Forward rapidity two-particle correlations in p-Pb collisions measured in ALICE

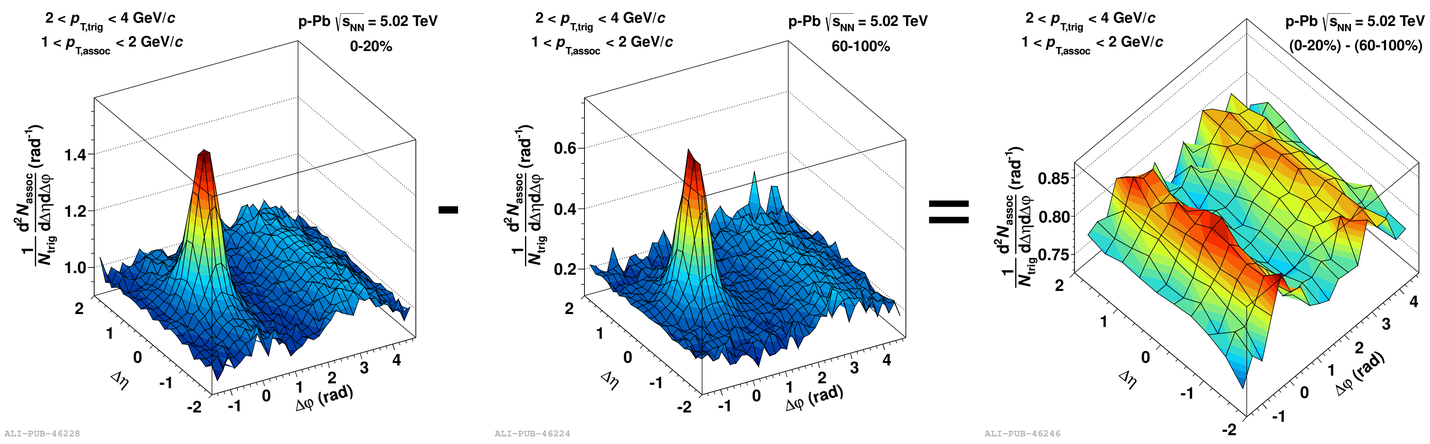
Tim Schuster (Yale University) for the ALICE collaboration

Long-range correlations in p-Pb

Two-particle correlations have revealed "ridge" structures in p-Pb collisions at $\sqrt{s_{NN}}$=5.02TeV

associated yield per trigger, pair acceptance modeled by mixed events

$$\frac{1}{N_{\rm trig}}\frac{{\rm d}^2N_{\rm assoc}}{{\rm d}\Delta\eta\,{\rm d}\Delta\varphi} = \frac{S(\Delta\eta,\Delta\varphi)}{B(\Delta\eta,\Delta\varphi)}$$



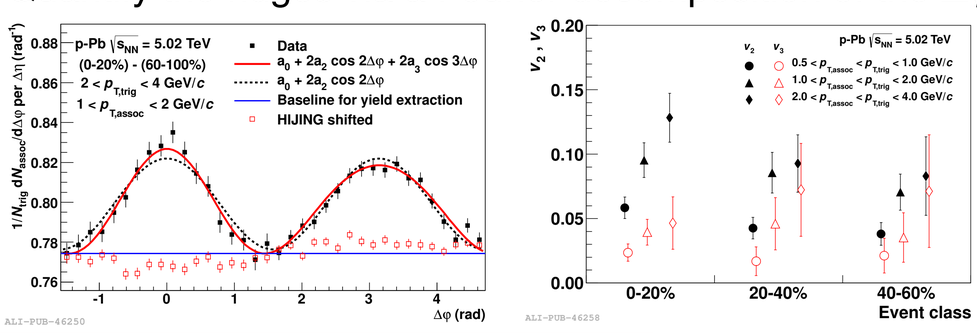
Subtraction method: high- minus low-multiplicity p-Pb events

Assumptions:

- low-multiplicity p-Pb (or pp) collisions contain only jet-like correlations
- shape of jet-like correlations in all event classes is the same

Minijet analysis supports these assumptions
Details in the poster of Emilia Leogrande [246] I-17
"Multi parton interaction studies in pp and p-Pb"

