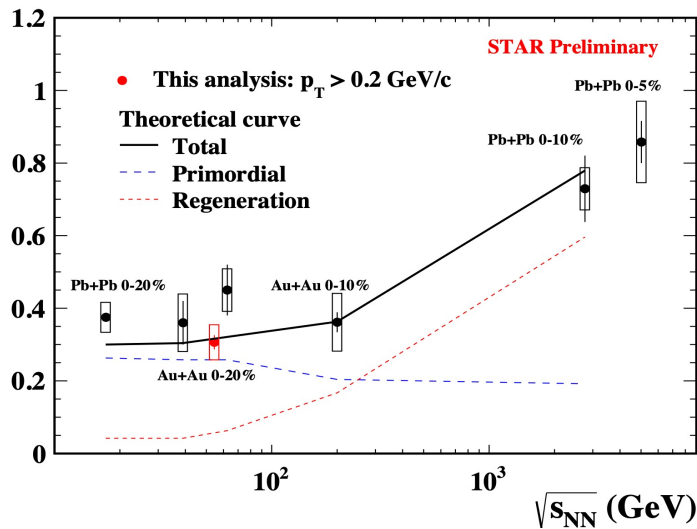
Zhenyu Ye



STAR, Phys. Lett. B 825 (2022) 136865
STAR, Phys. Lett. B 797 (2019) 134917



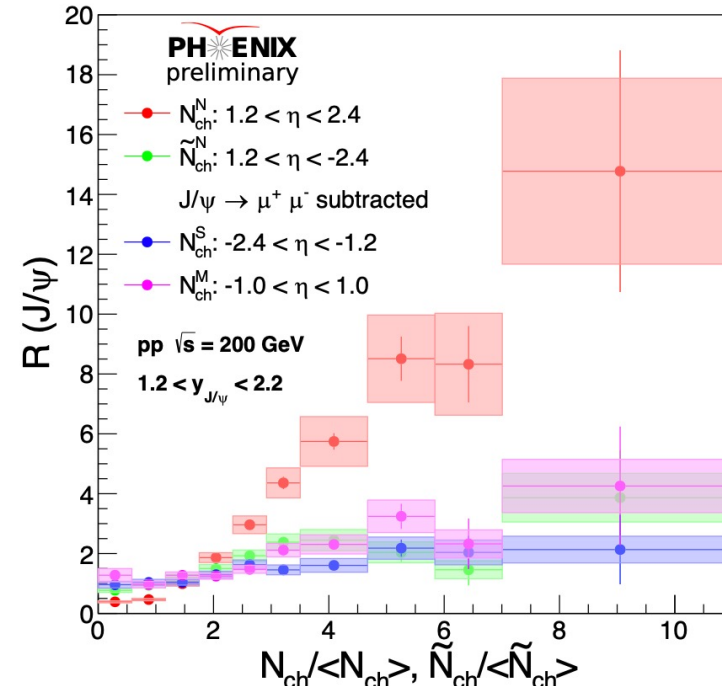
Clear collision system dependent J/ψ R_{pA} and R_{AA} in 200 GeV p+Au and Au+Au collisions



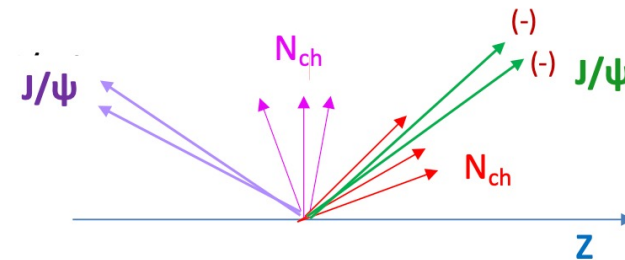
STAR, Phys. Lett. B 797 (2019) 134917
STAR, Phys. Lett. B 771 (2017) 13
ALICE, Nucl. Phys. A 1005 (2021) 121769
ALICE, Phys. Lett. B 734 (2014) 314
X. Zhao, R. Rapp, Phys. Rev. C 82 (2010) 064905

\sqrt{s} dependent J/ψ R_{AA} is consistent with theoretical predication.

