Particle production at the LHC : Predictions from EPOS

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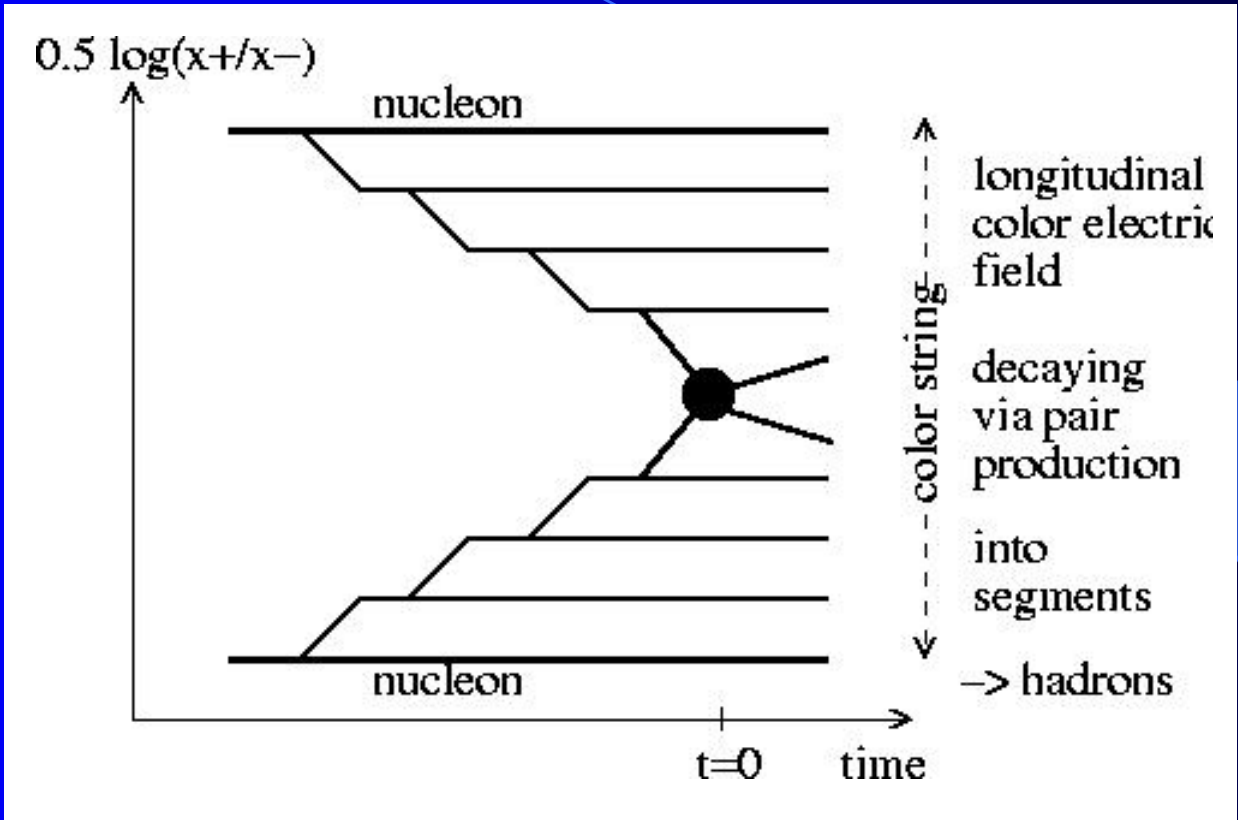
Heavy Ion Collision at LHC
29th May 2007

EPOS MODEL

- Quantum mechanical multiple scattering approach based on partons and strings
- Cross sections and particle production calculation in the same framework with energy conservation
- Careful treatment of projectile and target remnants
- Contains nuclear effects : splitting of parton ladders (screening)
- High density effect : treatment of collective effects of a dense core

→ See K.Werner talk on 7th of June

EPOS MODEL



Parton ladders : soft or hard interaction

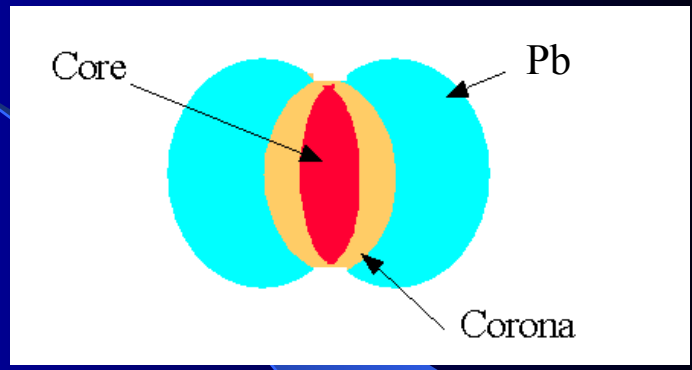
Multiple interaction : exchange of parton ladders in parallel with care of energy conservation

