

STATUS AND PLANS OF NA49 P+P AND P+A PROGRAMME

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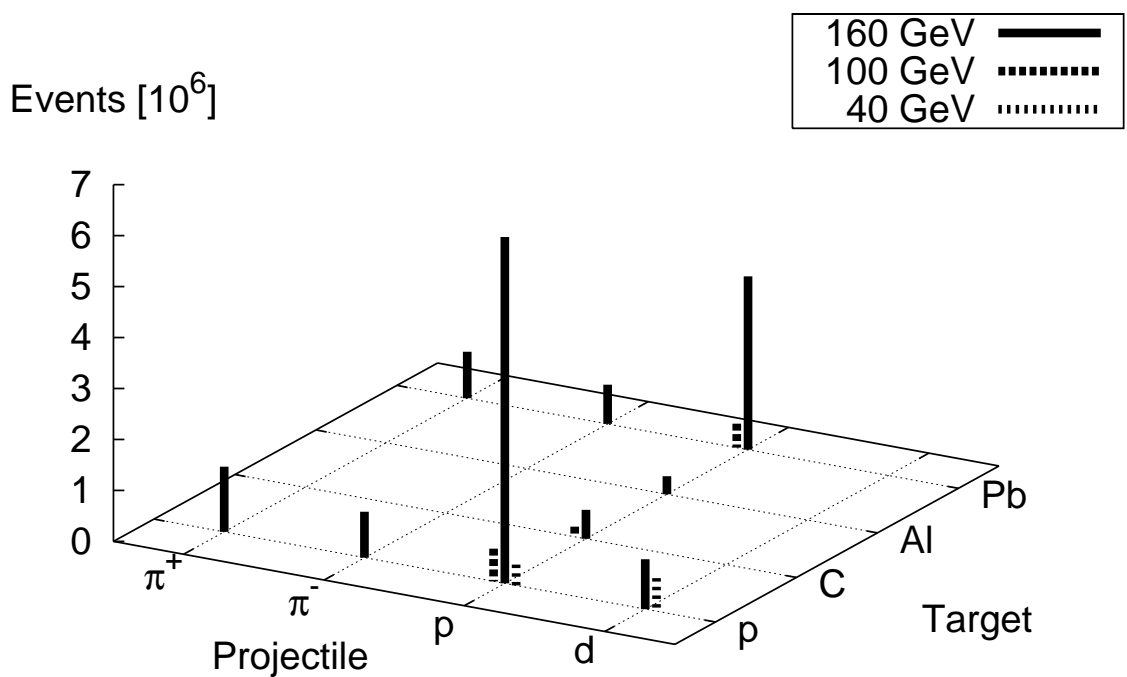
* Marie Curie Fellow

I. Link between

- Elementary $p + p$
 $n + p$
 $\pi + p$
- hadron+nucleus $p + A$
 $\pi + A$
- nucleus+nucleus collisions. $A + A$

