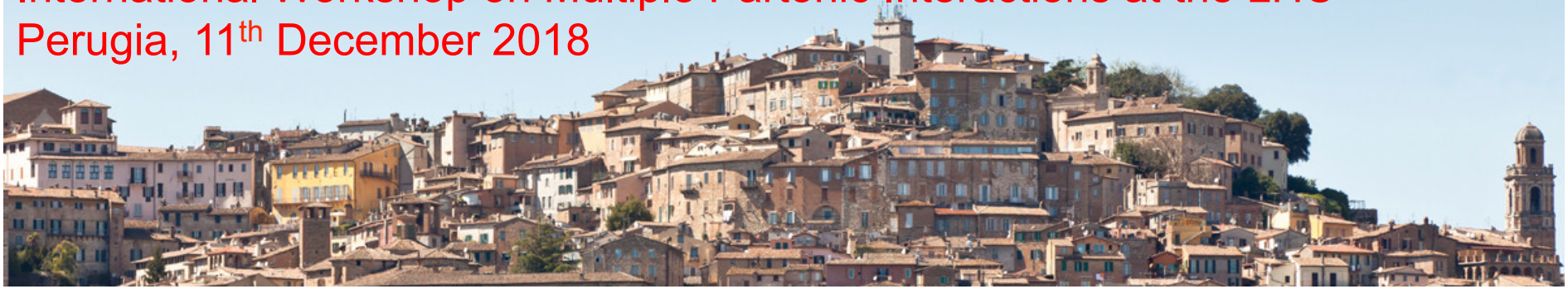
International Workshop on Multiple Partonic Interactions at the LHC
Perugia, 11th December 2018



Summary and conclusions of HI session

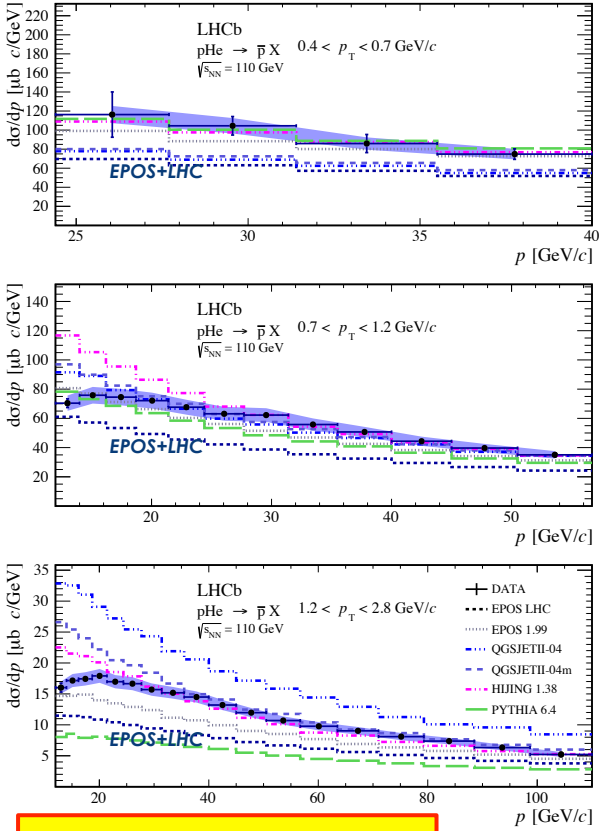
Valentina Zaccolo
University and INFN – Trieste

Experimental results

HI and fixed target with LHCb

LHCb has unique forward kinematics as heavy-ion collider and in fixed target mode → **System for Measuring Overlap with Gas (SMOG)** served as a "pseudo-target"

First direct determination of the antiproton production cross-section in pHe collisions