Mingxiong Liu

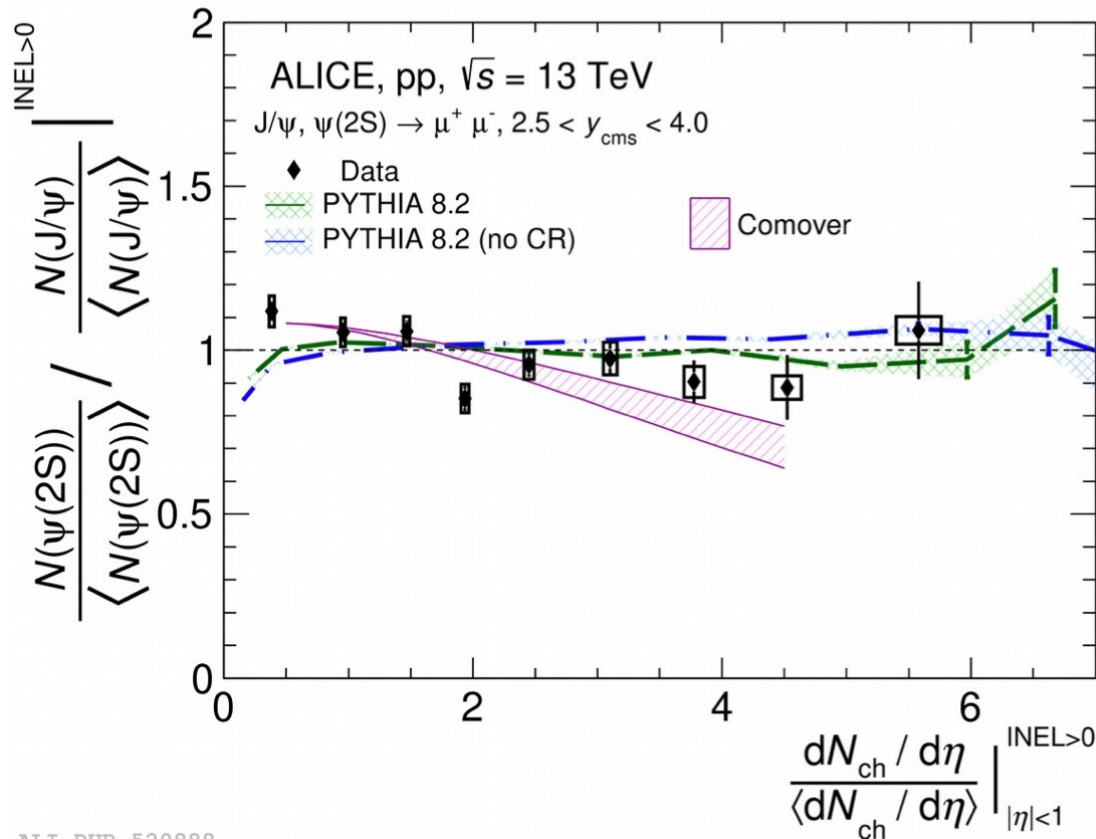


First forward relative J/ψ yields R VS charged particle multiplicity in 200GeV p+p collisions.



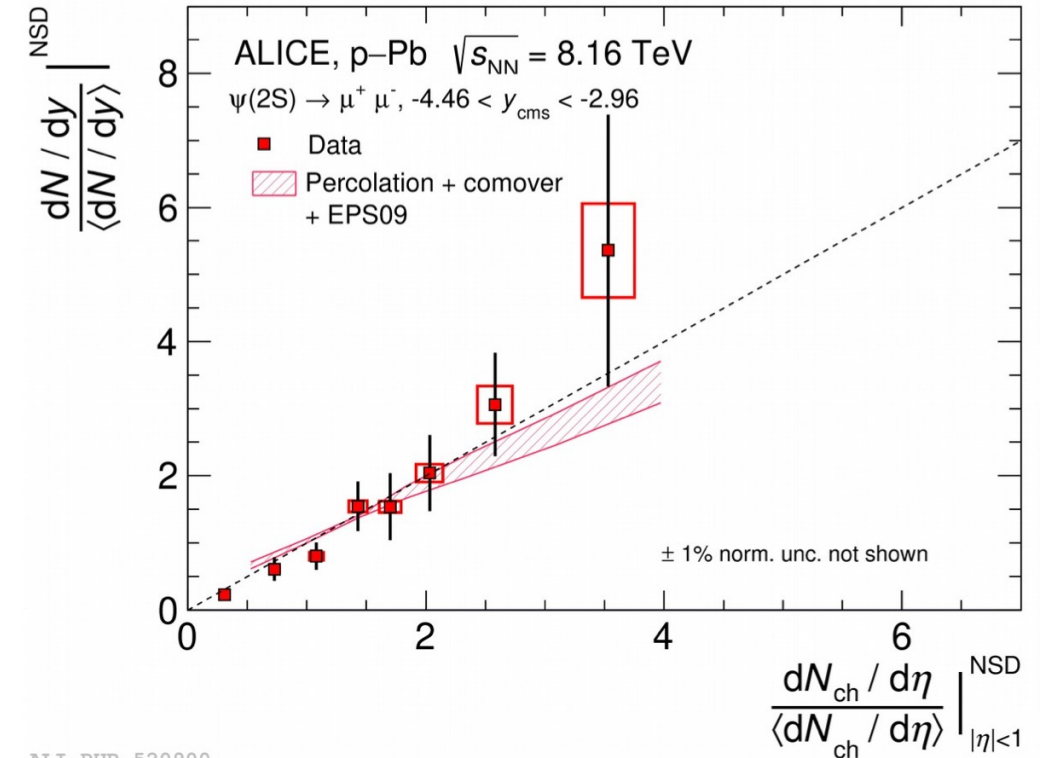
Quarkonia Highlight: p+p, p+A at LHC

Theraa Tork



ALI-PUB-520888

- Similar multiplicity dependence for J/ψ and $\psi(2S)$ production in 13 TeV p+p collisions.