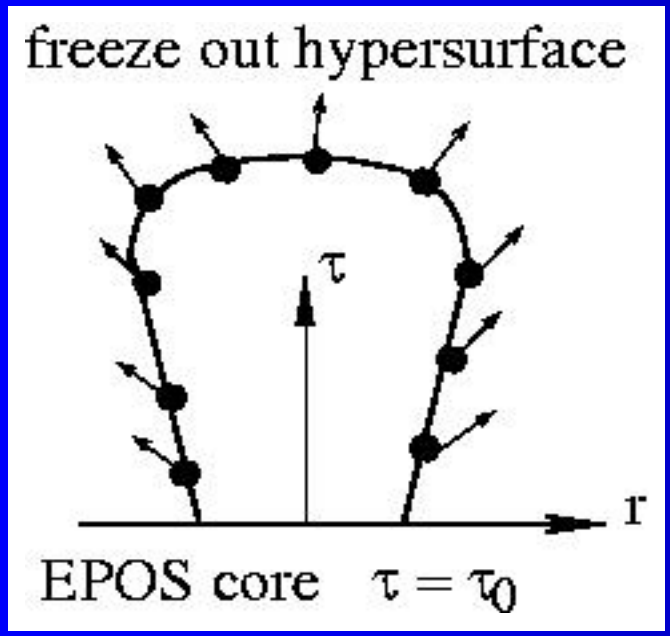
Collective Effects of the Dense Core

Modification of the string procedure

Corona = low density part, usual EPOS particle production

Core = dense area, hydro-like expansion





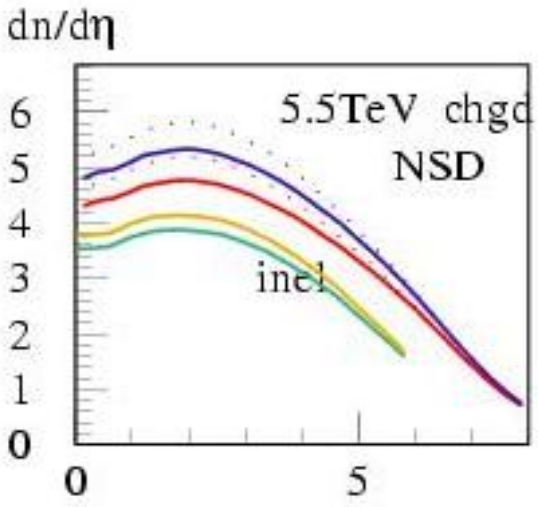
Define a freeze out hypersurface : transition from strongly interacting matter to freely streaming hadrons.