II. Precision studies of particle distributions

Event samples collected, 1996 - 2002

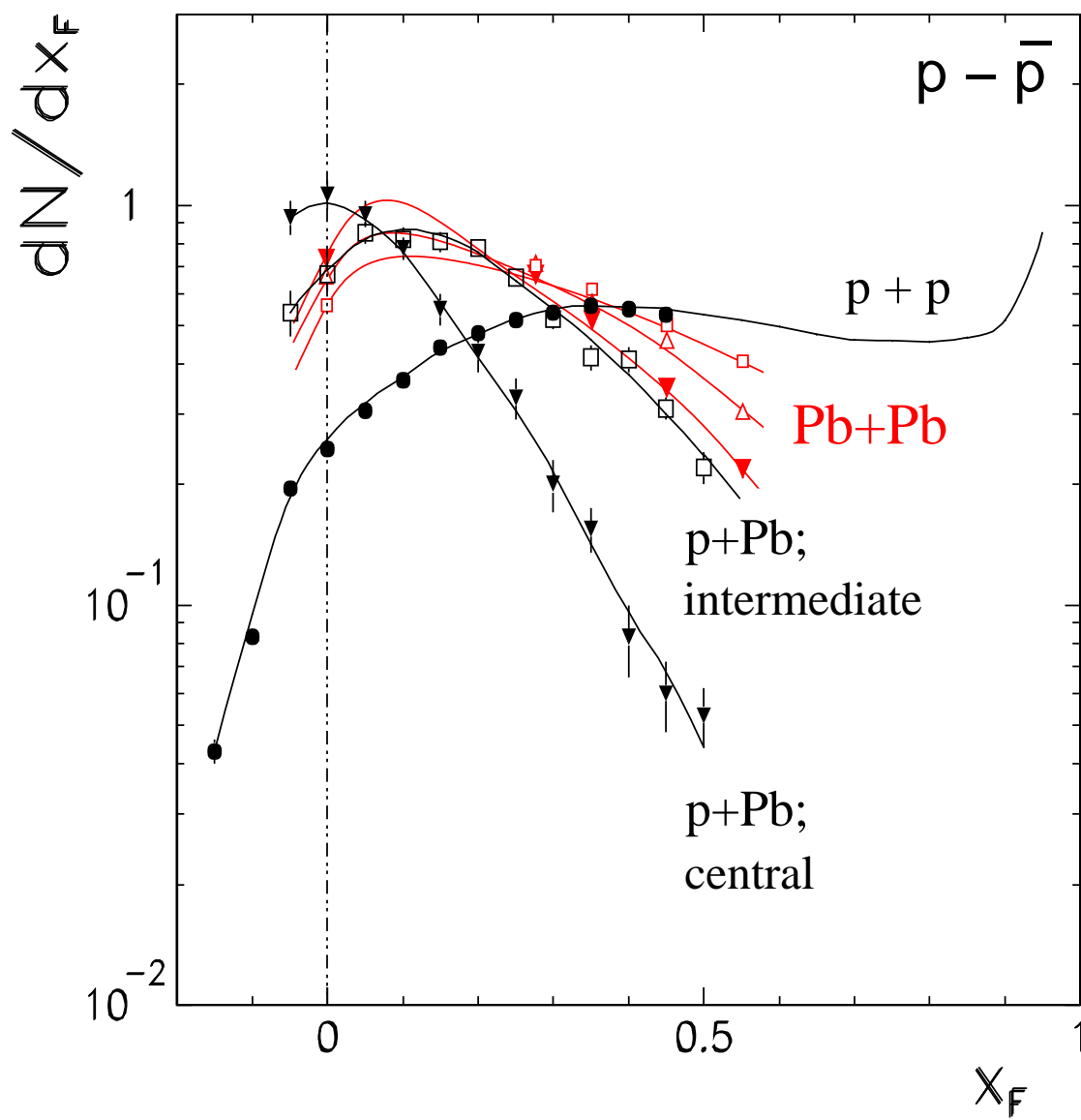