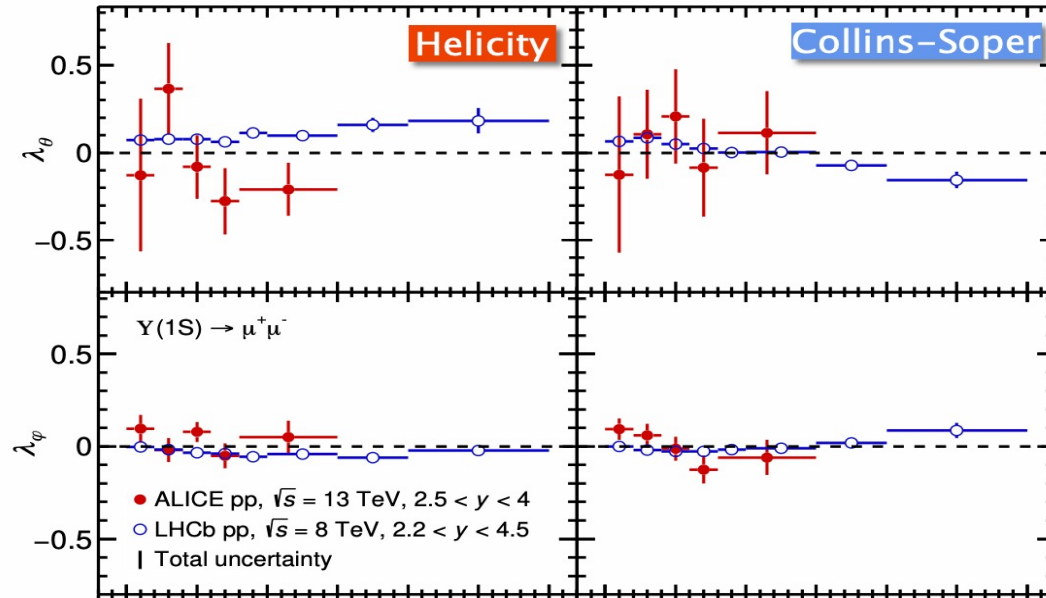
ALI-PUB-520900

- Percolation+ comovers+EPS09 calculation predicts the trend of the multiplicity dependent $\psi(2S)$ yields in p+Pb collisions.

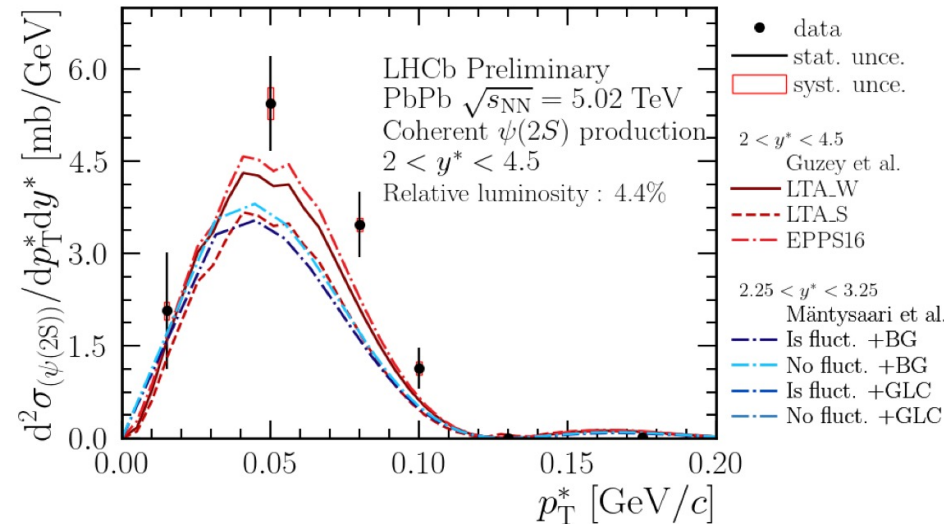
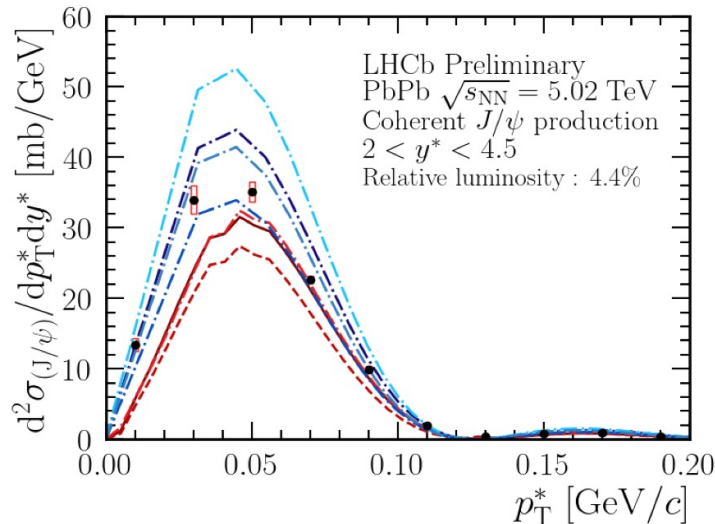
Quarkonia Highlight: LHC measurements



Yanchun Ding



- Υ polarization measured in 13 TeV p+p collisions is consistent with LHCb 8 TeV p+p results.



Xiaolin Wang



- First measurements of coherent J/ψ and $\psi(2S)$ production cross-section vs. p_T in PbPb UPC from **LHCb**.