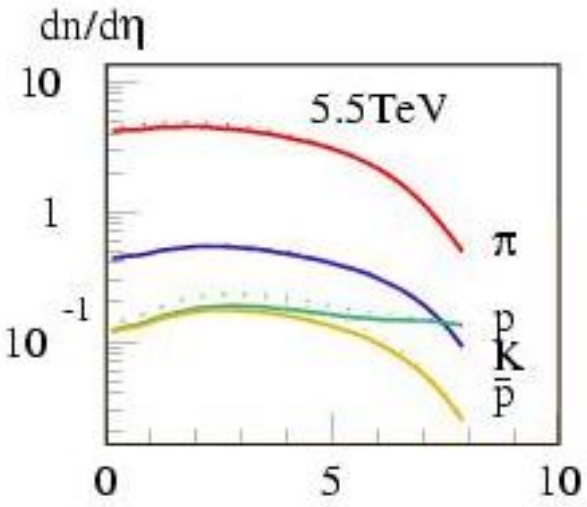
Actually parameterized in EPOS

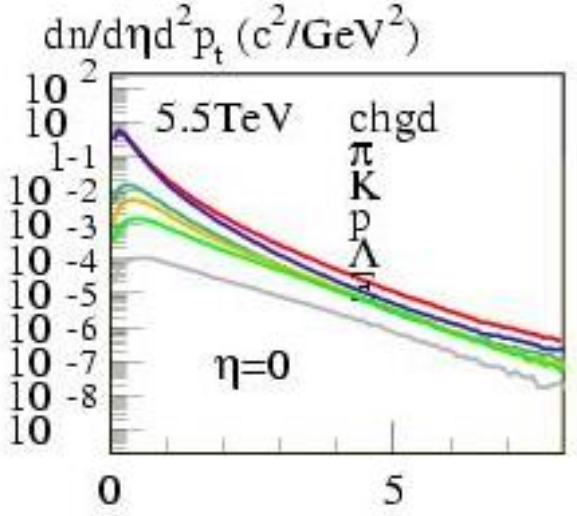
Important also in pp scattering

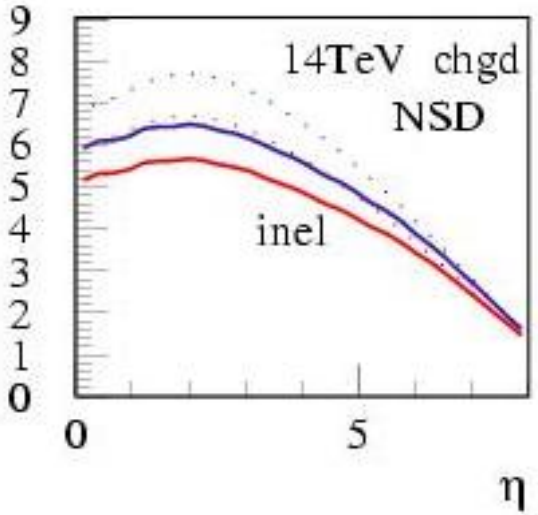
Proton-Proton : pseudorapidity distributions and Pt spectra

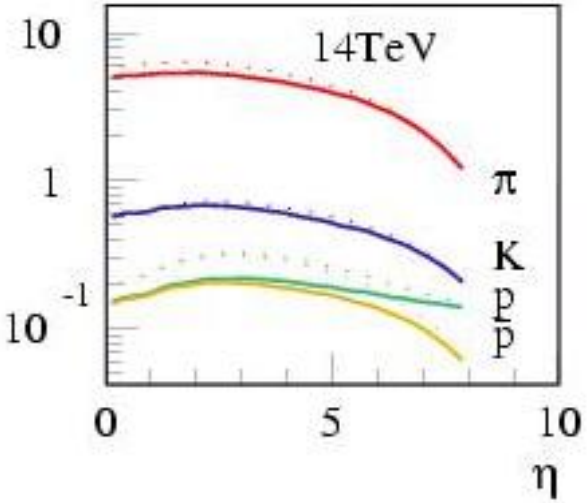
Full line : mini plasma option Dotted : conventional