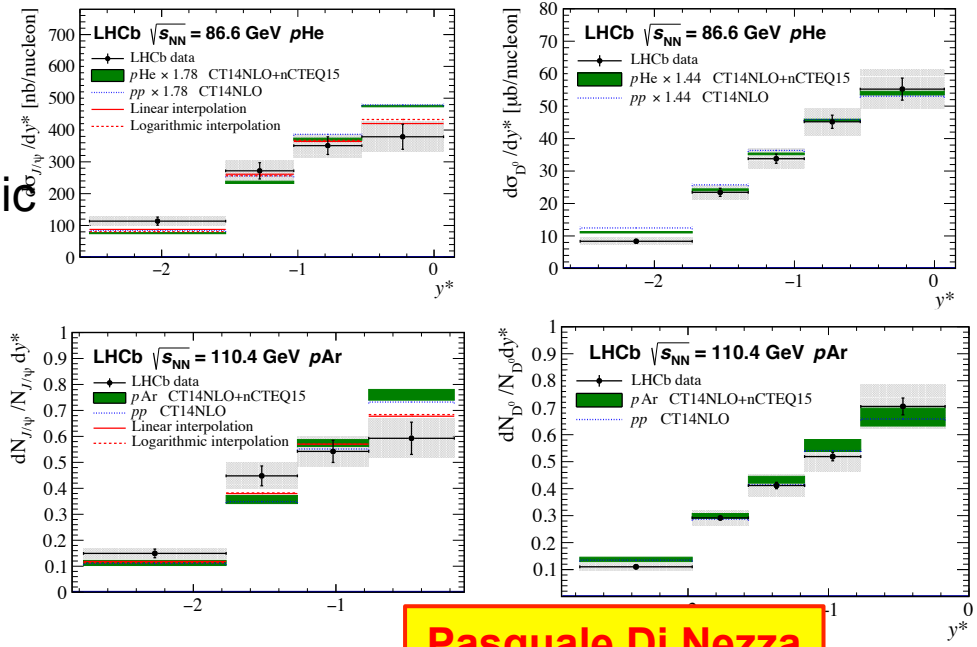
Pasquale Di Nezza

HI and fixed target with LHCb

LHCb has unique forward kinematics as heavy-ion collider and in fixed target mode → **System for Measuring Overlap with Gas (SMOG)** served as a "pseudo-target"

No strong differences are observed between pHe data and the theoretical predictions that do not include any intrinsic charm contribution

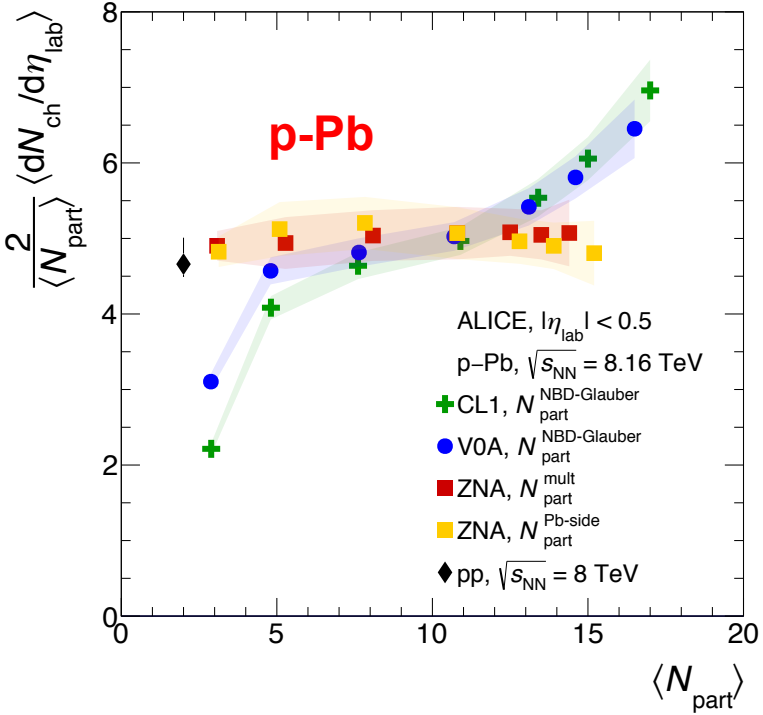
→ No evidence for a substantial intrinsic charm content of the nucleon is found

