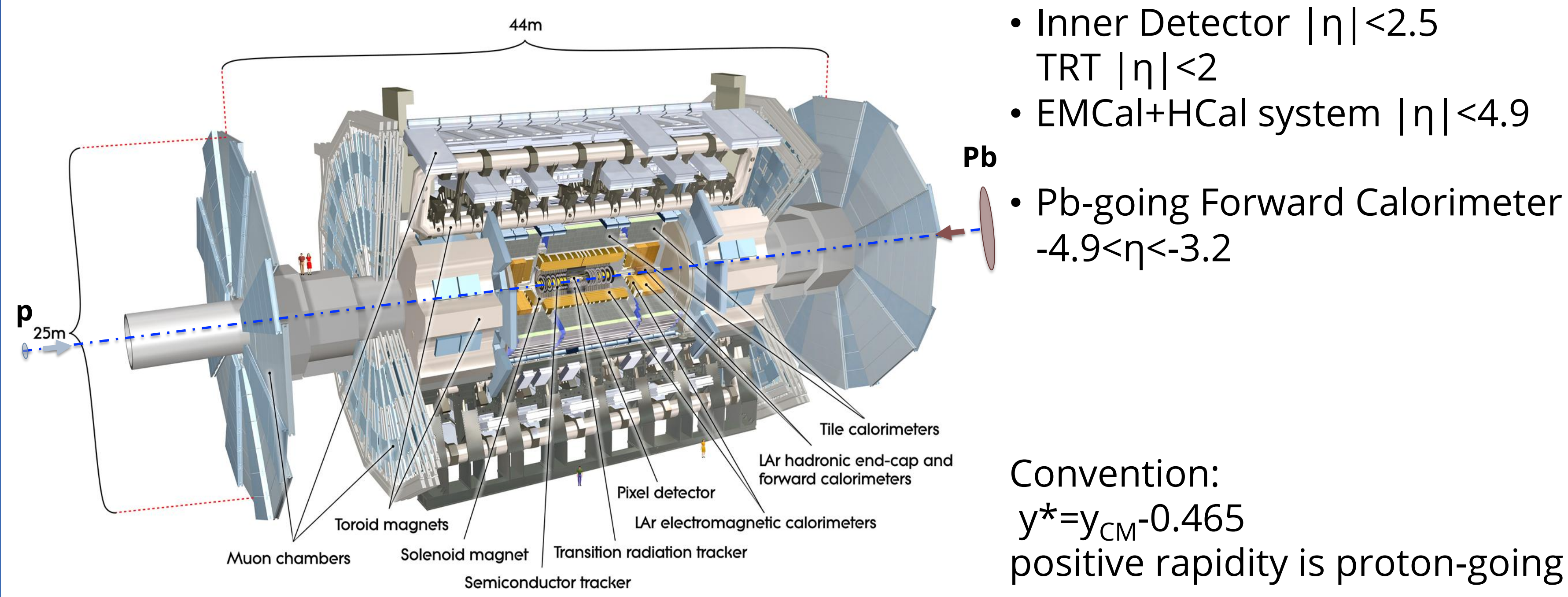


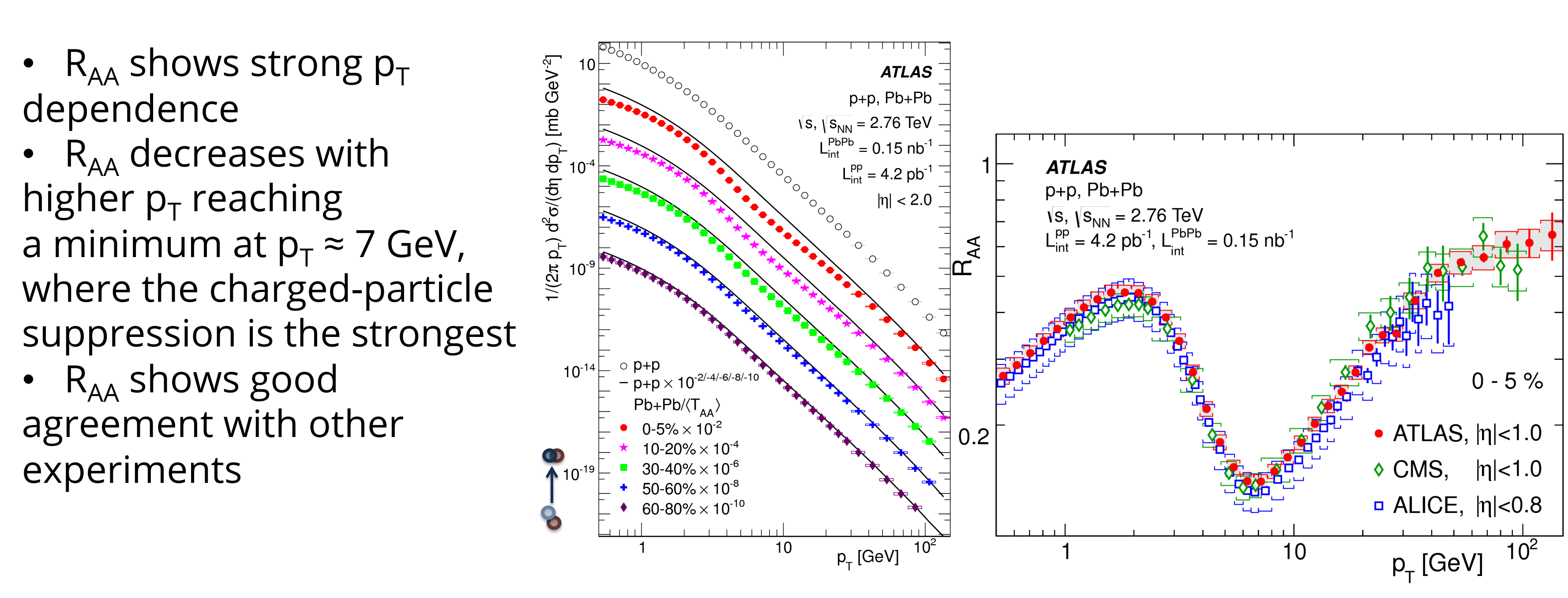
Evgeny Shulga for the ATLAS Collaboration

Department of "Elementary Particle Physics" N40, National Research Nuclear University "MEPhI", 115409, Russia, Moscow, Kashirskoe highway, 31