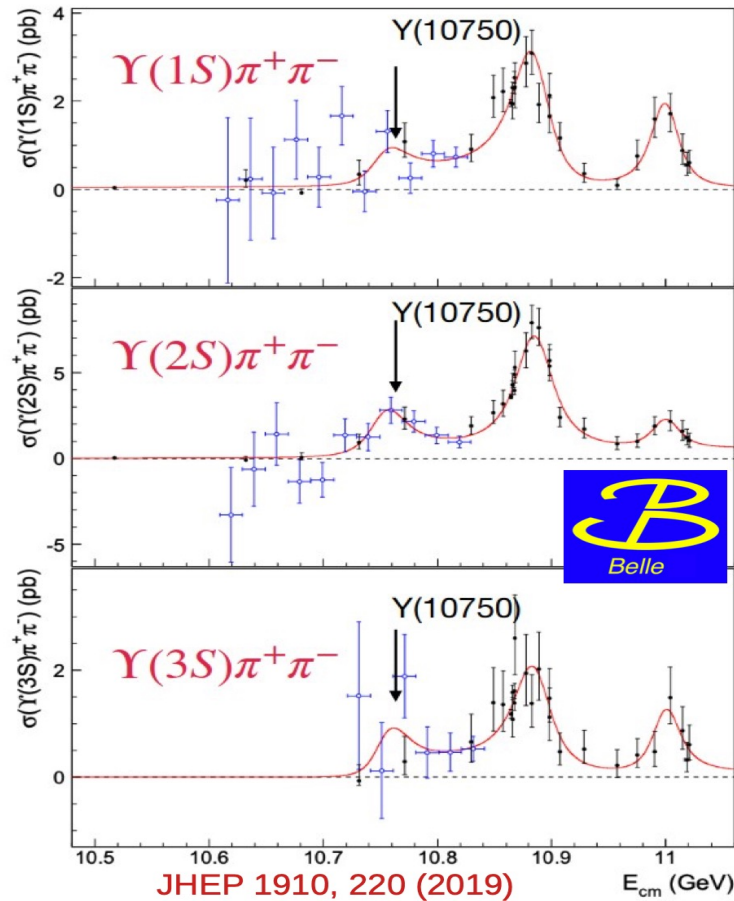
Quarkonia and Exotic Highlight

- New bottomonia state, $\Upsilon(10750)$, measured at Belle-II.

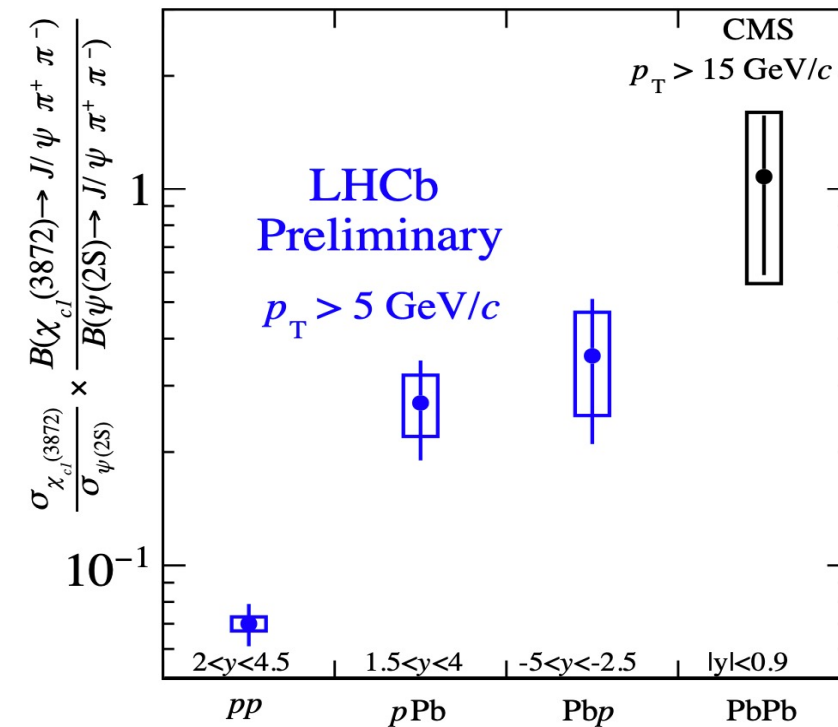
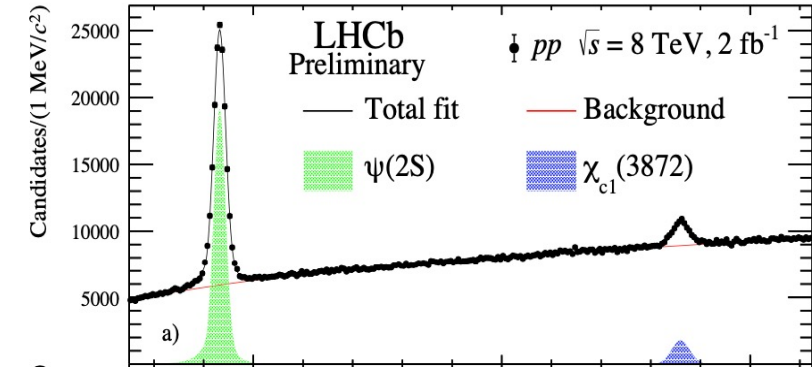
Klemens Lautenbach



Sara Sellam



- Increasing $X(3872)/\psi(2S)$ ratio versus the system size indicates final state effects.