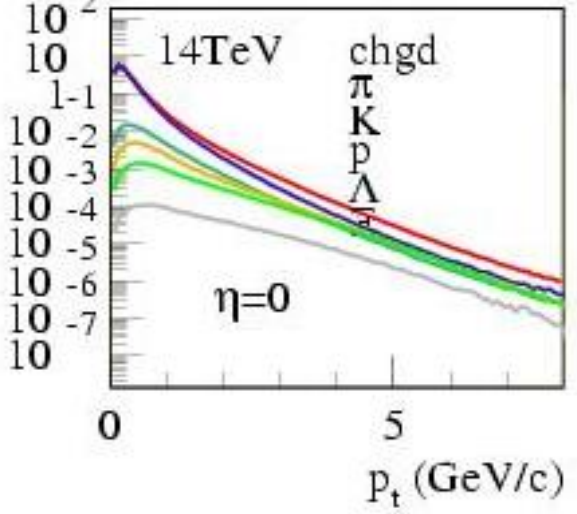




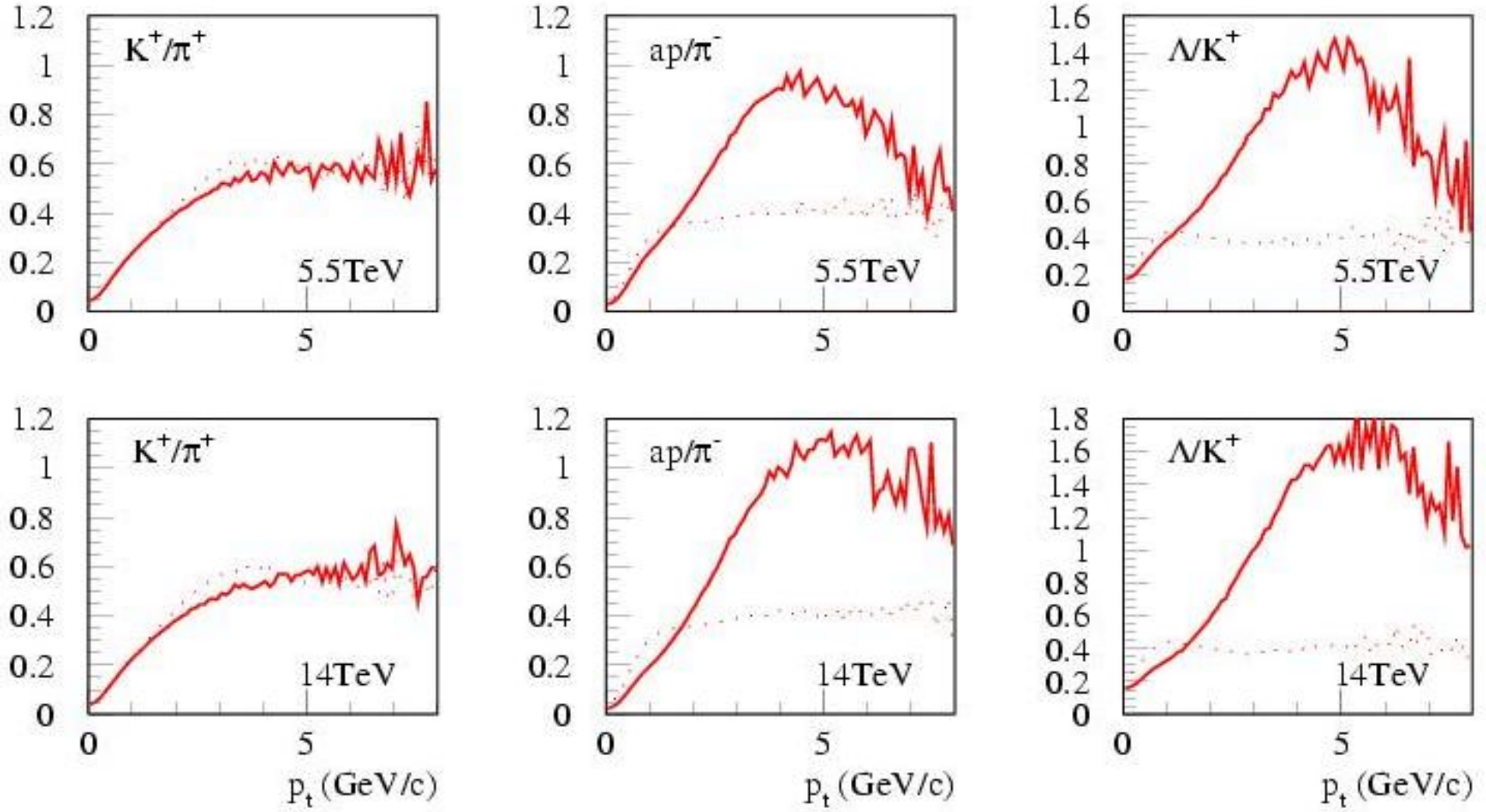