The ATLAS Detector



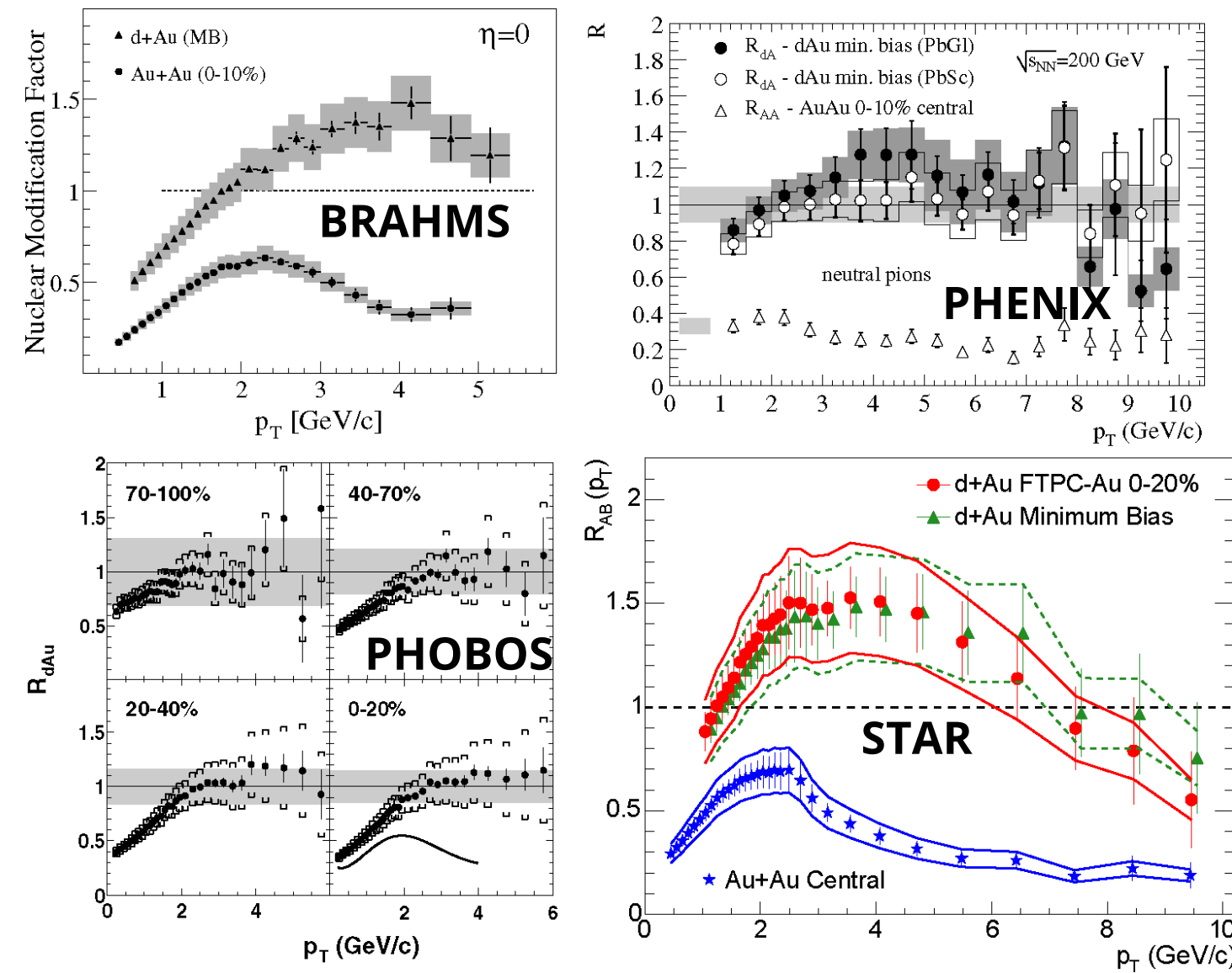
Charged hadrons in Pb+Pb [2]



Nuclear modification measurements at RHIC [1]

- why to study charged particle spectra?
 - to understand properties of hot dense matter created in HI collisions (Pb+Pb) and contribution of "cold" effects (p+Pb)
 - to understand the mechanism of energy loss of partons
- nuclear modification factor:

$$R_{pPb}(p_T, y^*) = \frac{1}{\langle T_{Pb} \rangle} \frac{1/N_{evt} d^2 N_{pPb}/dy^* dp_T}{d^2 \sigma_{pp}/dy^* dp_T}$$