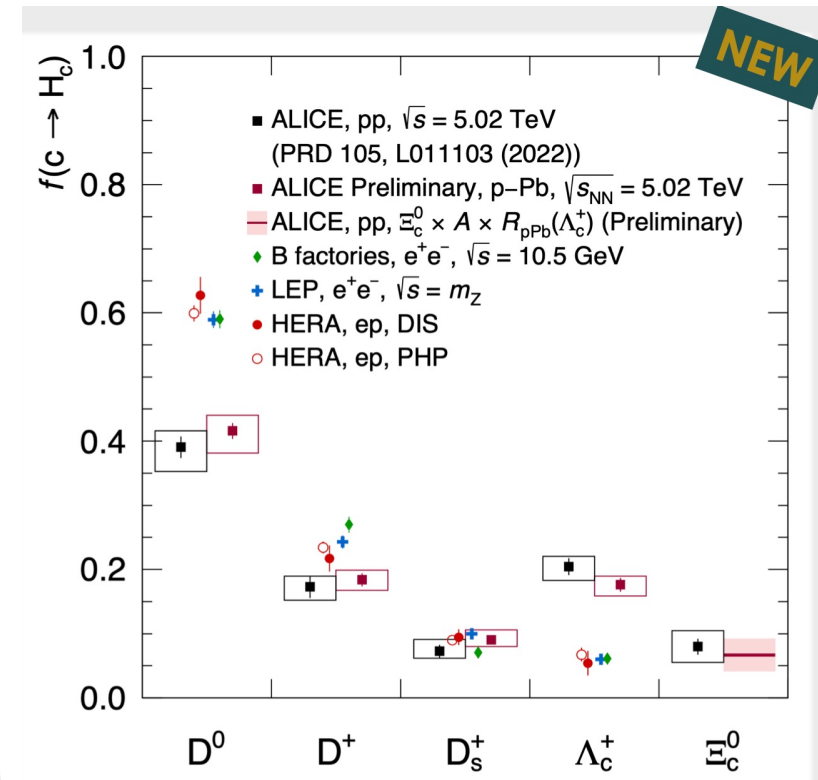
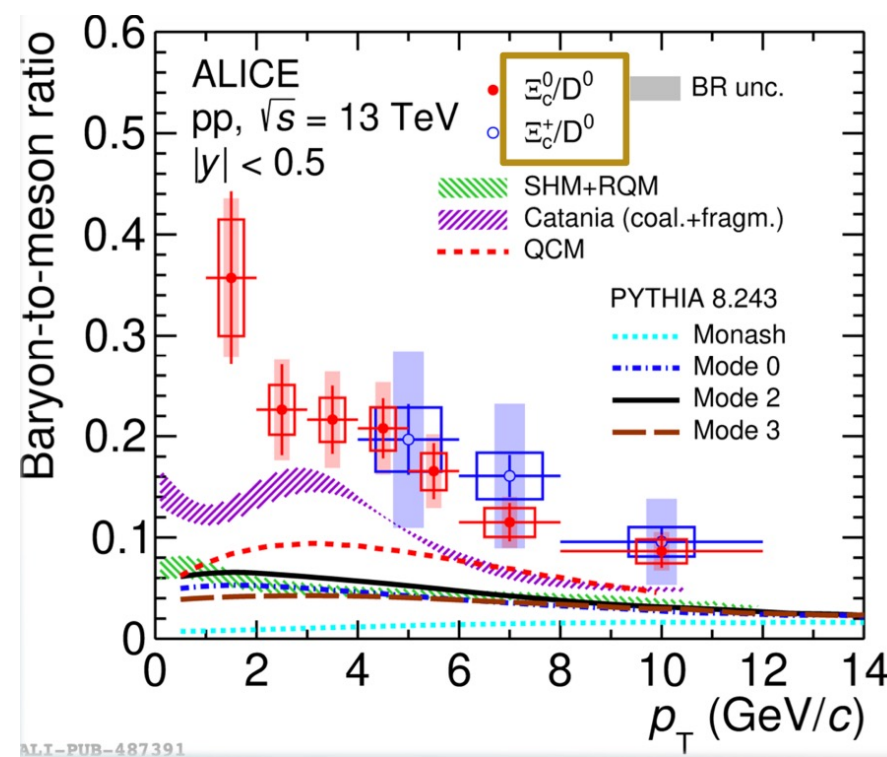
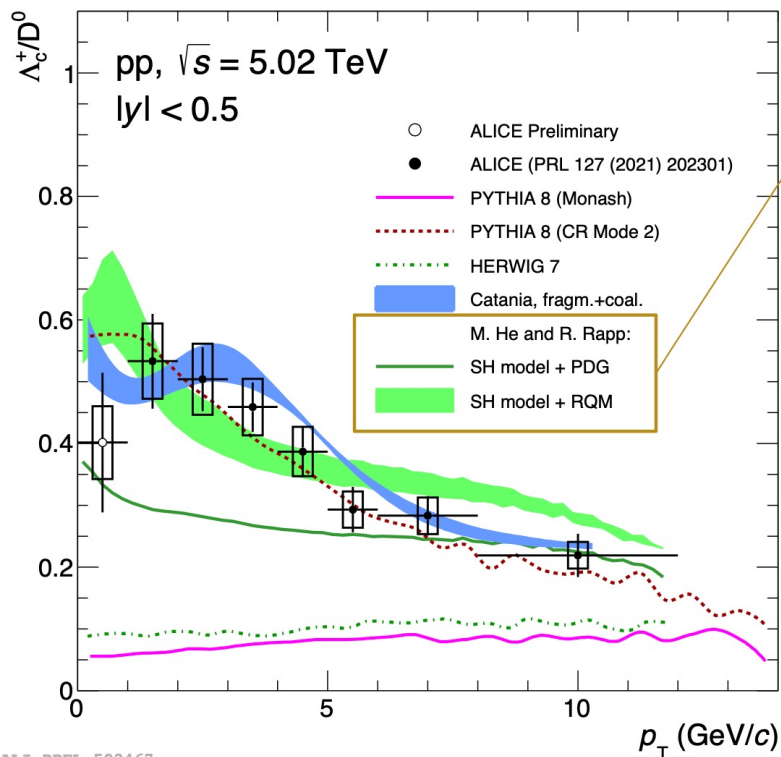


Open Heavy Flavor Highlight: open charm in p+p at LHC



- Significant enhancement in a series of charm baryon to meson ratio measurements.
- Difference between p+p and e+e, e+p results indicates the universality of charm hadronization mechanism breaking?

