FOCAL physics program in pp and Pb-Pb collisions

Physics capabilities

p, p-Pp collisions

- π^0, direct γ spectra, correlations
- Jets in pp

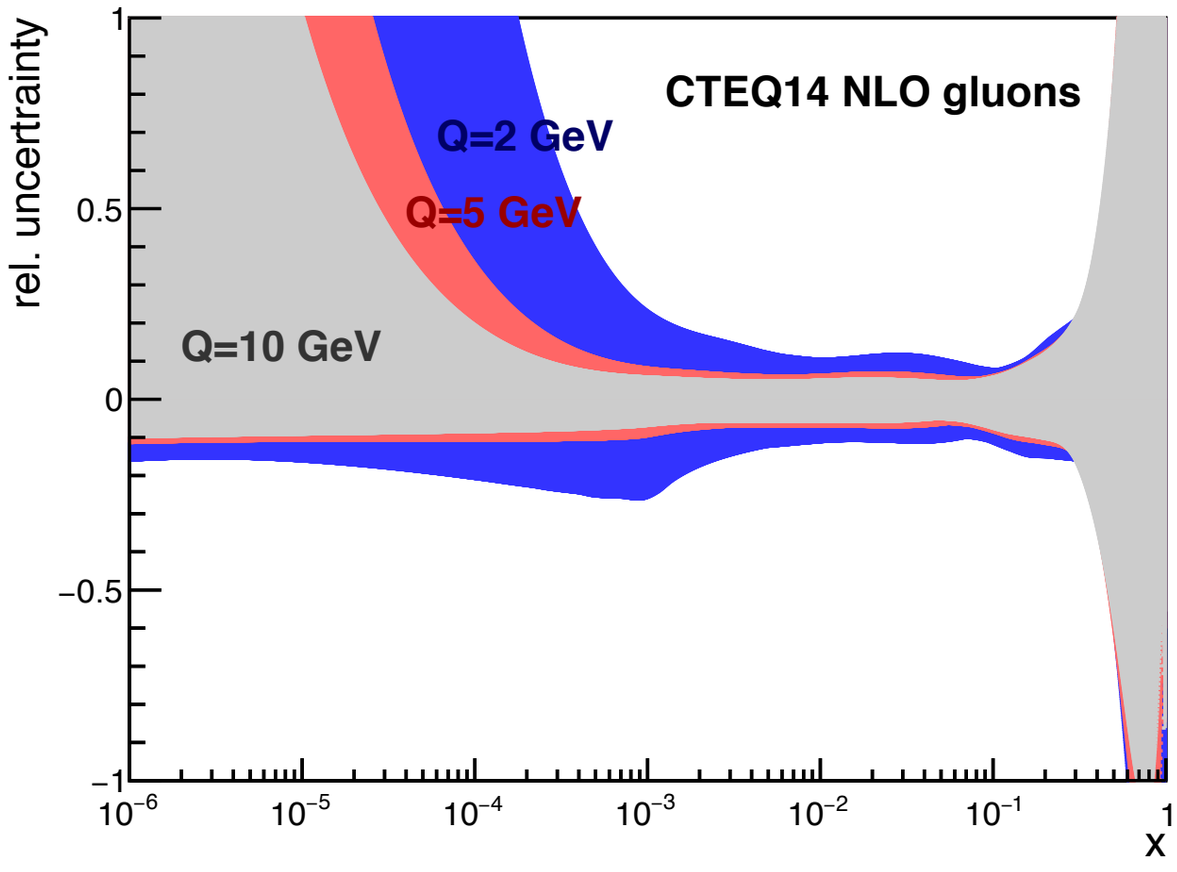
Pb-Pb collisions

- π^0 at higher p_T
- Event plane, energy flow measurements
  - Performance to be studied
- Jets at high p_T?