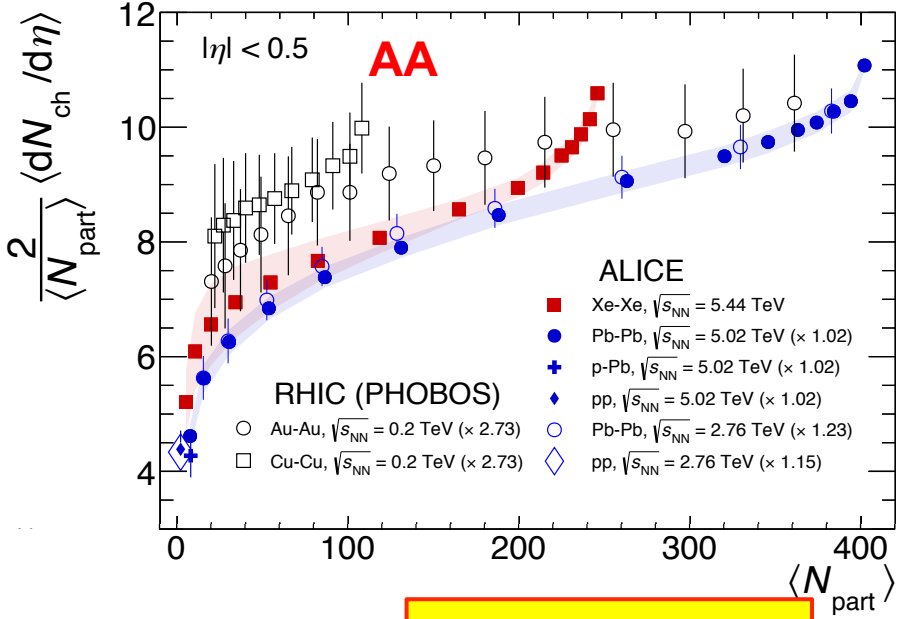


Pasquale Di Nezza

MPI in ALICE multiplicity measurements

Multiplicity fluctuations at fixed number of ancestors/MPI influence pA and AA distributions as a function of centrality: uptick effect

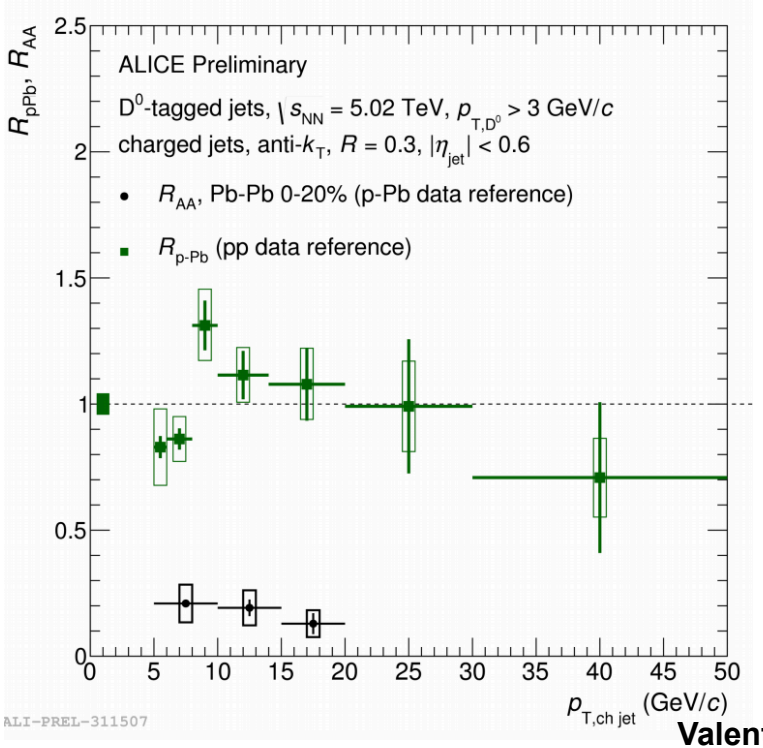




Valentina Zaccolo

HF measurements with ALICE

Heavy-flavor quarks (charm and beauty) mainly produced in hard scattering → can probe the entire evolution of the QGP



p-Pb initial cold nuclear matter state effects on D jets are small

→ charm jet quenching in lead-lead collisions should not be influenced by such effects