Part I.

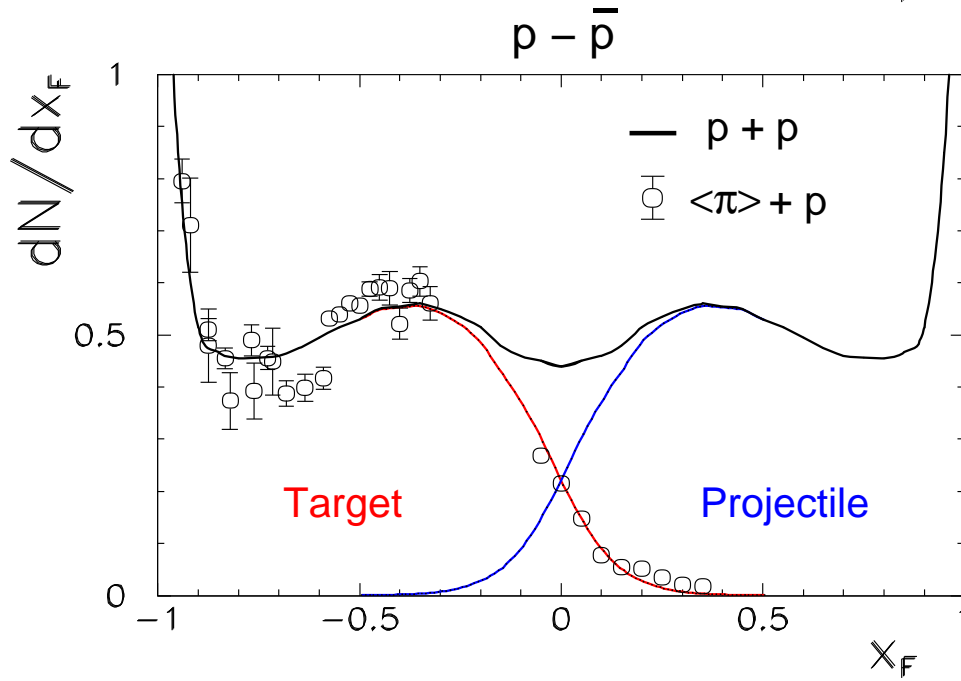
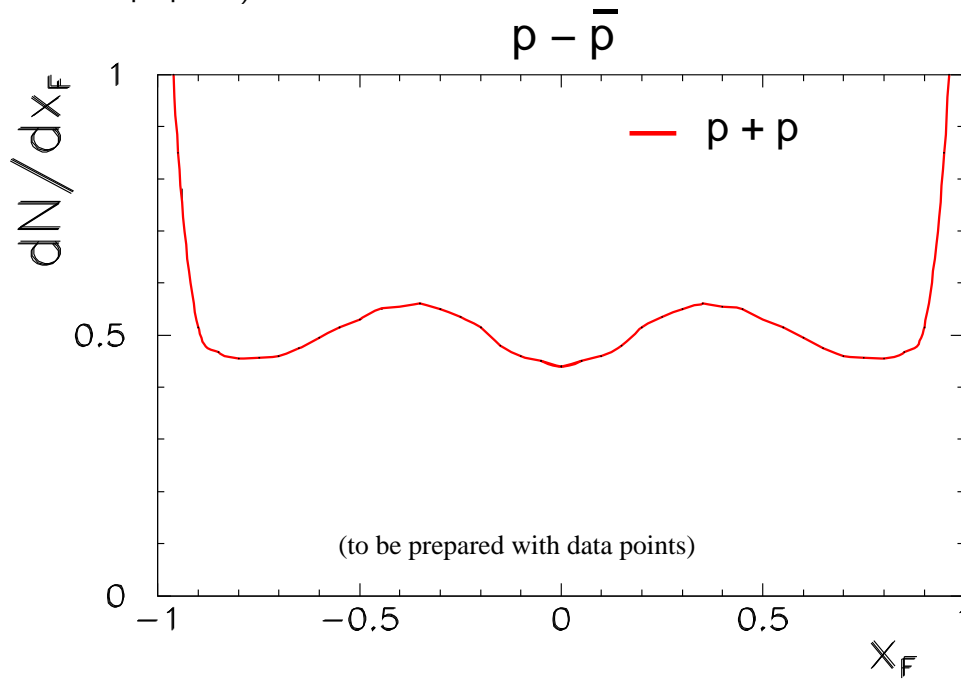
Link from elementary to nuclear interactions