J/ψ difficult due to large backgrounds in electron channel

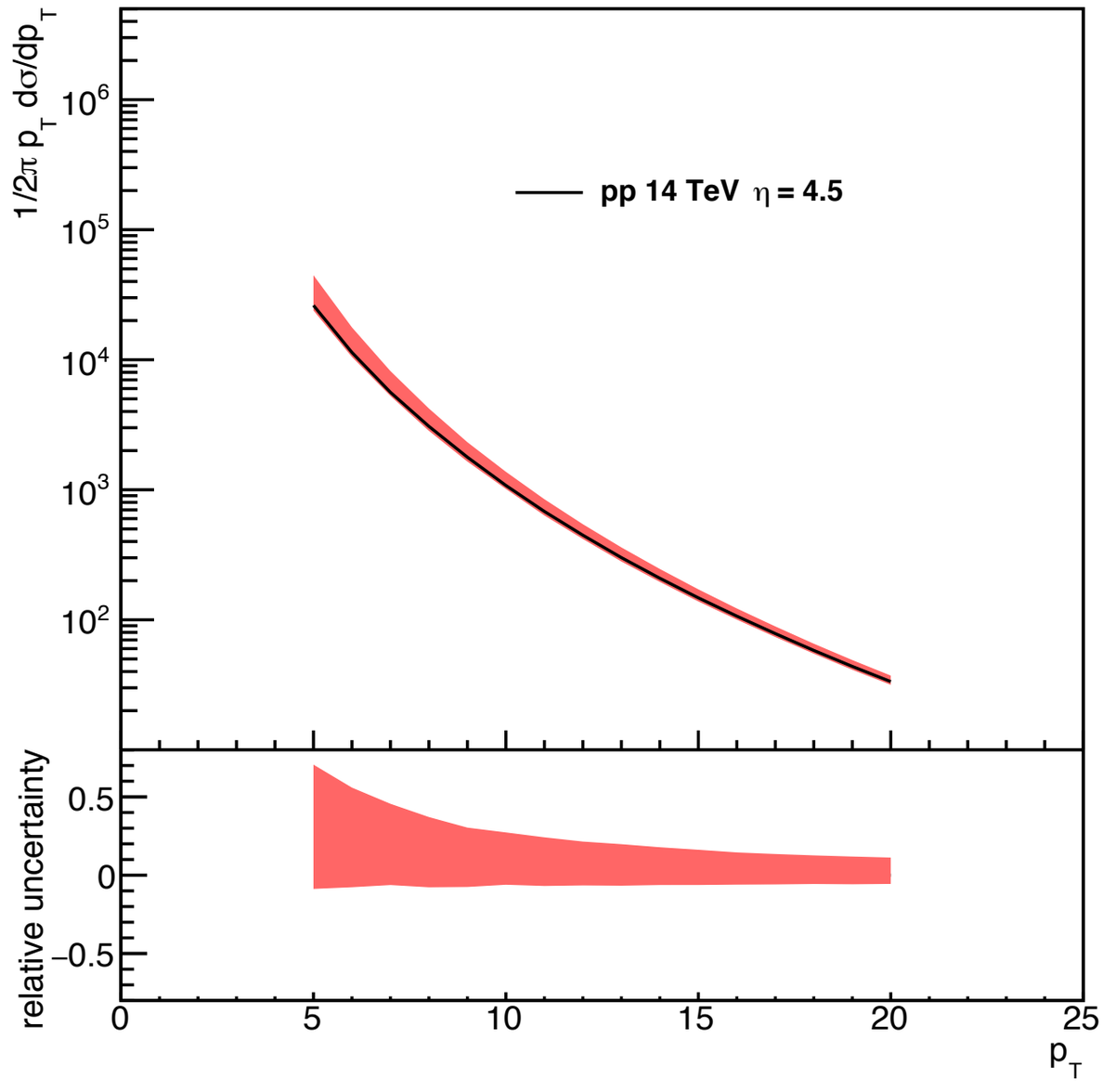
Photon spectra in pp

Crucial as reference measurements for p-Pb, Pb-Pb



Uncertainties in proton PDFs
still sizeable
Photons are a clean probe in pp

Direct photon spectra, uncertainties