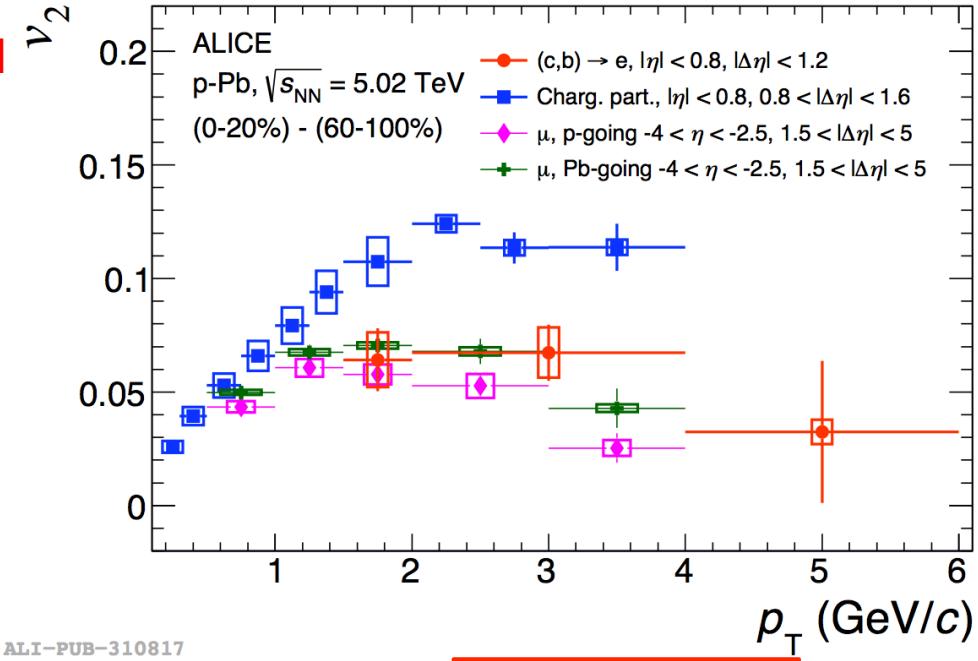
Auro Prasad Mohanty

HF measurements with ALICE

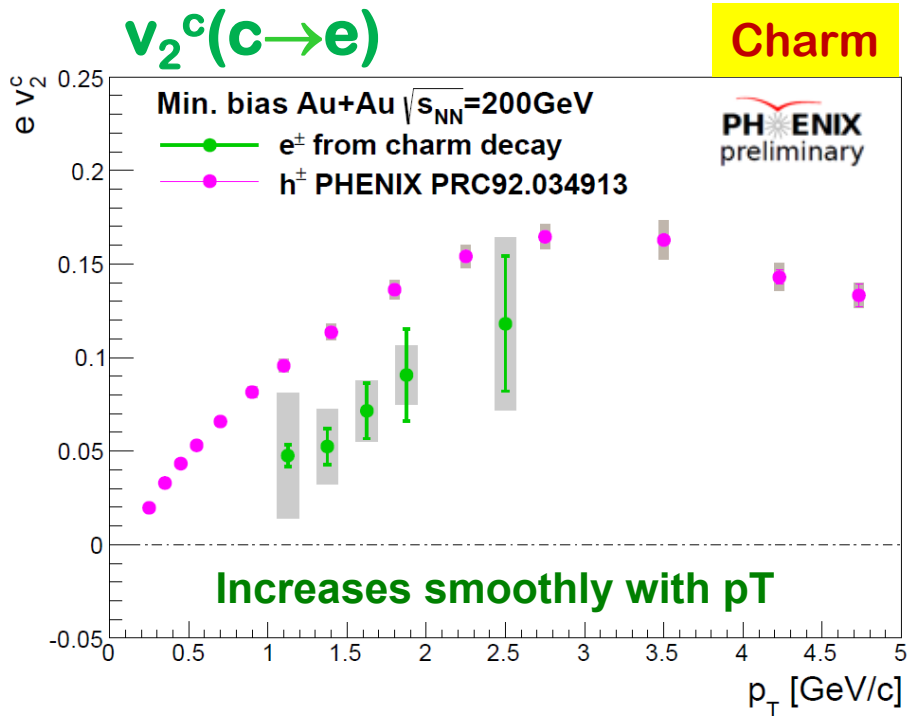
Heavy-flavor quarks (charm and beauty) mainly produced in hard scattering → can probe the entire evolution of the QGP