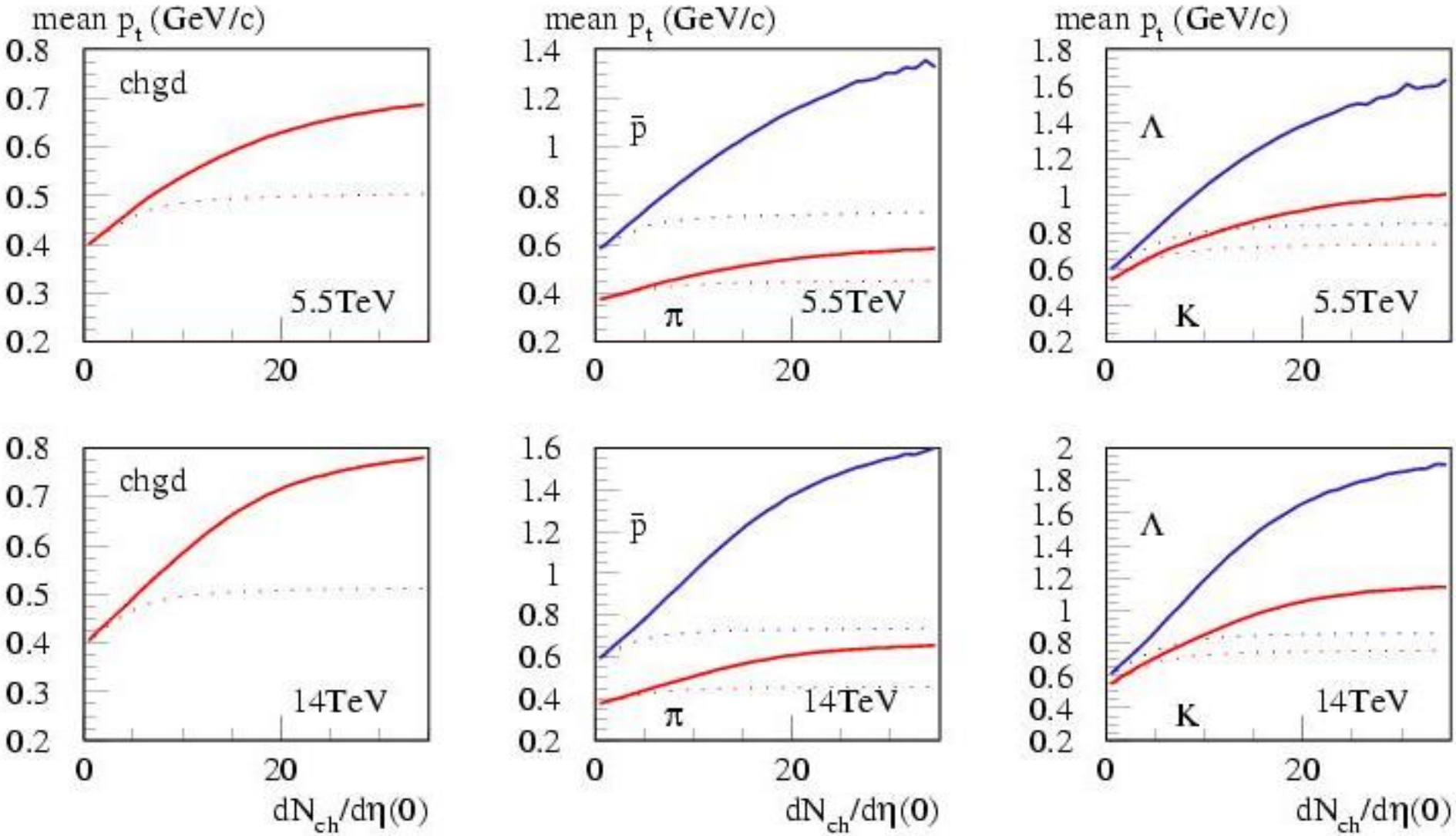




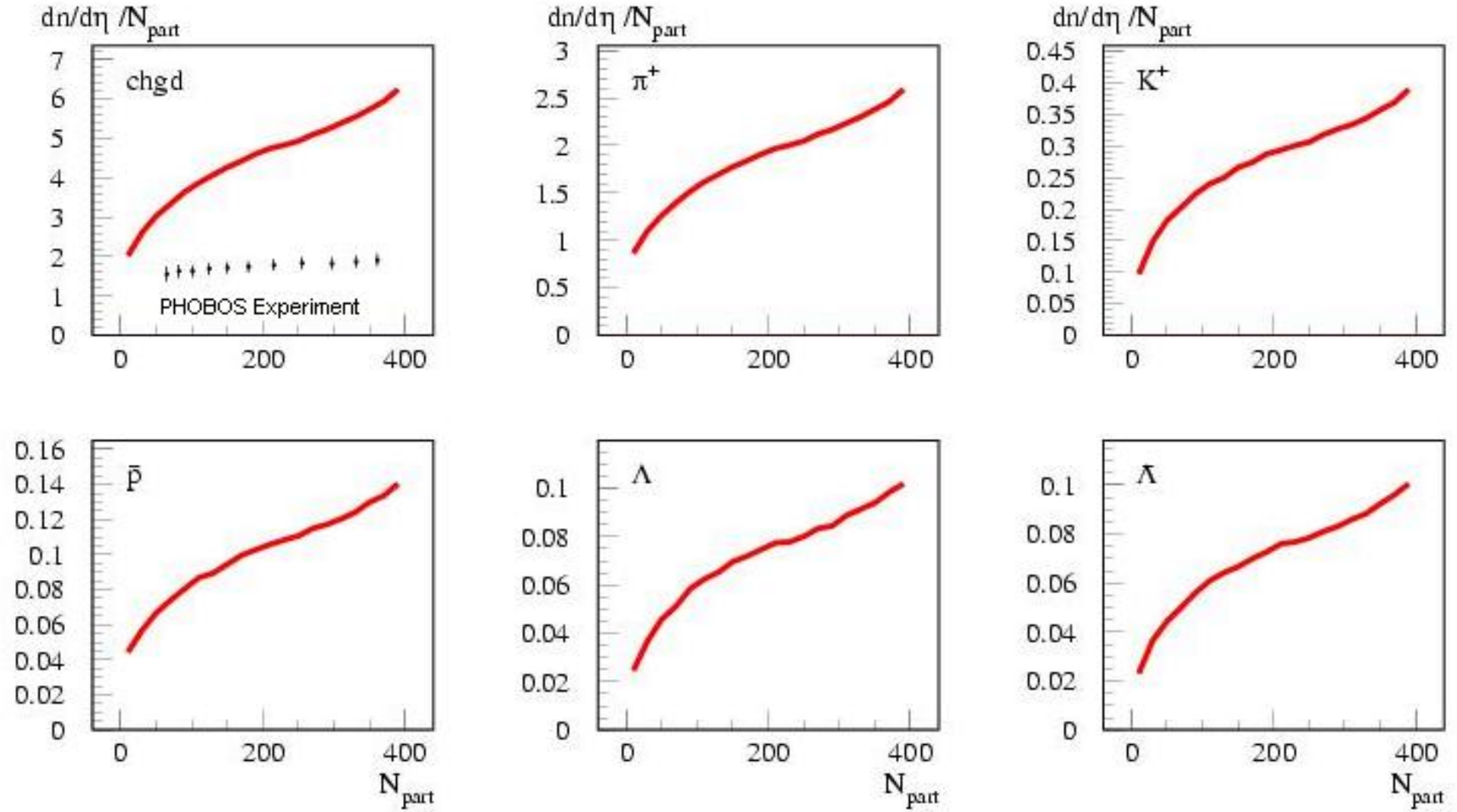
Proton-Proton : Pt dependance of particle ratios at η = 0