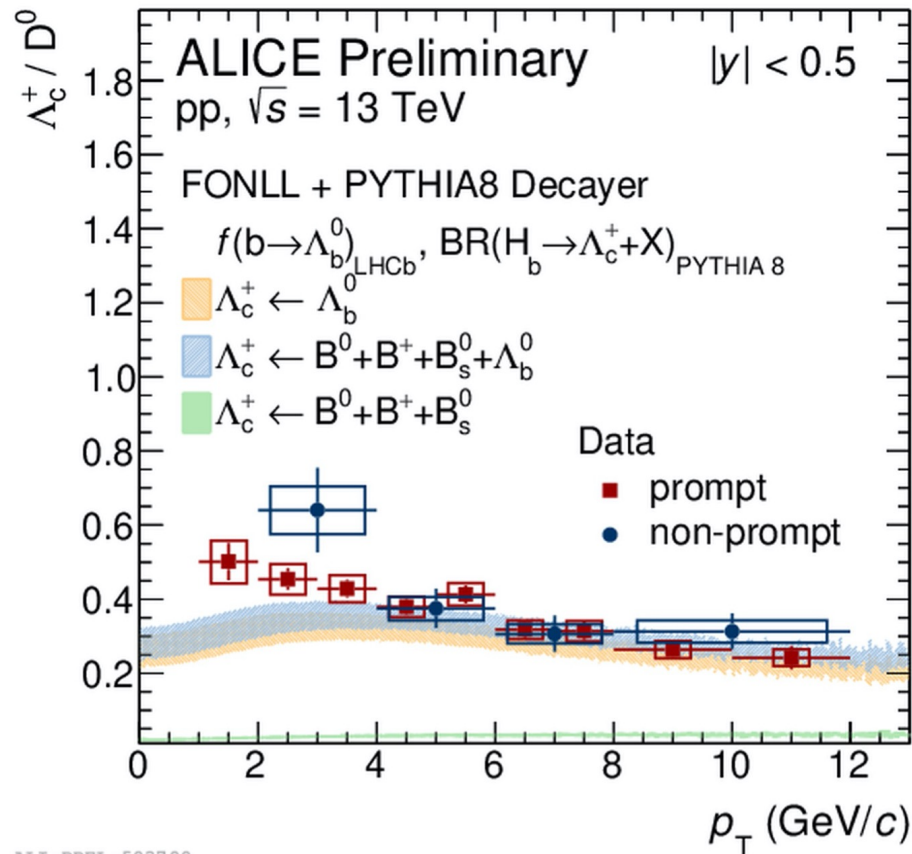
Annalena Kalteyer



Open Heavy Flavor Highlight: open beauty in p+p at LHC

- Non-prompt Λ_c/D^0 ratio in 13 TeV p+p is higher than the NLO calculations at low p_T .

Pietro Antonioli

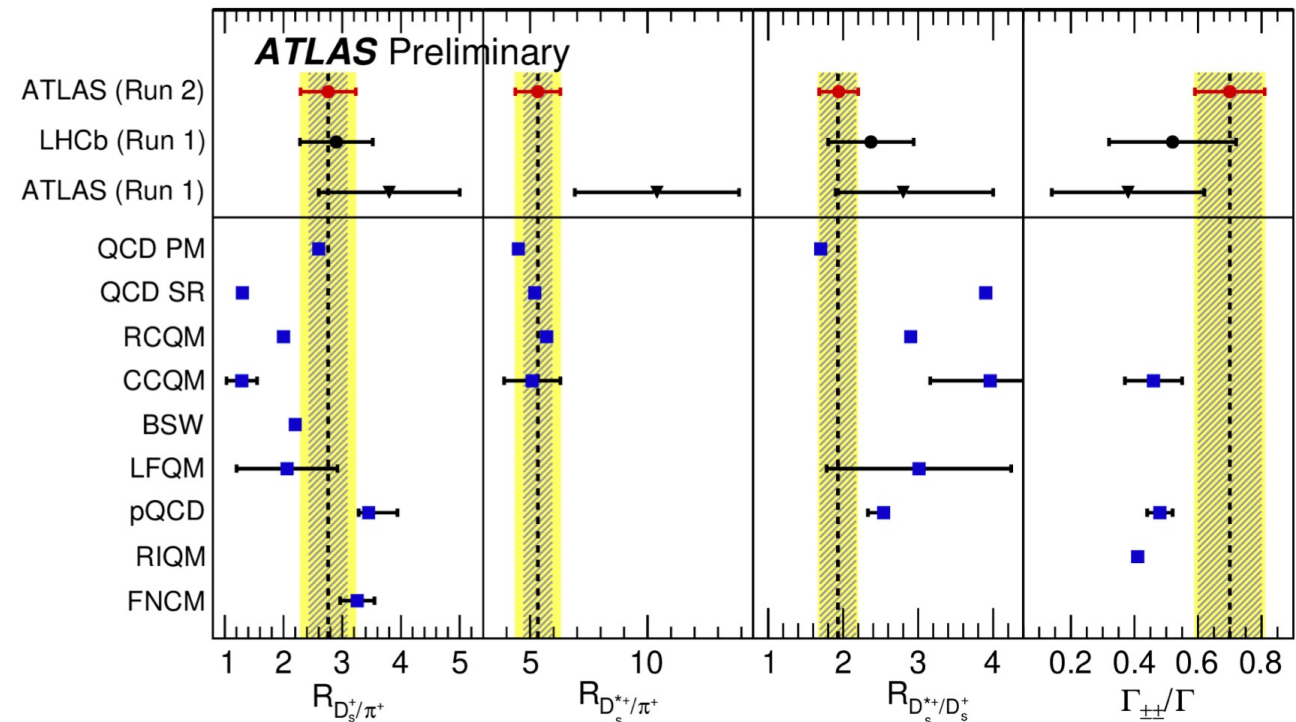


ALI-PREL-503700

- Unique approach to test weak decay models by the B_c measurements in 13 TeV p+p at ATLAS.