Reference pp spectrum

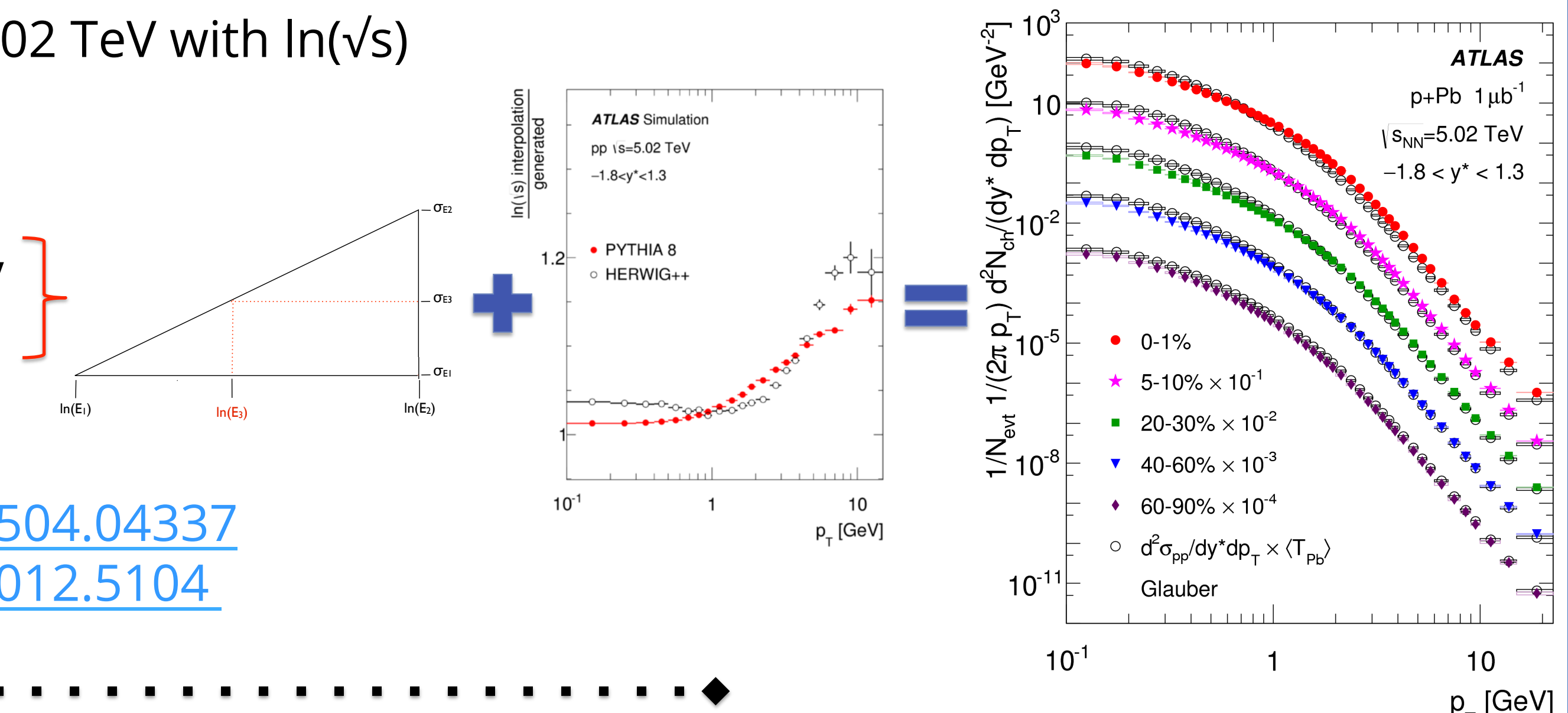
- Interpolation to 5.02 TeV with $\ln(\sqrt{s})$

pp samples:

200 μb^{-1} , $\sqrt{s} = 2.76$ TeV
130 nb^{-1} , $\sqrt{s} = 7$ TeV

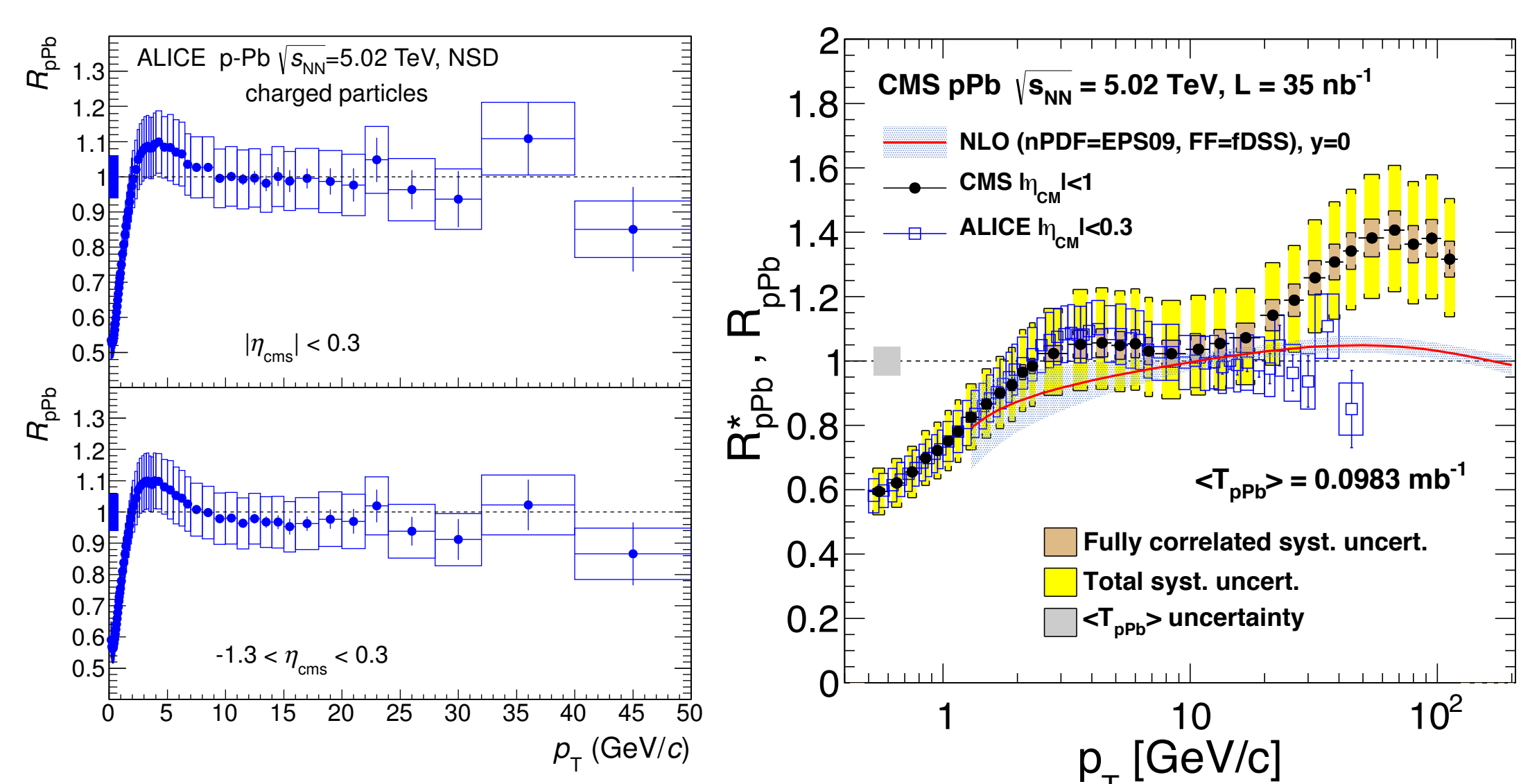
published in:

<http://arxiv.org/abs/1504.04337>
<http://arxiv.org/abs/1012.5104>



Nuclear modification measurements at the LHC

- In case of no nuclear effects R_{pPb} should not differ from unity at high p_T
- ALICE results do not support CMS @ high p_T using constructed reference pp spectra
- p+Pb 2013 ATLAS data allow to check high p_T CMS results