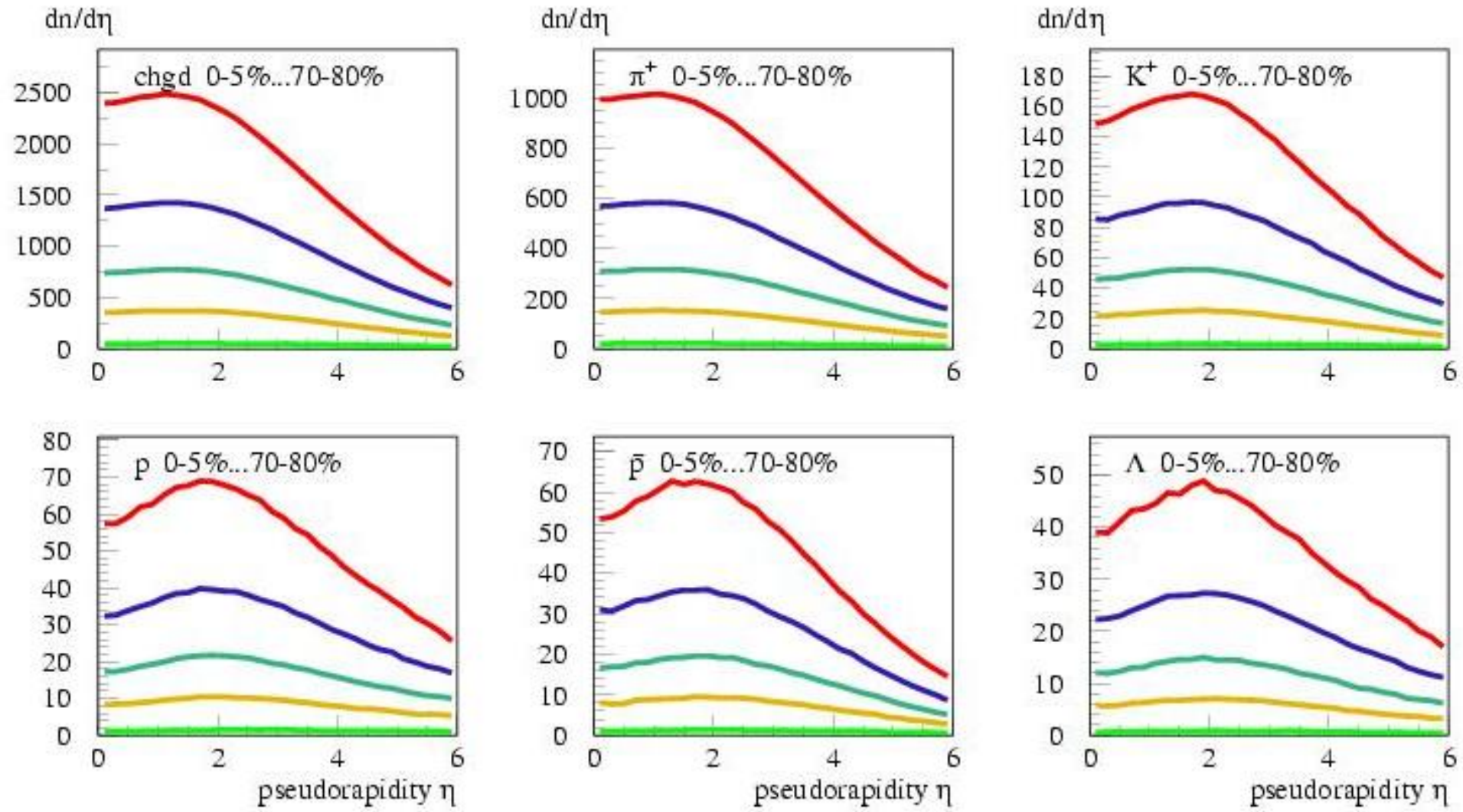
Proton-Proton : average Pt at η = 0



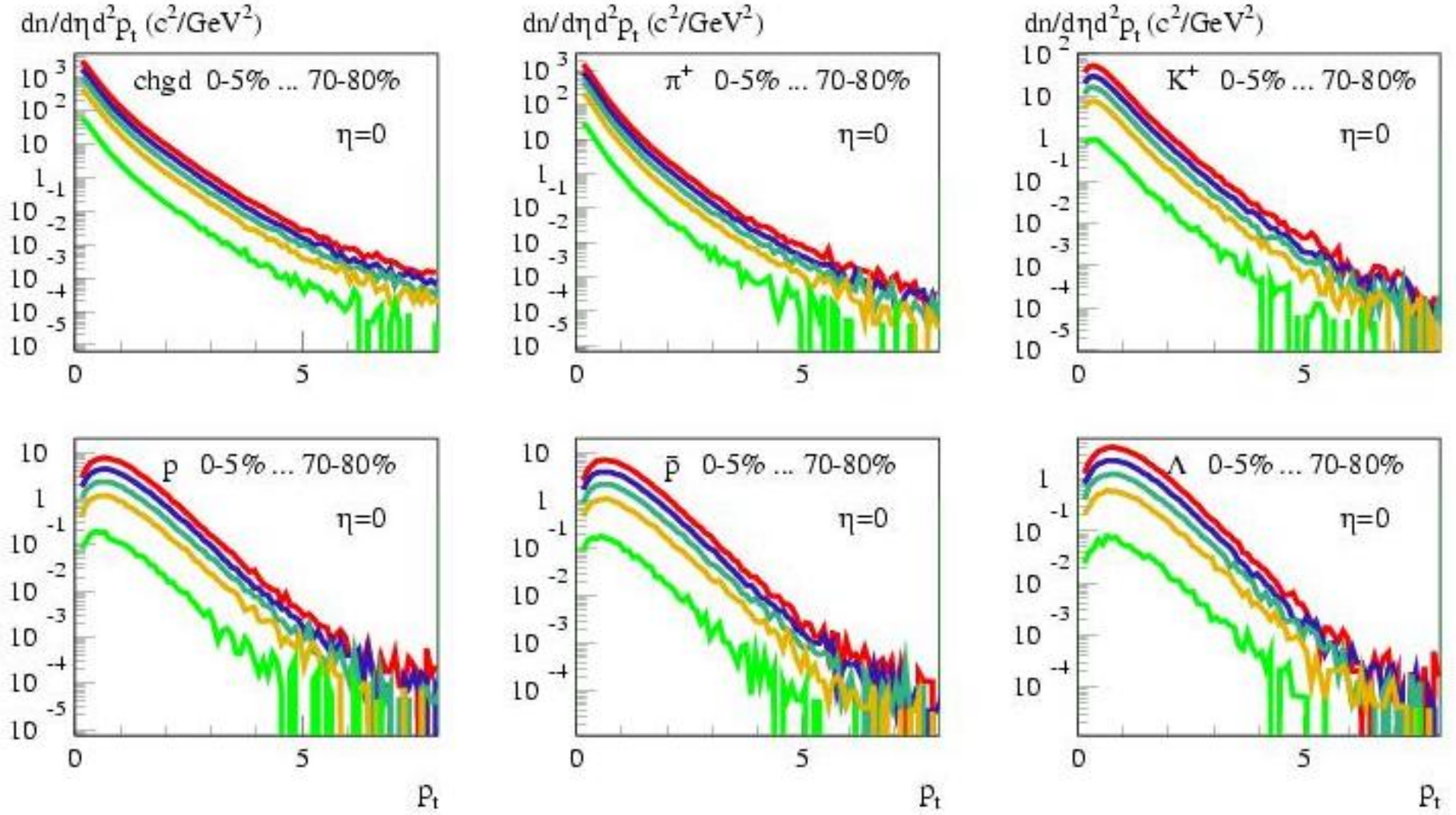
Lead-Lead at 5.5 TeV : centrality dependance of particle yields