$$R_{D_s^+/\pi^+} \equiv \frac{B(B_c^+ \rightarrow J/\psi D_s^+)}{B(B_c^+ \rightarrow J/\psi \pi^+)}$$

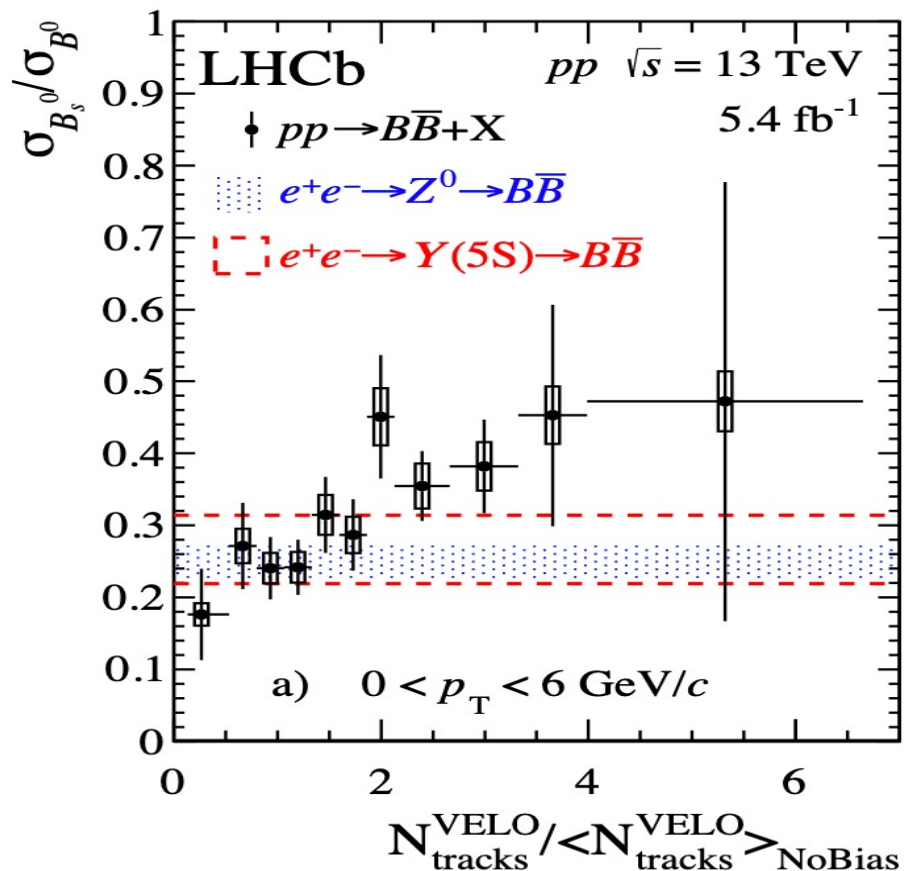
Sally Seidel



Open Heavy Flavor Highlight: open beauty at LHC and RHIC

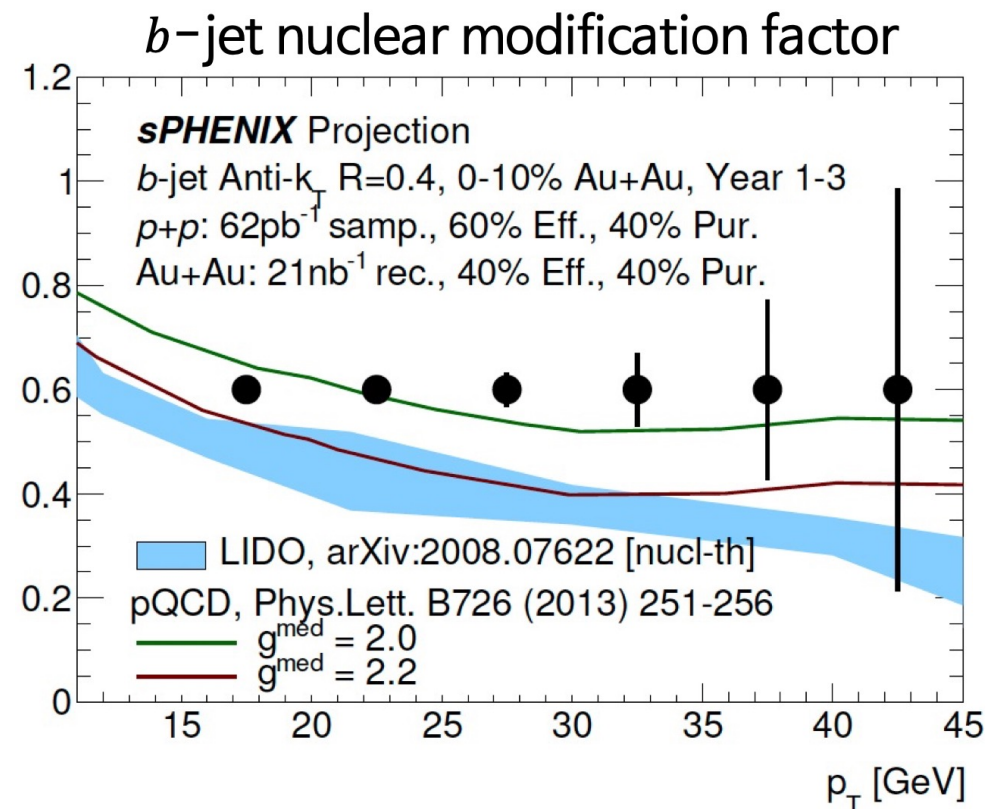
- $\sigma(B_s^0)/\sigma(B^0)$ consistent with e+e results at low p_T but increase with multiplicity.