- net baryon number transfer
- transverse activity
- strangeness production

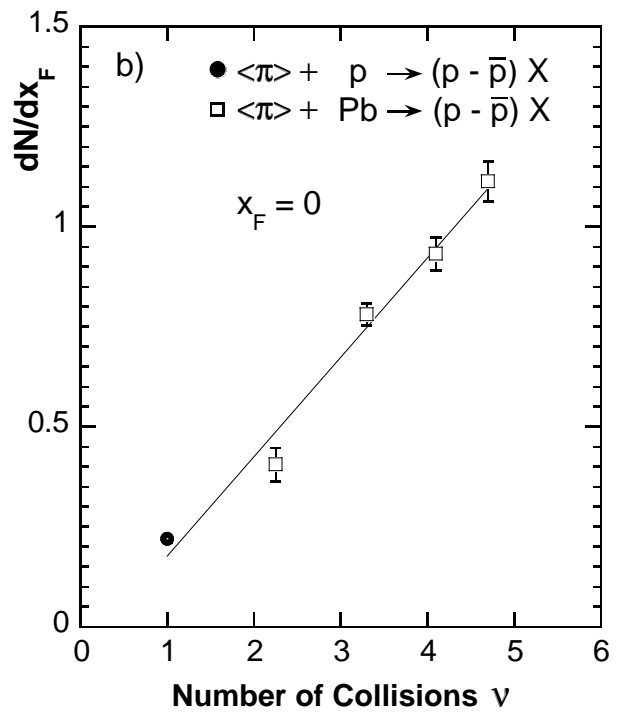
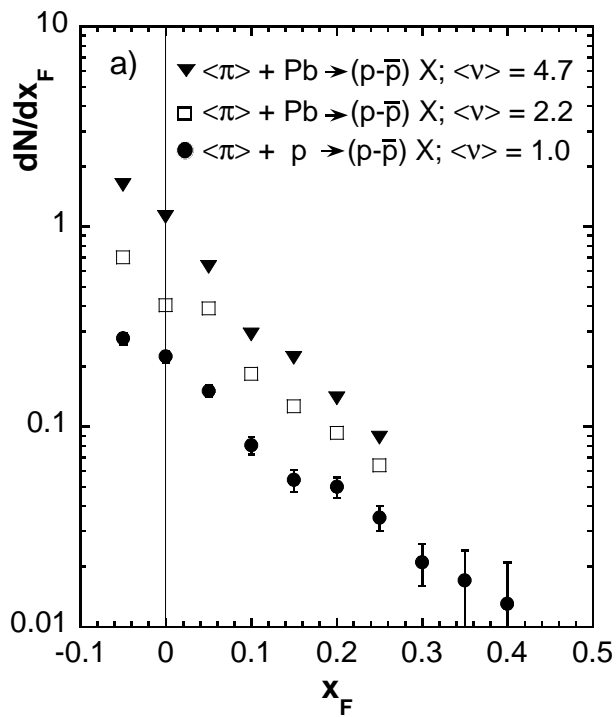
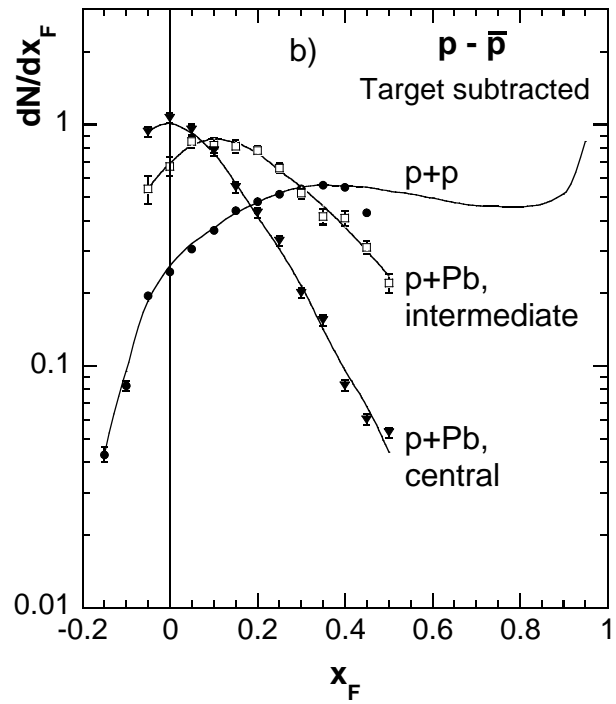
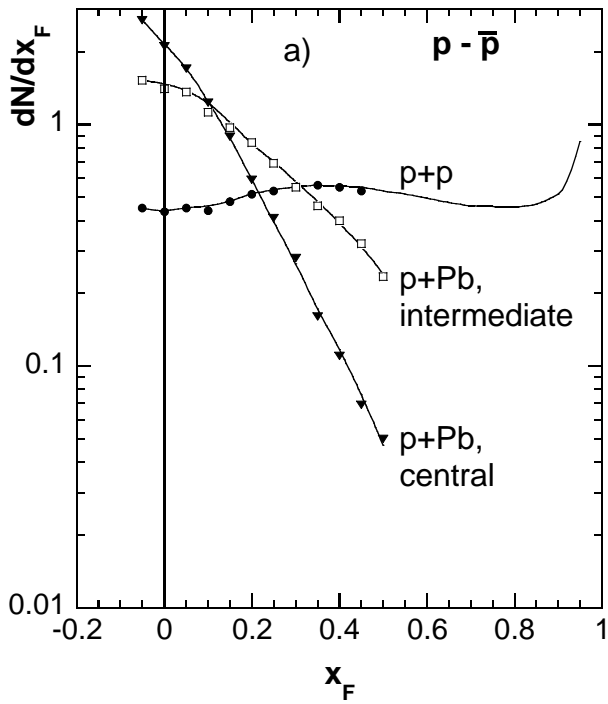
Net baryon distribution Projectile component