Quantify the ridges via a Fourier decomposition of the $\Delta\varphi$-projection:



ALICE PLB 719 (2013) 29

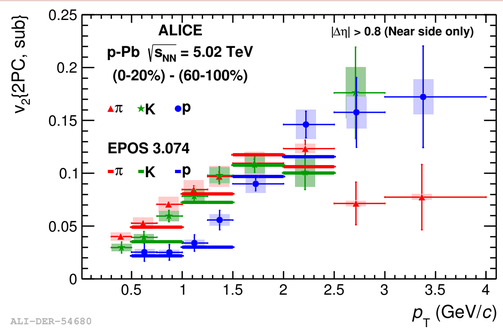
Central-central correlations

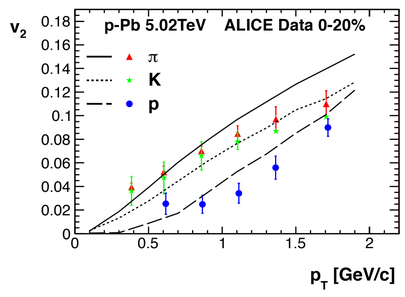
A further look at the ridges

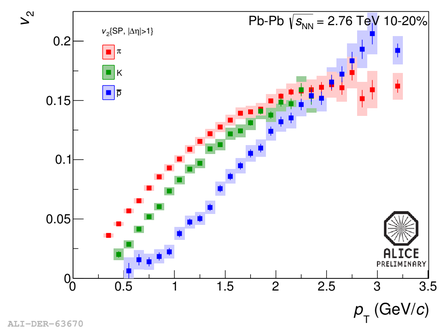
Particle species dependence and possible explanations

ALICE measured v_2 of π, K, p

- mass ordering resembles Pb-Pb
- can be explained in hydro models

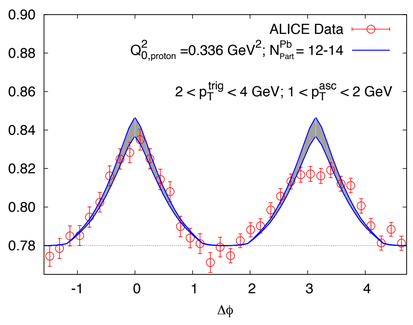






Further possible mechanisms explaining the long-range correlations:

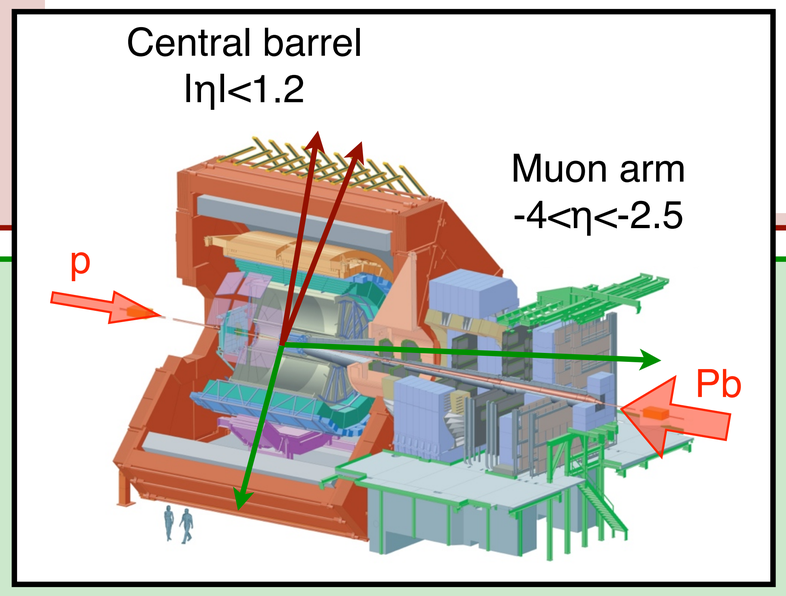
- initial-state saturation effects (e.g. CGC)
- multi-parton interactions (MPI)
- color connections



Details in the presentation of
L. Milano, Tuesday, 14:40h
(Correlations and fluctuations)