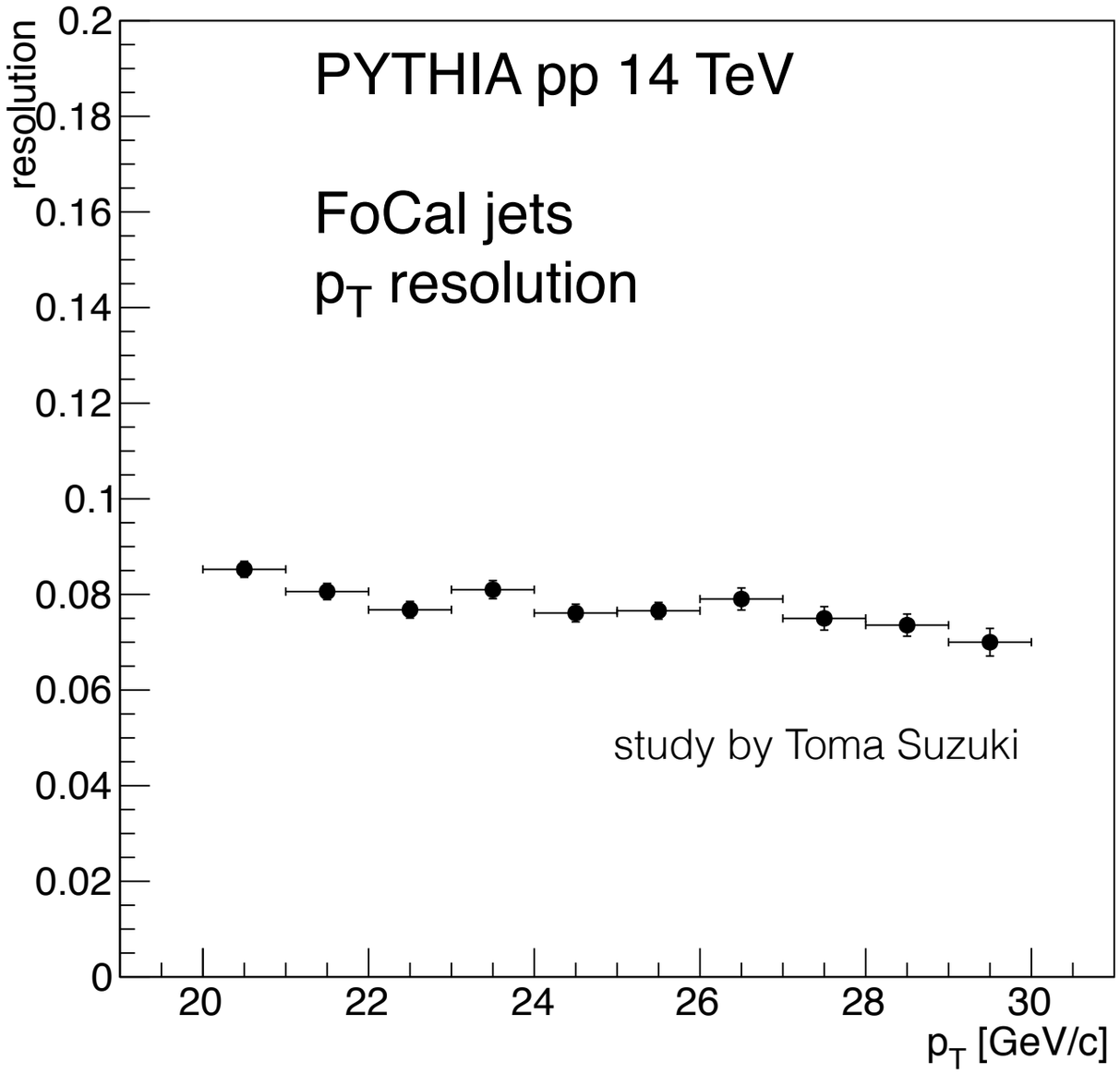
Uncertainties on π^0 are smaller

Jet production

Jet reconstruction performance with HCAL+ECAL very promising

Inclusive jet spectra in a unique kinematic region in pp?

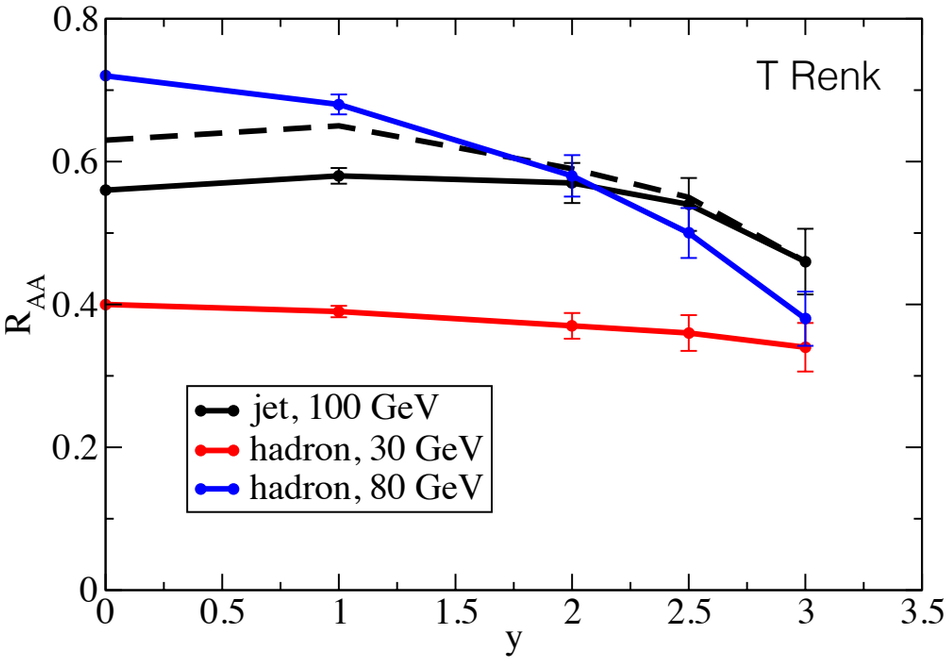
Further test of factorisation, low x PDFs