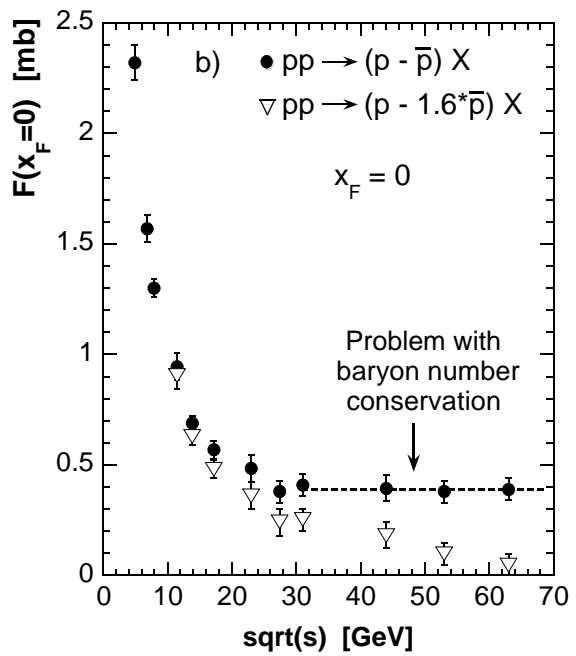
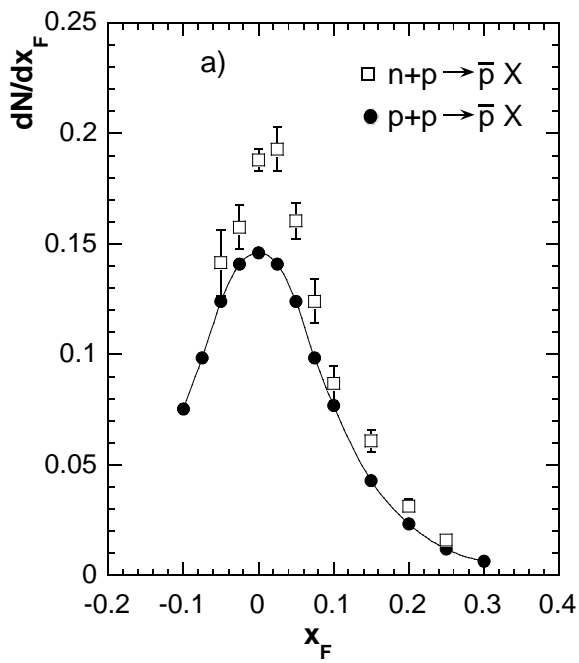
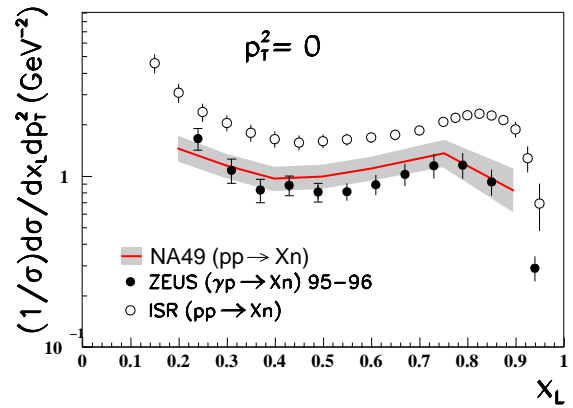
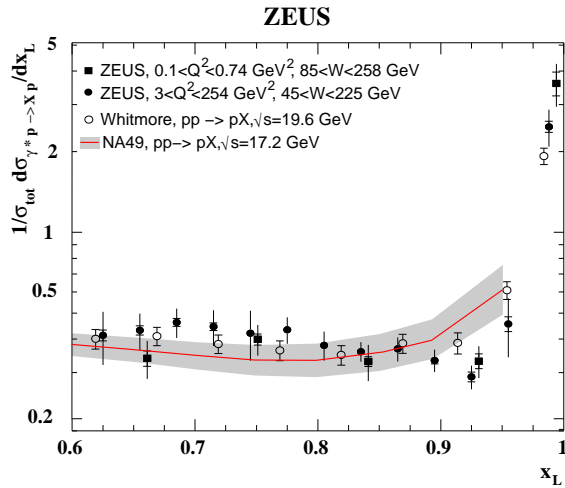


(final plots to be prepared)



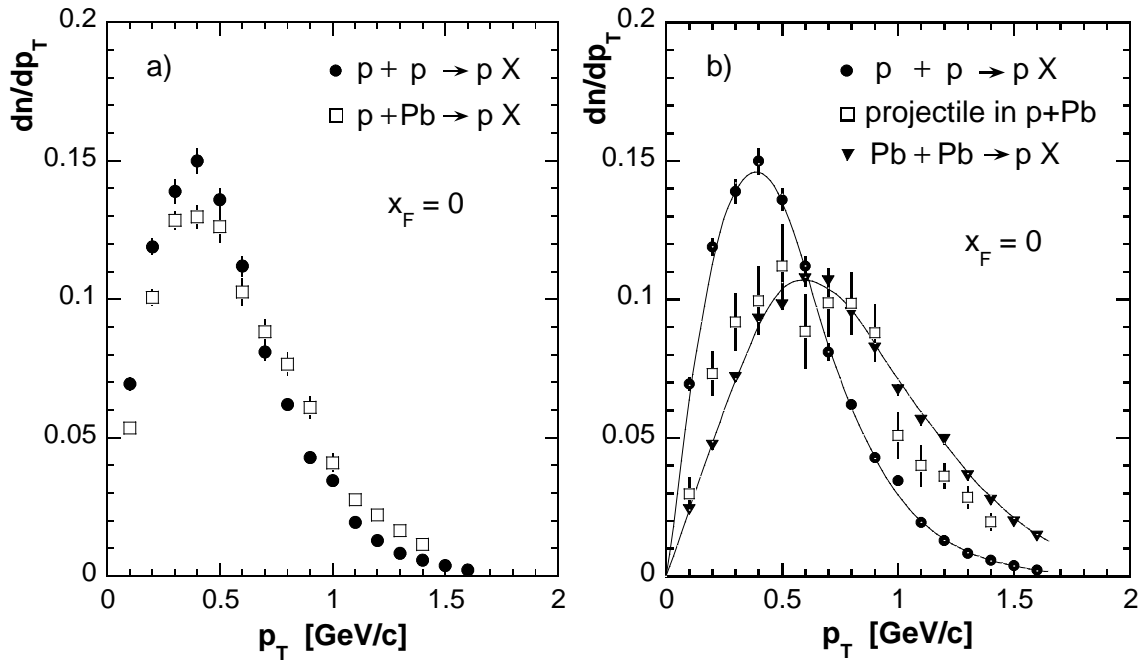
(Figure with projectile distribution only)