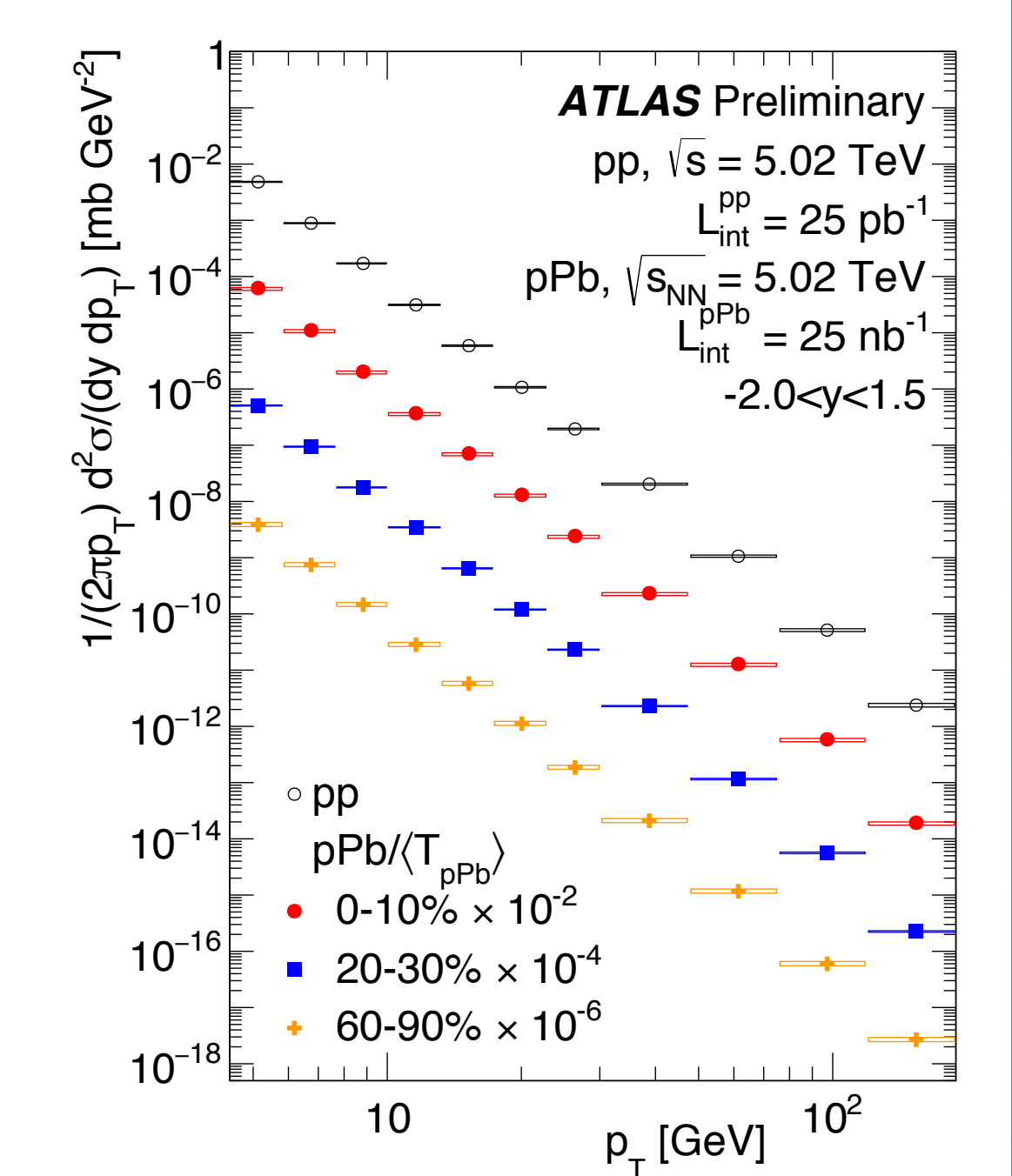
- High p_T charged particle spectra obtained from pp collision data

pp data at $\sqrt{s} = 5.02$ TeV were recorded in 2015 with a total luminosity of 25 pb^{-1}