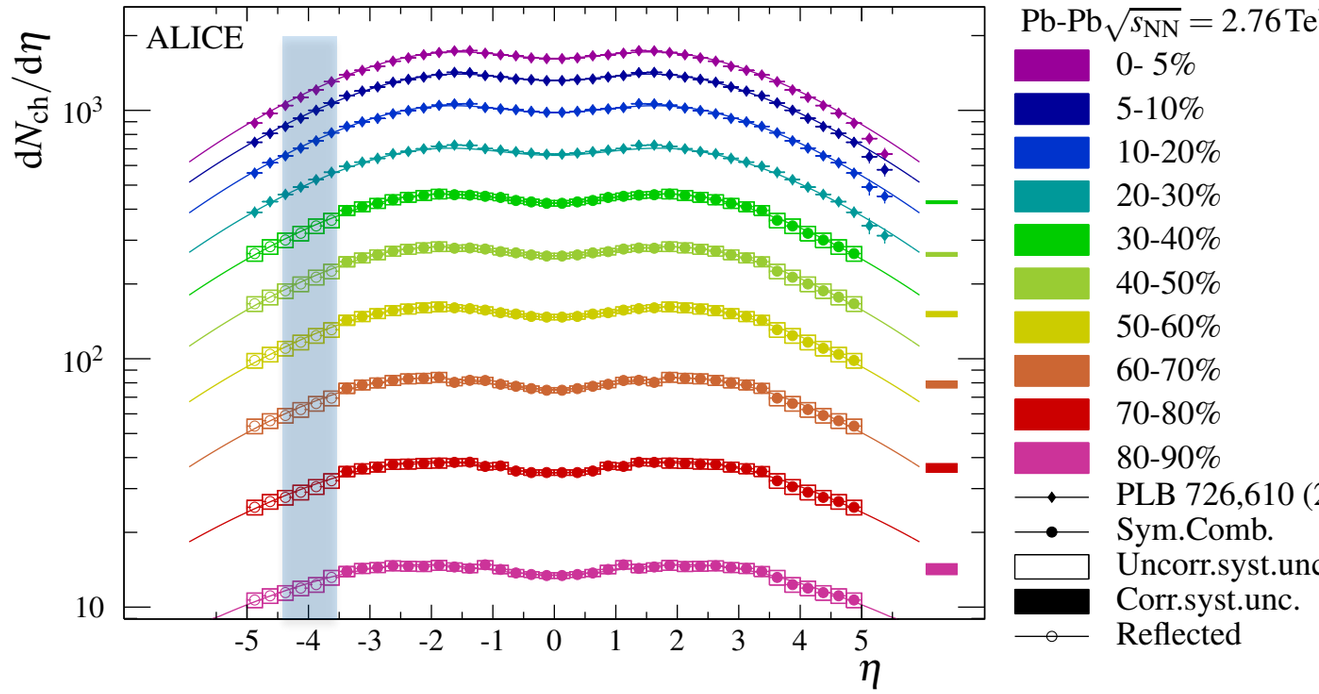
π^0 in Pb-Pb collisions

Forward RAA to probe longitudinal medium evolution

Main observable: R_{AA} at forward rapidity