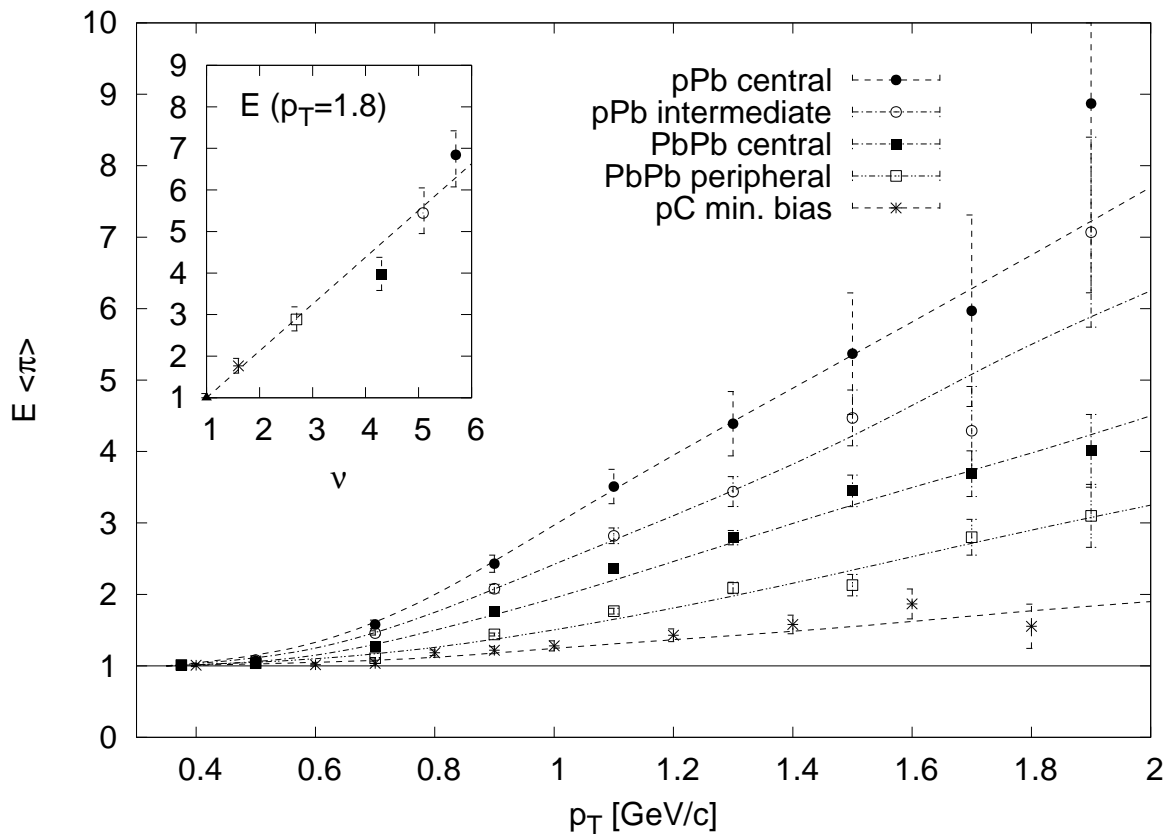


Transverse momentum distributions

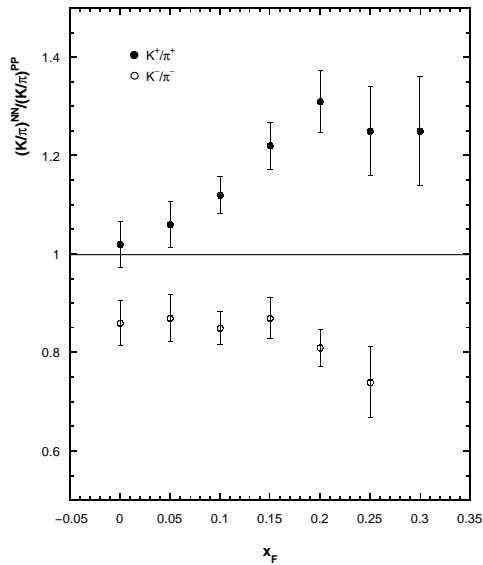
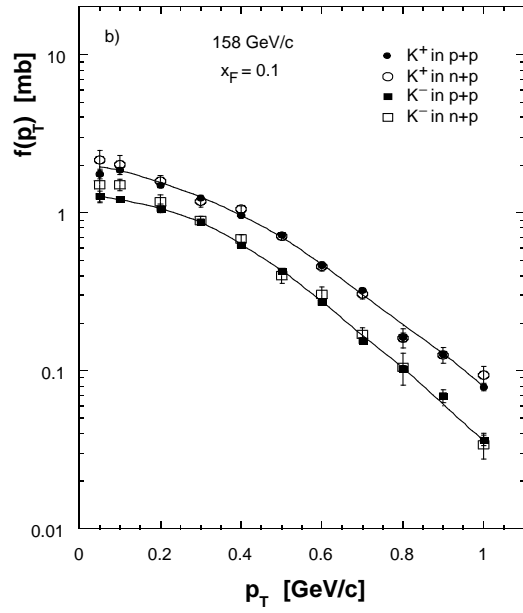