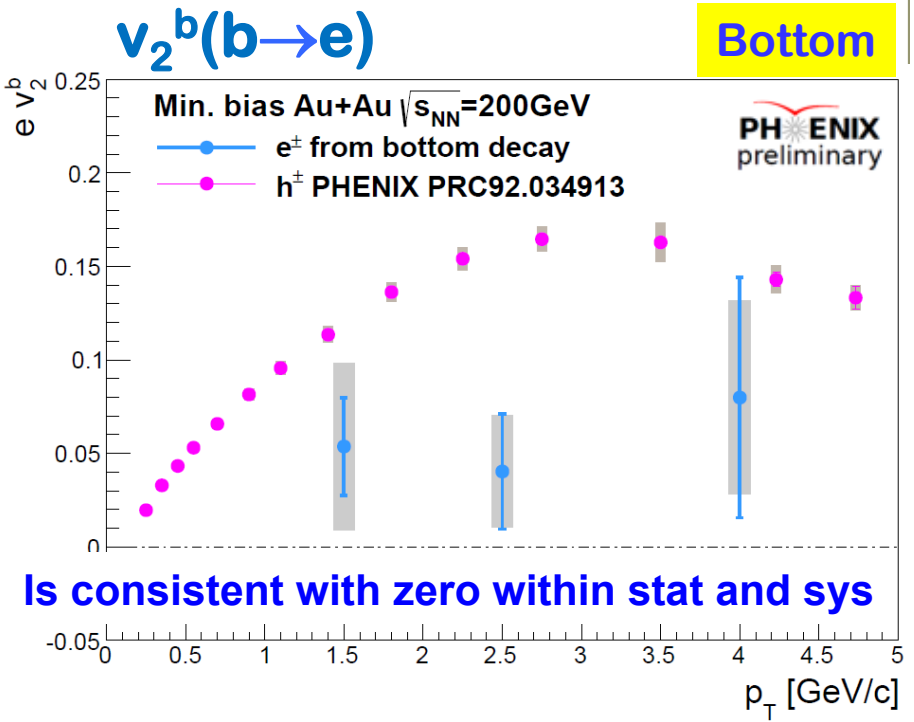
Flow-like effects in the HF sector studied in high-multiplicity p-Pb collisions

→ Collective effects? Initial or final state cold nuclear matter effects? Color reconnections?

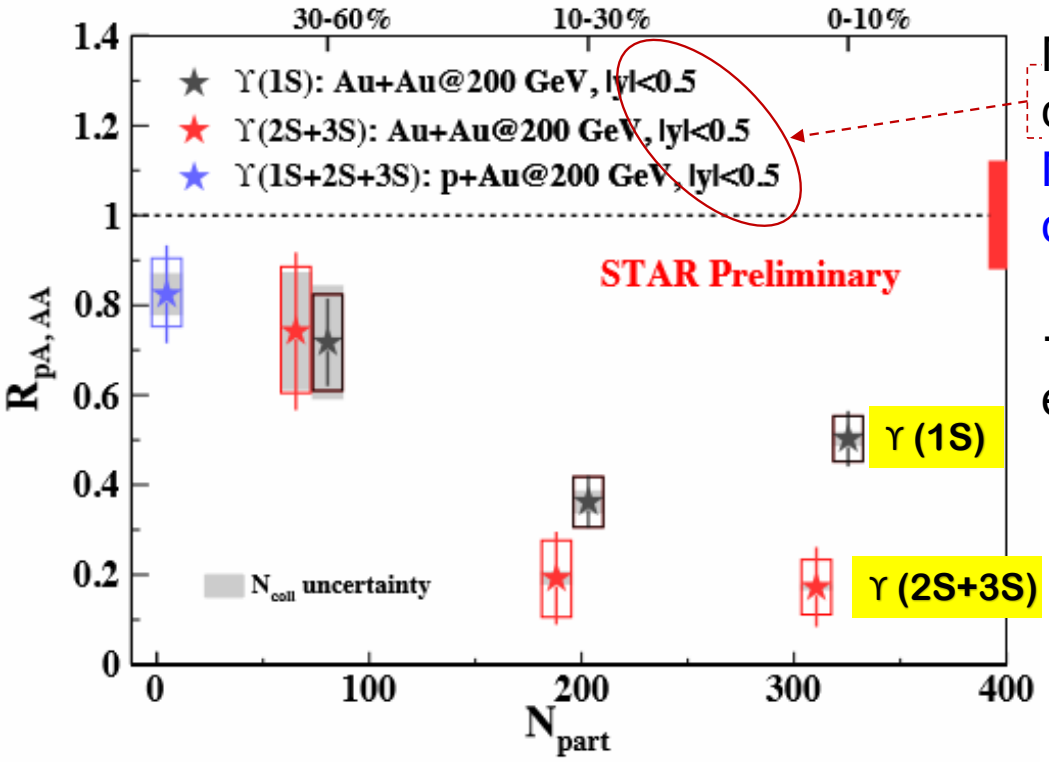


HF and quarkonia with PHENIX and STAR





HF and quarkonia with PHENIX and STAR



More suppression of Y(1S) in central collisions

More suppression of Y(2S+3S) compared to Y(1S)