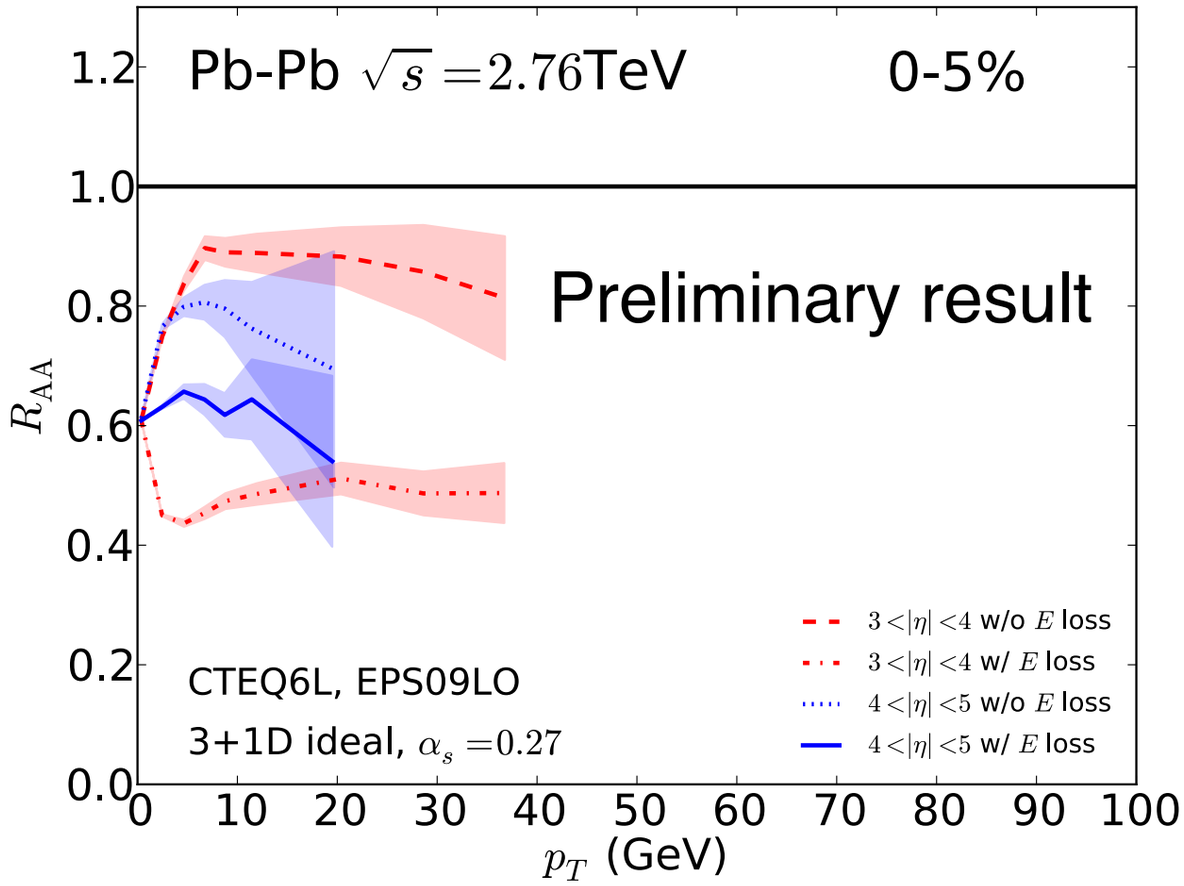
Expect trade-off between several effects
(density, time evolution,
q/g ratio, phase space limits)