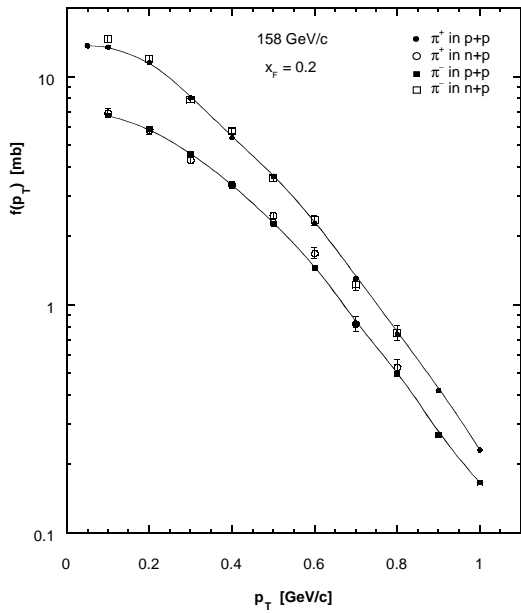
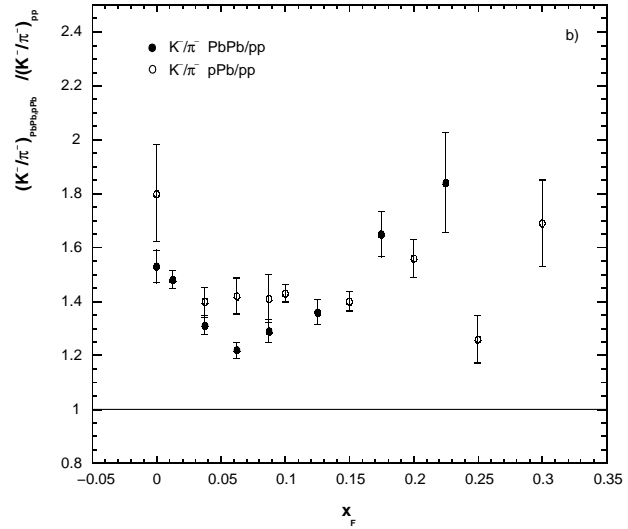
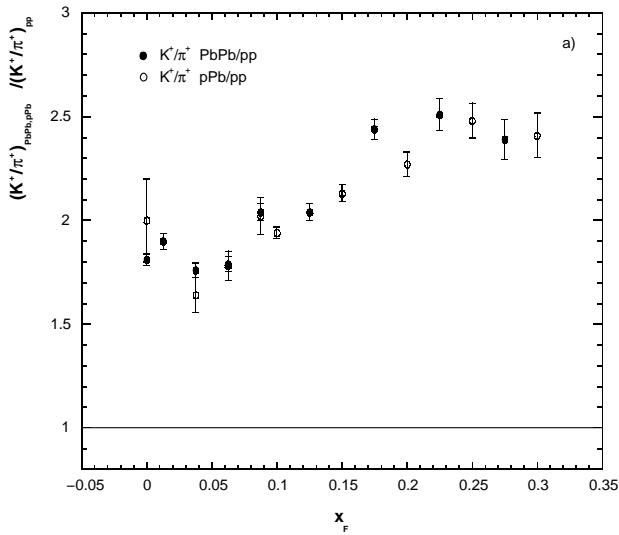
a) protons