Sara Sellam



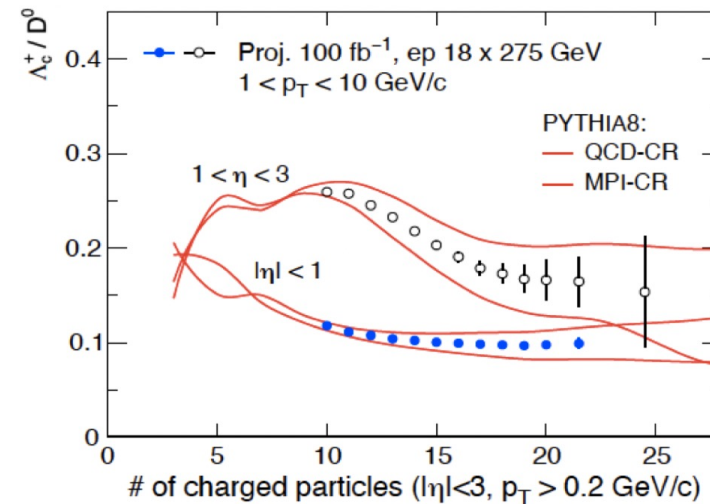
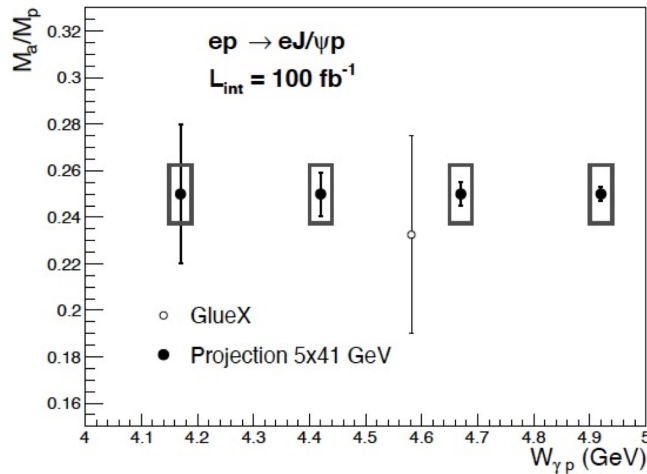
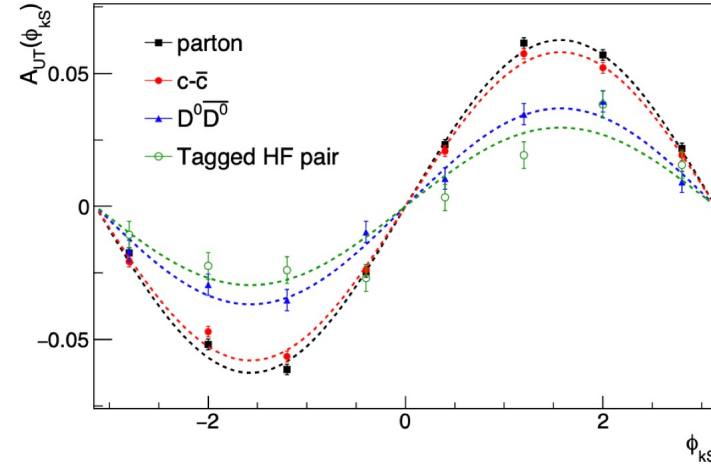
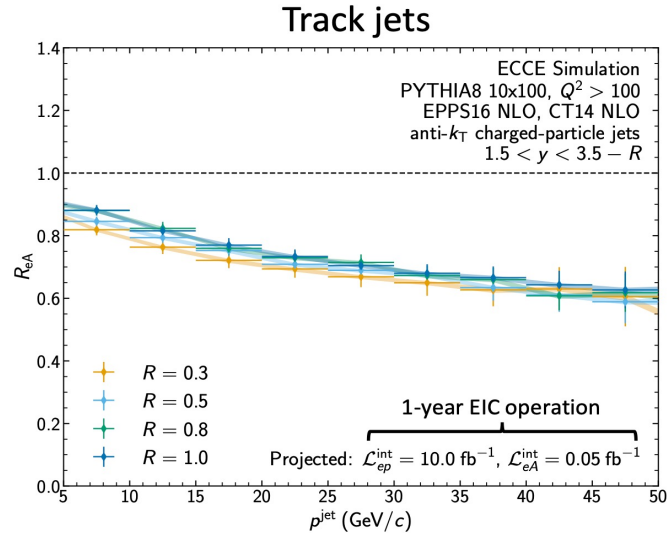
- New measurements of bottom jet and hadron production in p+p and A+A to be realized at sPHENIX.

Sanghoon Lim



Opportunities provide by the EIC

- High precision heavy flavor and jet measurements to be achieved at EIC will help constrain (n)PDFs and explore the hadronization process.



Cheuk-Ping Wong,
Sooraj Radhakrishnan,
Yasser Corrales Morales

Projected hadron R_{eA} vs z_h