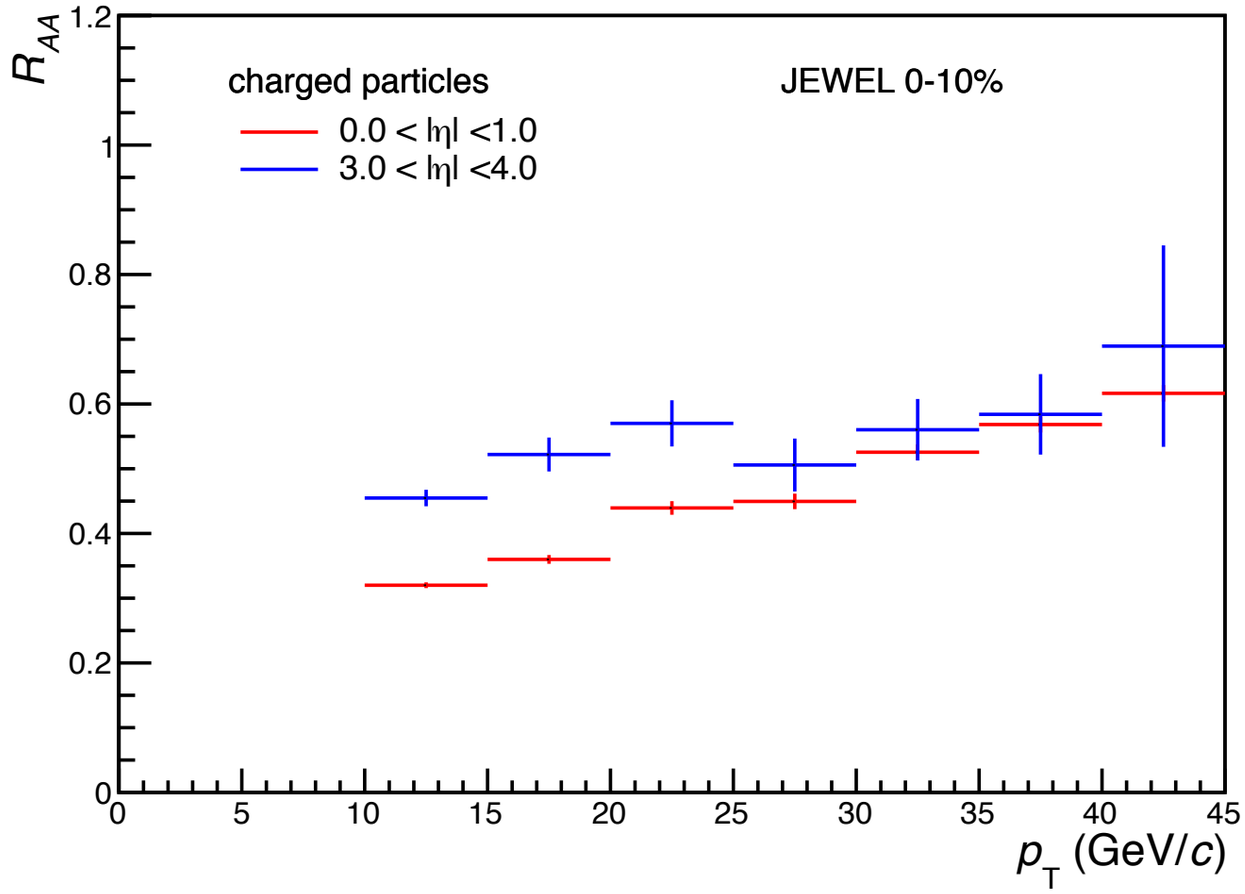


Density at η~4 is about
0.8 times mid-rapidity

Forward R_{AA} calculations

C Park, S Jeon etc al





First look in MUSIC:
strong increase
of R_{AA} at forward rapidity

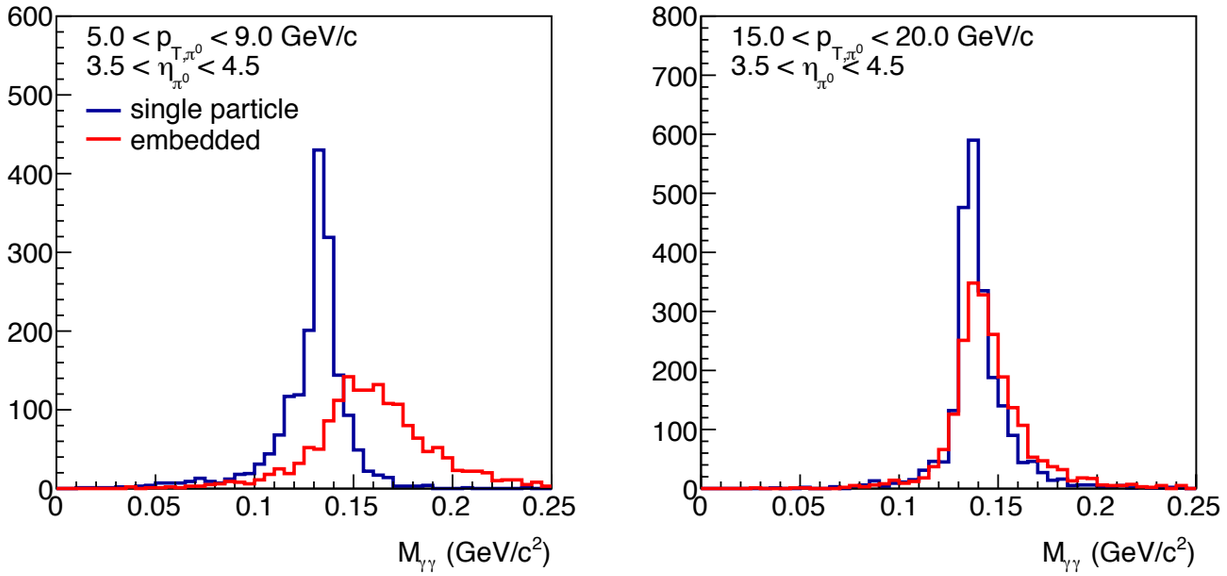
JEWEL: modest decrease of
suppression expected

Summary so far: predictions differ; likely related to different treatment of relative velocities of medium and probes; interesting to pursue…