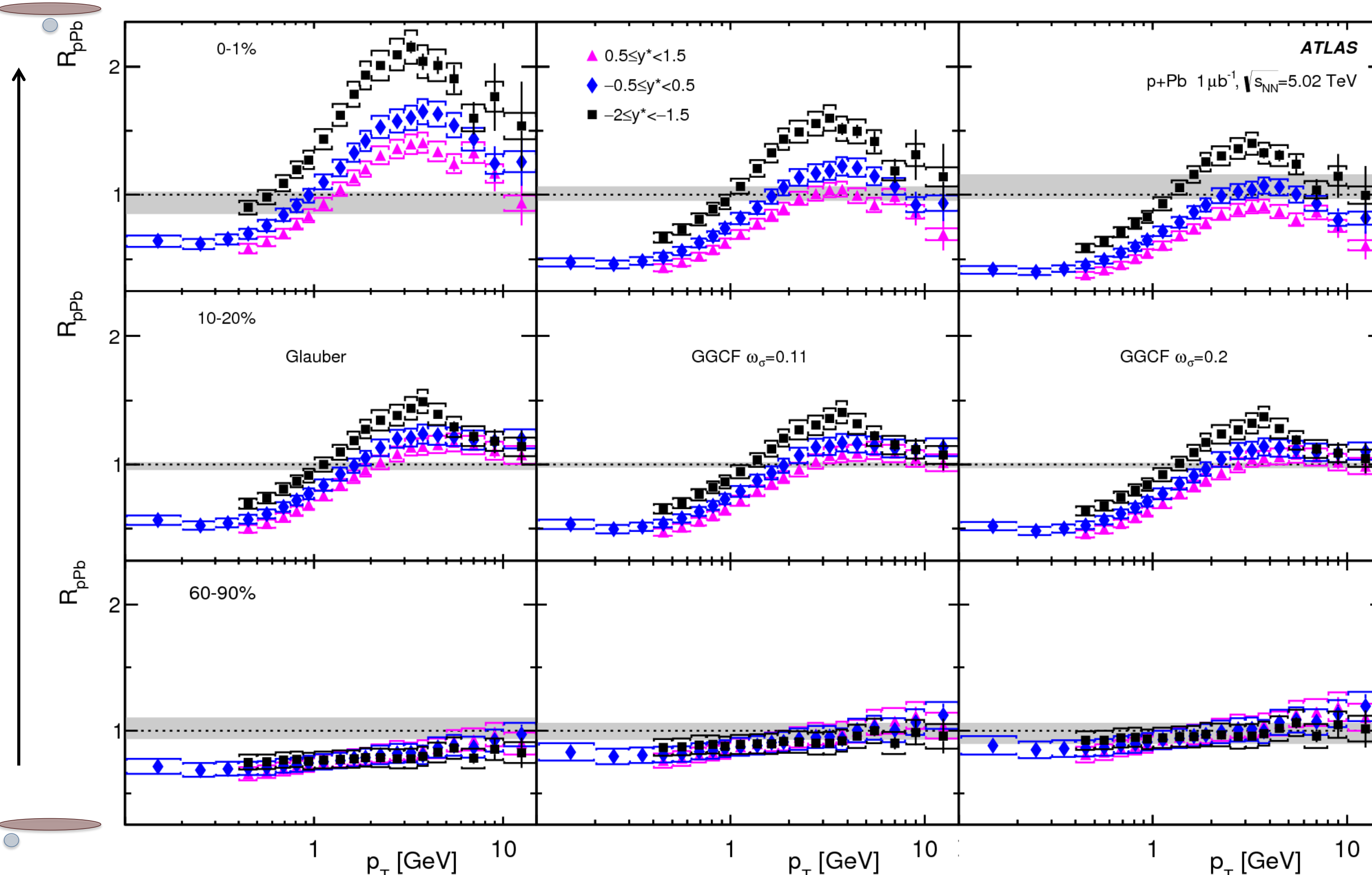
The jet triggers used an anti-kt jet algorithm with a radius parameter of $R = 0.4$ and various thresholds [3]

Tracks in events recorded by jet triggers are required to be matched to a jet within $\Delta R^2 = \Delta \eta^2 + \Delta \phi^2 < 0.16$ and have $p_T \leq 1.3 \times p_T^{\text{jet}}$

The jet trigger with the lowest threshold becomes fully efficient at $p_T^{\text{jet}} = 26$ GeV



Results [4], [5]