→ consistent with “sequential melting” expectation

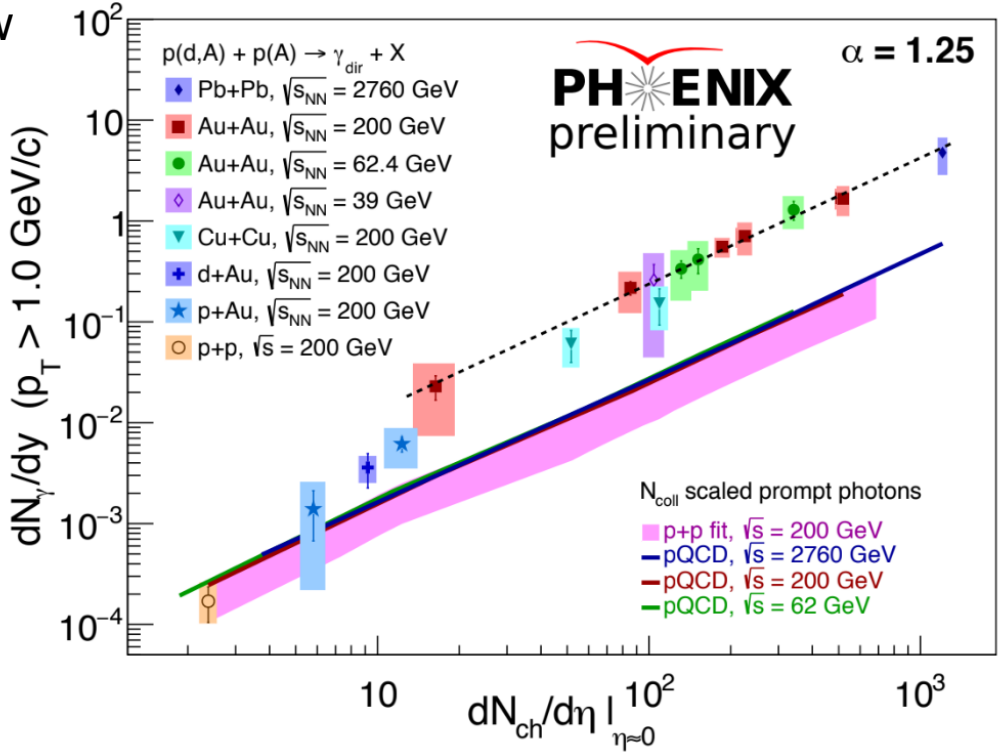
Rachid Nouicer

Direct photon production at PHENIX

The γ yields differ by a factor 10 at low p_T from pp to AA

→ gap partially filled by p-Au

→ pp high multiplicity points can help



Balazs Ujvari

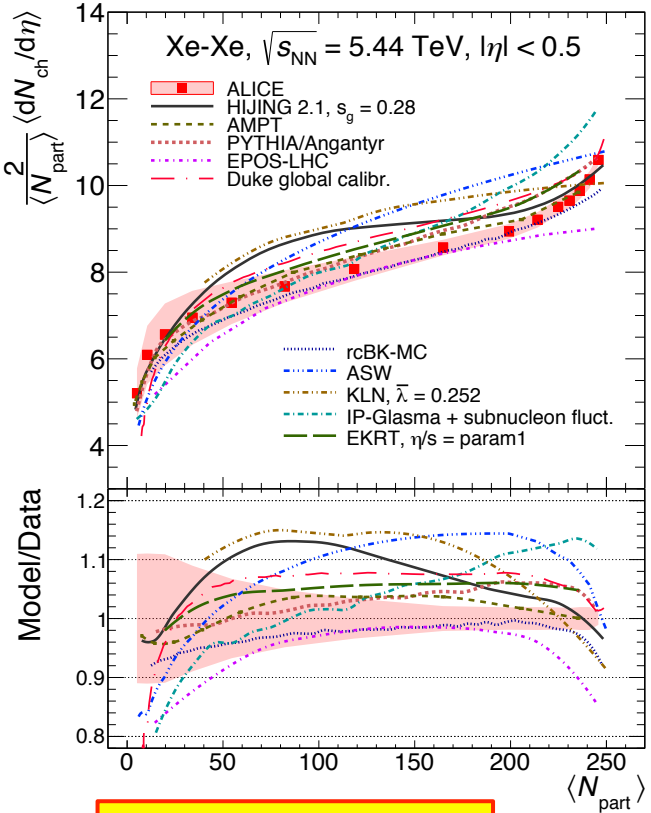
Theory models

Soft QCD from ee to AA with PYTHIA

Developments:

- String-string interactions → vortex lines
  (can reproduce pp ridge structure and strangeness enhancement)

- Angantyr extension for pA and AA: currently no QGP effects (ropes, shoving) in AA but can reproduce global features

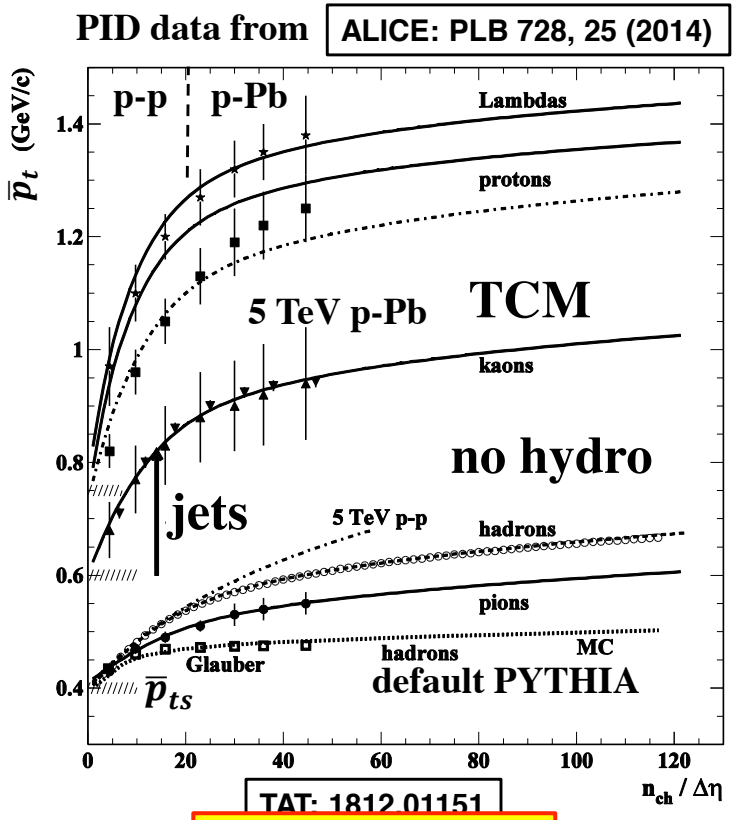


TCM of hadron production

Empirical model derived from particle data:

- no radial flow in p-Pb
- no jet modification in p-Pb
- no color reconnection

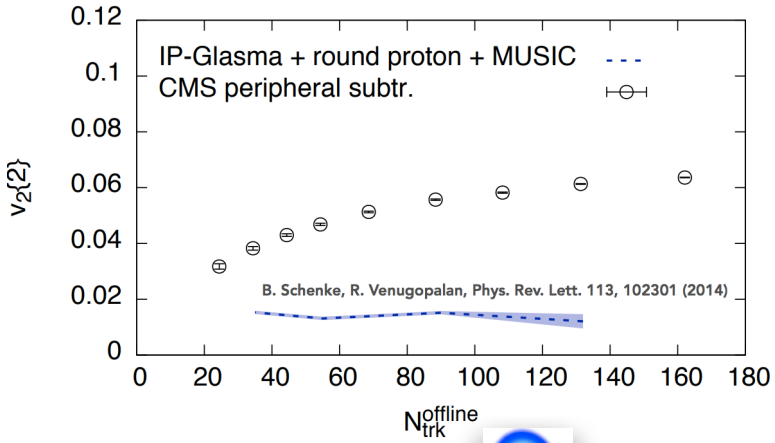
→ can reproduce particles spectra



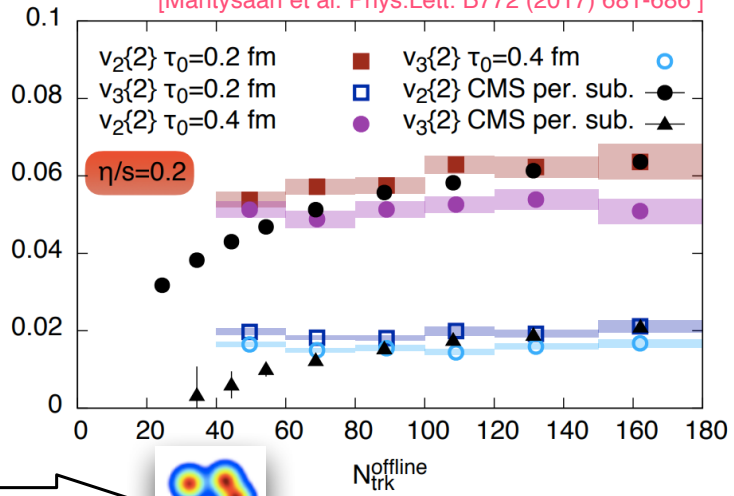
Flow harmonic coefficients

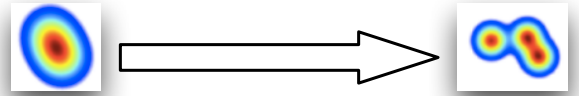
Experimental data cannot bring to a conclusion on whether it is an initial state or a final state effect

Proton structure definition is crucial



[Mäntysaari et al. Phys.Lett. B772 (2017) 681-686]





Fluctuating internal d.o.f

Alba Soto Ontoso

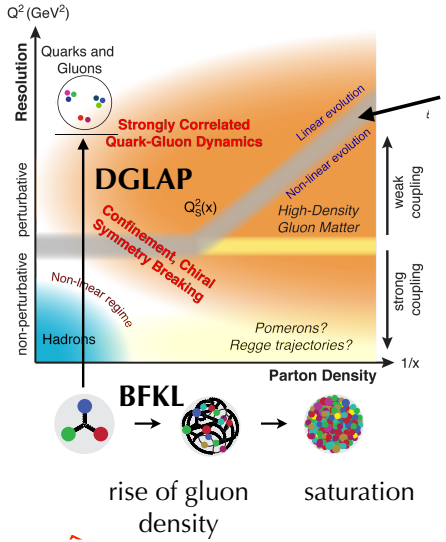
Future projects

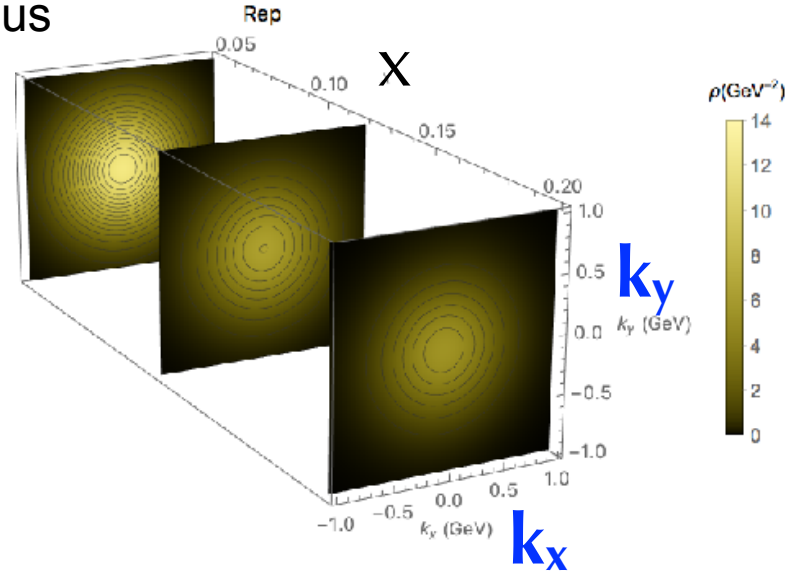
Electron Ion Collider

Addresses open questions on structure of nucleons and nuclei:

- spin of nucleons and nuclei: quarks contribute to a fraction of proton spin
- tomography in momentum and spatial space
- saturation: gluon occupancy amplified for nucleus

EU-US collaboration:
more news in 2019!





Marco Radici

Tentative summary

Physics of Heavy Ions is active, rich and still to develop!

- small systems like pp and p-Pb (d-Au) were planned as control systems but show instead interesting features to be studied/understood more (initial/final state effects? cold/hot nuclear matter effects?)

- MPI effects are visible in global observables in AA and pA

➢ What are the HI measurements which are more influenced by MPI?

Look forward to new (more precise) experimental results, to new small collision systems... in general to more interaction among experimental and theoretical community!