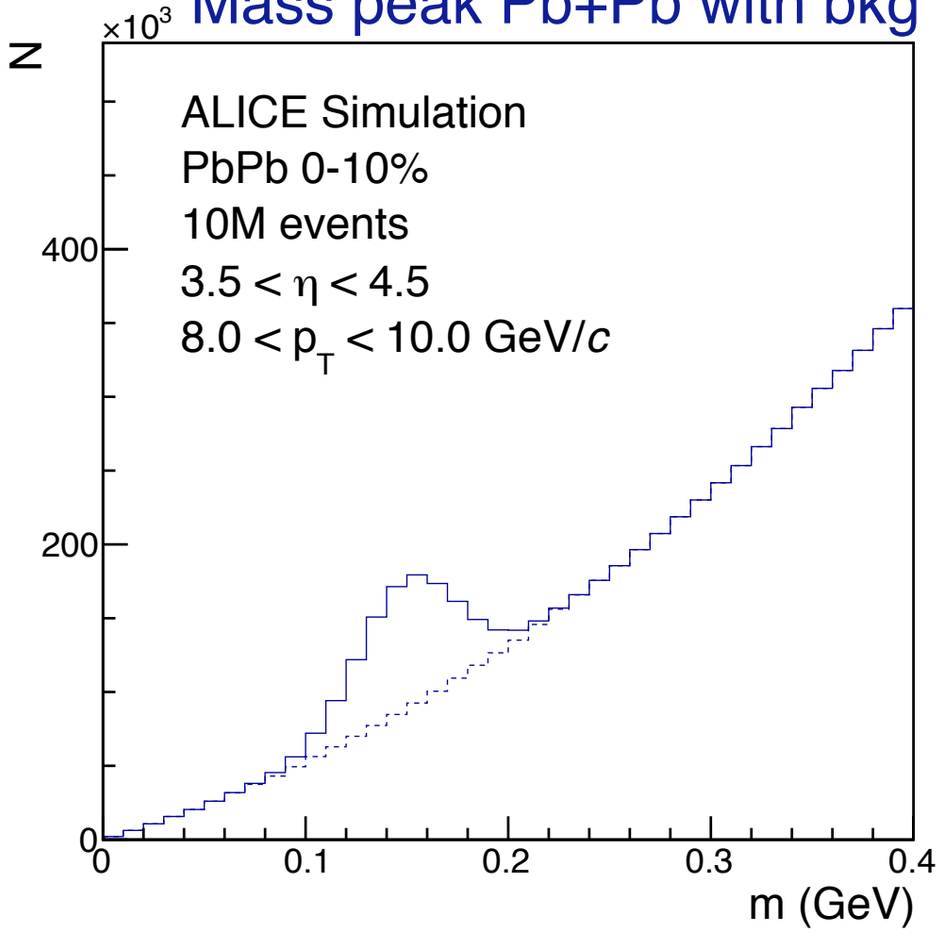
A new constraint on medium density and interactions

Forward physics in Pb+Pb

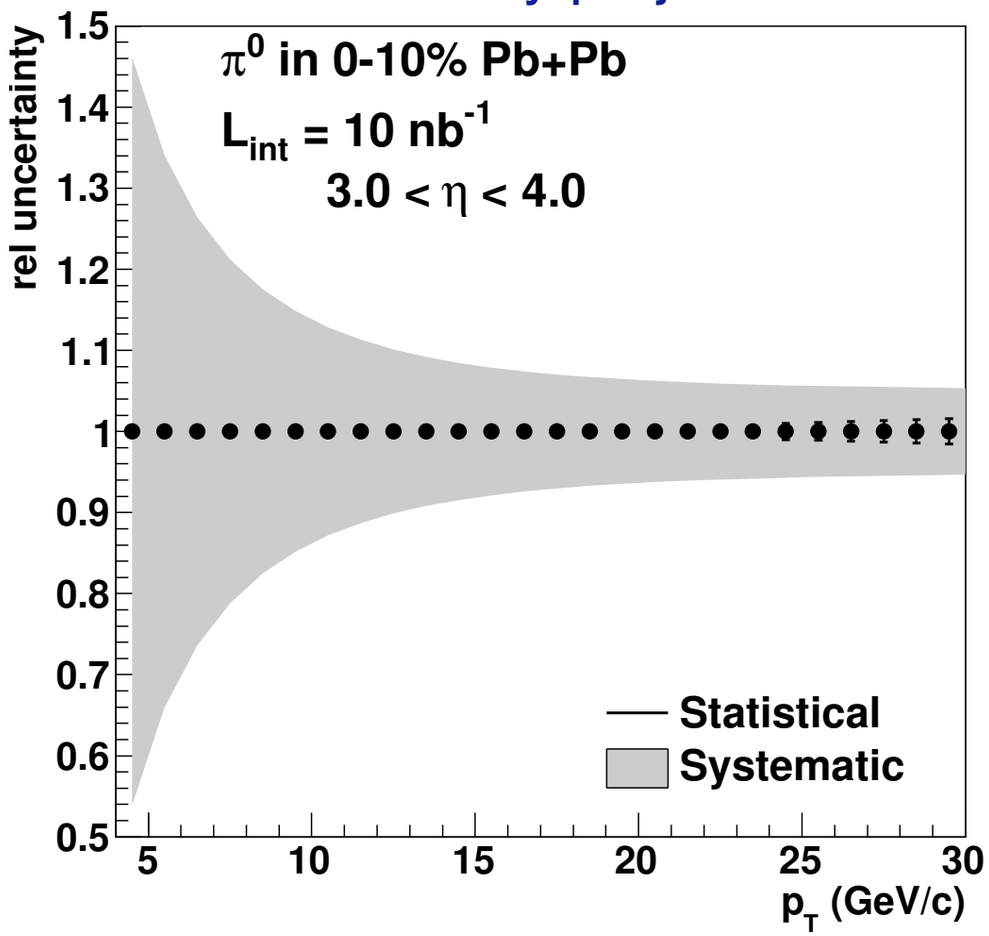
Mass peak Pb+Pb vs pp (signal only)