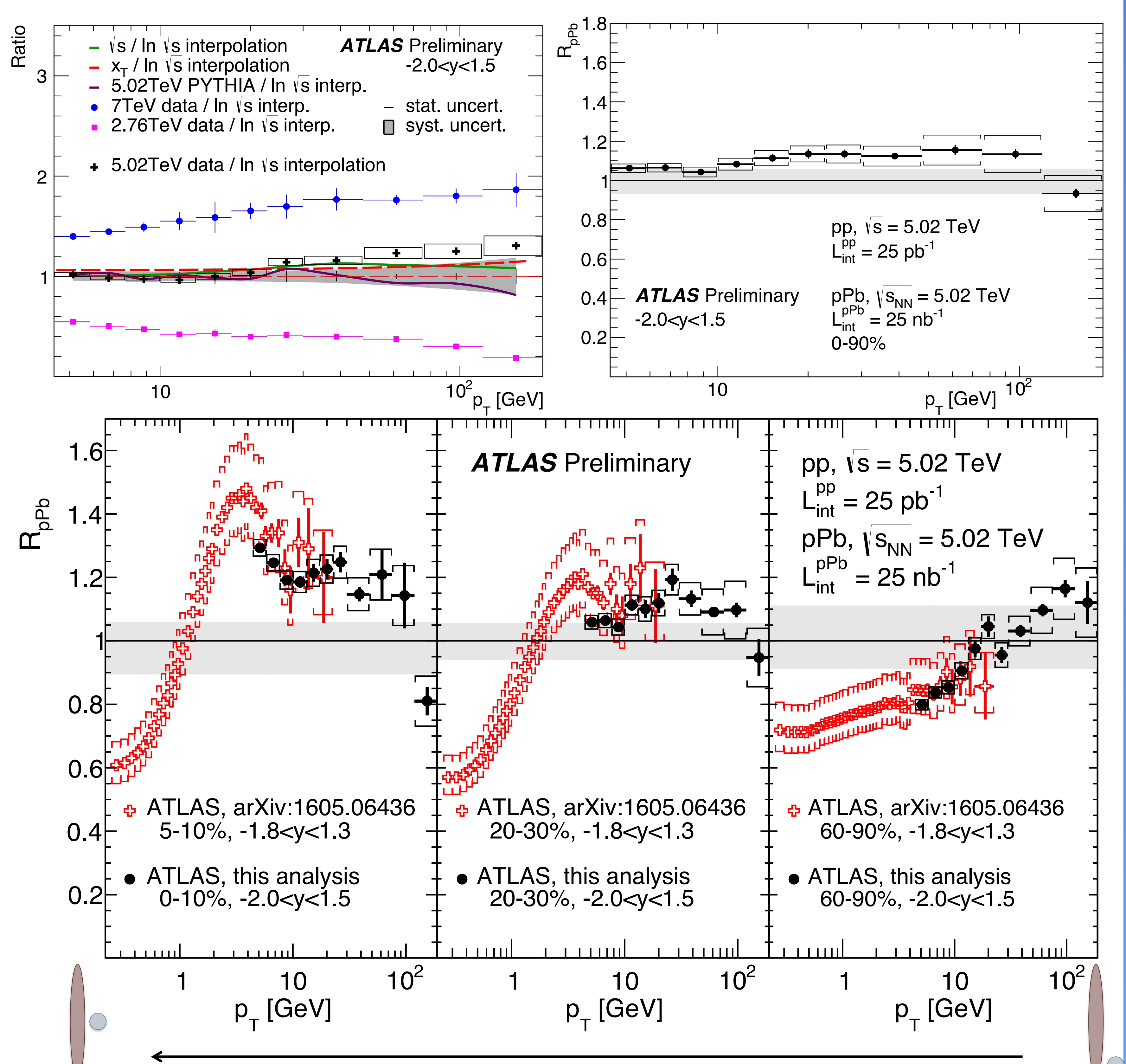


Lower p_T with interpolated pp reference:

- Nuclear effects are still present at the "peak" and lower p_T region
- Strong rapidity & centrality dependence of the particle production
- Glauber and GGCF models provide different interpretations

Higher p_T with pp reference:

- The most central interval 0-10% shows an increase toward lower p_T , the peripheral interval shows a decrease
- High p_T R_{pPb} does not show significant deviation from unity in the centrality interval 0-90% for any transverse momentum



References

- [1] STAR Collaboration, Nuclear Physics A 757 (2005) 102-183. [3] ATLAS Collaboration, Phys. Lett. B719 (2013) 220-241. [5] ATLAS Collaboration, ATLAS-COM-CONF-2016-114.
[2] ATLAS Collaboration, JHEP09 (2015) 050. [4] ATLAS Collaboration, arXiv:1605.06436.