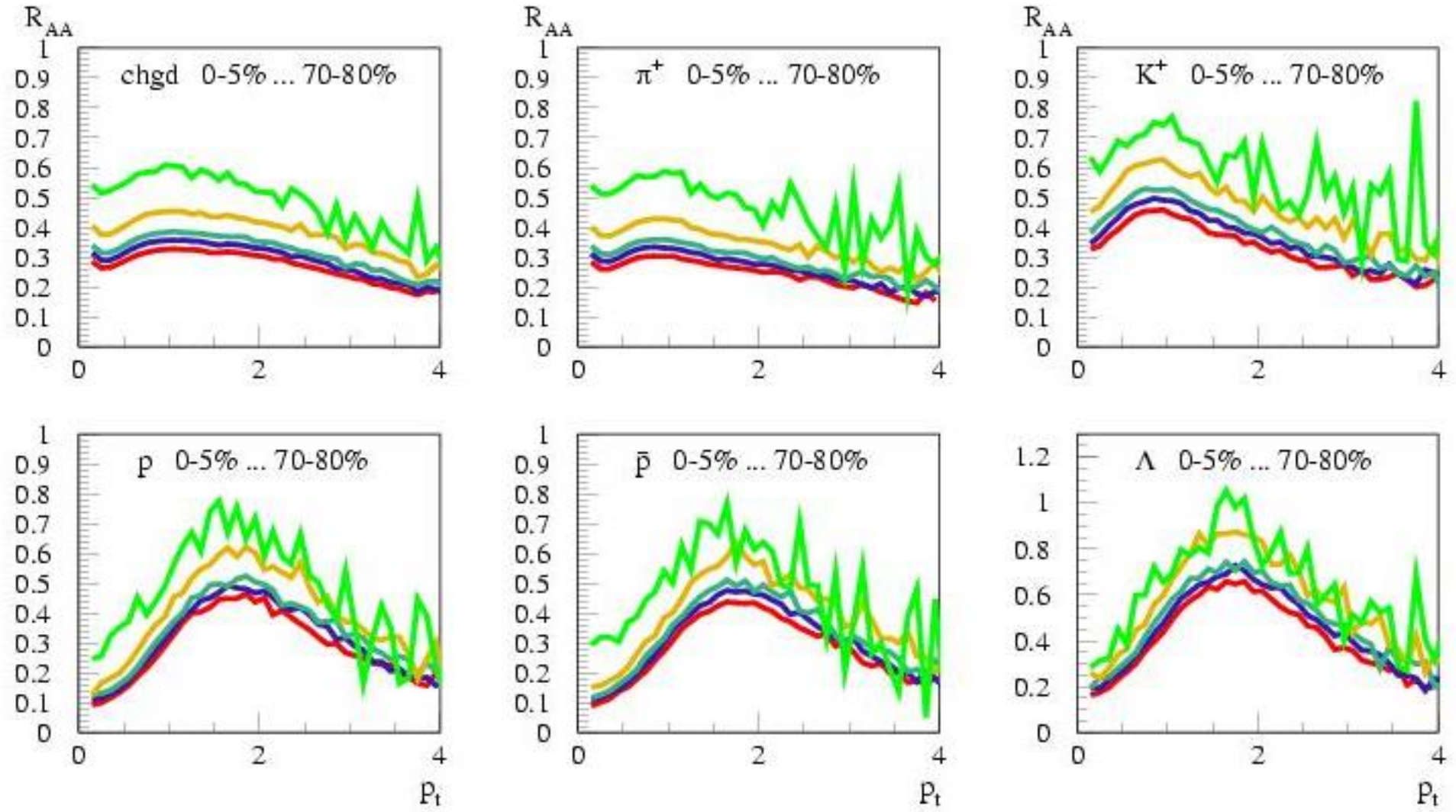
Lead-Lead at 5.5 TeV : pseudorapidity distributions at different centralities



Lead-Lead at 5.5 TeV : Pt distributions at η = 0



Lead-Lead collisions at 5.5 TeV : Raa at η = 0



Conclusion

Proton-Proton

" mini-plasma option " influence results, particularly for particle ratios such as Λ/K^+
Multiplicity dependence of Pt

Some collective effect already in pp

Lead-Lead

Raa : curves well below one : strong screening effect,
BUT : one have to keep in mind the non-triviality of pp

Lead-Lead at 5.5 TeV : V2 at 5.5TeV for minimum bias collisions