Mass peak Pb+Pb with bkg



Uncertainty projection



Main uncertainty:

- Combinatorial background
- Bkg effects on p_T scale

Pb-Pb event plane detection

Performance to be studied:

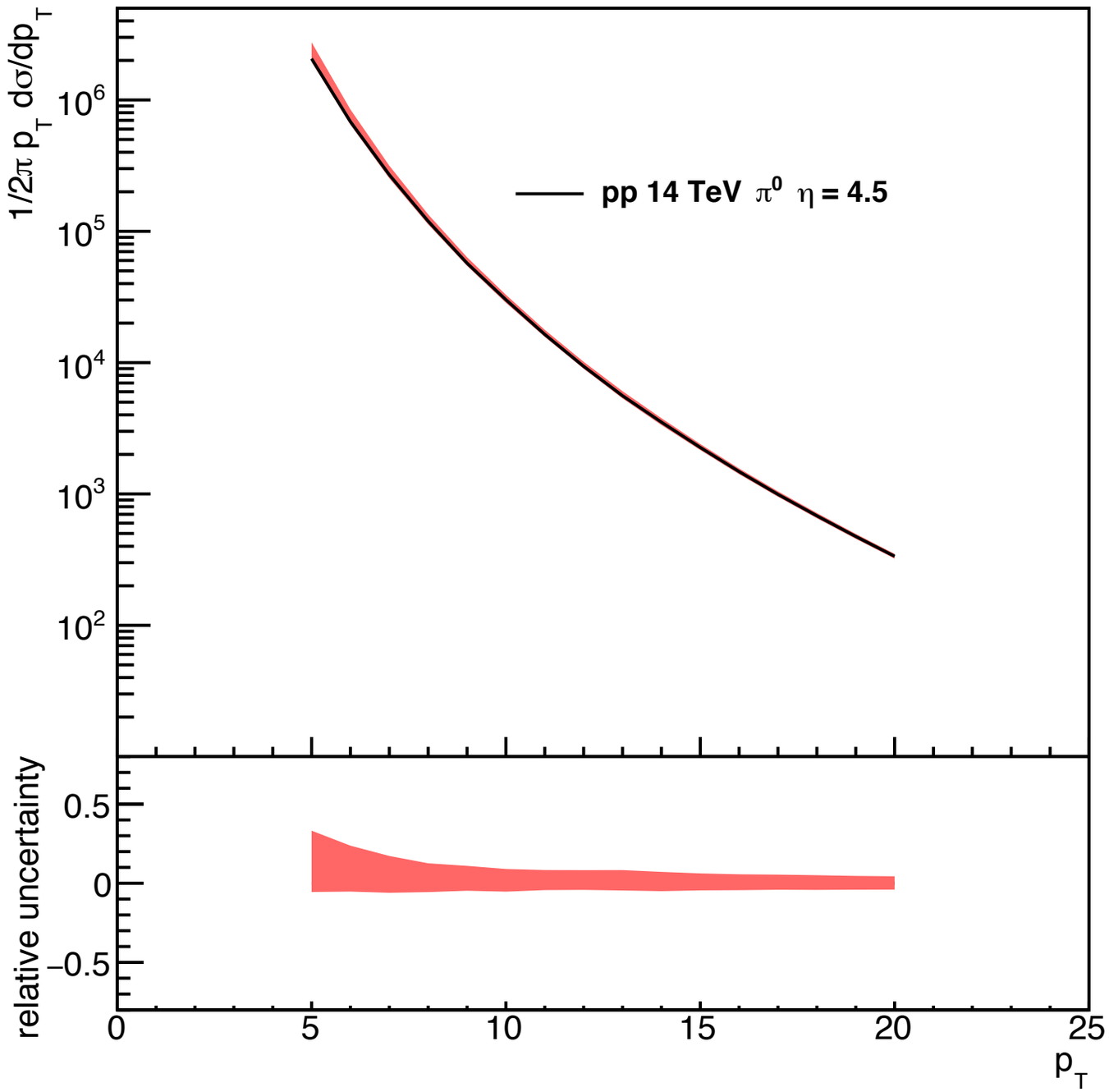
- Calorimetric measurement may be more difficult than tracking/ multiplicity
- Fine segmentation: should be able to do $psi_{3,4}$

Extra slides

π^0 spectra in pp

PDF uncertainties very small for π^0

NB scale uncertainties not drawn; larger than PDF uncertainties



Interesting test of pQCD at fwd rapidity