ALICE p-Pb:	PLB 726 (2013) 164
ALICE Pb-Pb:	arXiv:1405.4632 [nucl-ex]
hydro:	PRL 111, 172303 (2013)
CGC:	PRD 87, 094034 (2013)
MPI:	DESY-PROC-2012-03
Color conn.:	EPJ C71 (2011) 1730

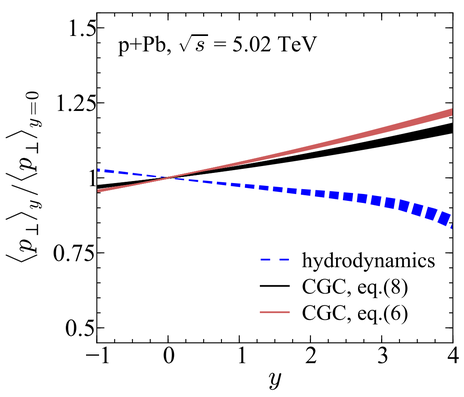
Forward-central correlations



η dependence of the ridges

Extend the kinematic reach of two-particle correlation analyses by using muon arm tracks: study low-x region of nucleus

What to expect at forward η?



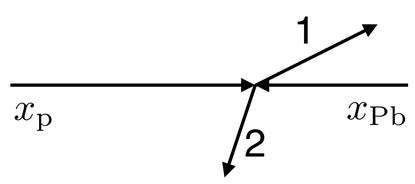
- weaker hydro effects from a less dense medium
- stronger saturation effects at lower x

No model predictions for v_2 yet!

PLB 728 (2014) 662

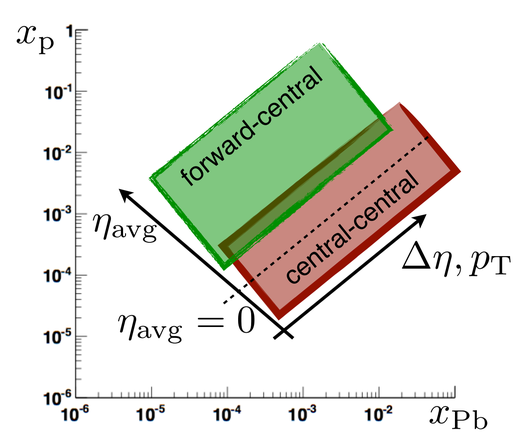
How are forward η and low x related?

- assume 2→2 scattering:



$$\eta_{\rm avg} = \frac{\eta_1-\eta_2}{2} \approx \ln\frac{x_{\rm Pb}}{x_{\rm p}}$$

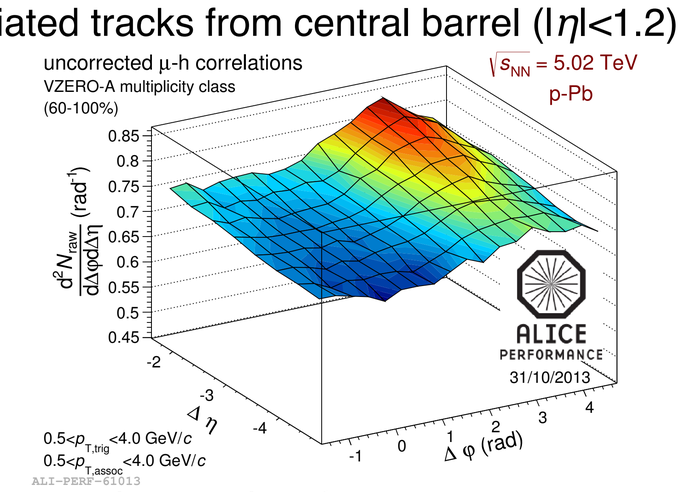
$$\Delta\eta = |\eta_1-\eta_2|$$



- low x can be studied at forward η

Study forward two-particle correlations using

- triggers from muon arm (-4<η<-2.5)
- associated tracks from central barrel (|η|<1.2)



Muon arm tracks consist of

- "primary" μ (e.g. heavy flavor decay)
- π→μ and K→μ decays

Resolution and acceptance under investigation to compare to charged particle correlation studies