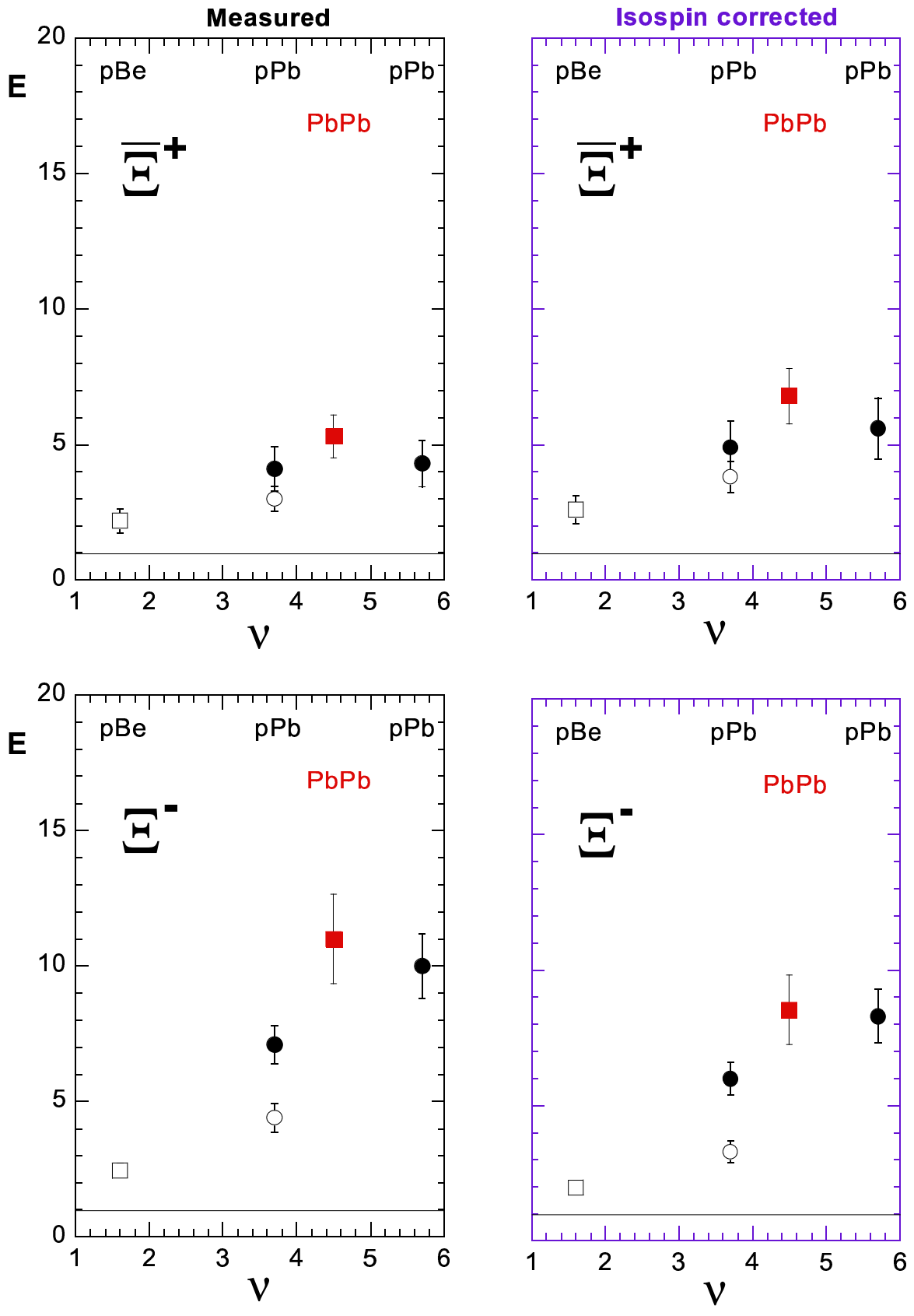
b) pion enhancement



Strangeness enhancement for K^+/π^+ , K^-/π^-



Strangeness enhancement for Ξ^- and Ξ^+



Conclusion Part I.

- no special place for $A+A$ collisions
- smooth transition from elementary to nuclear interactions

→ no “new” physics

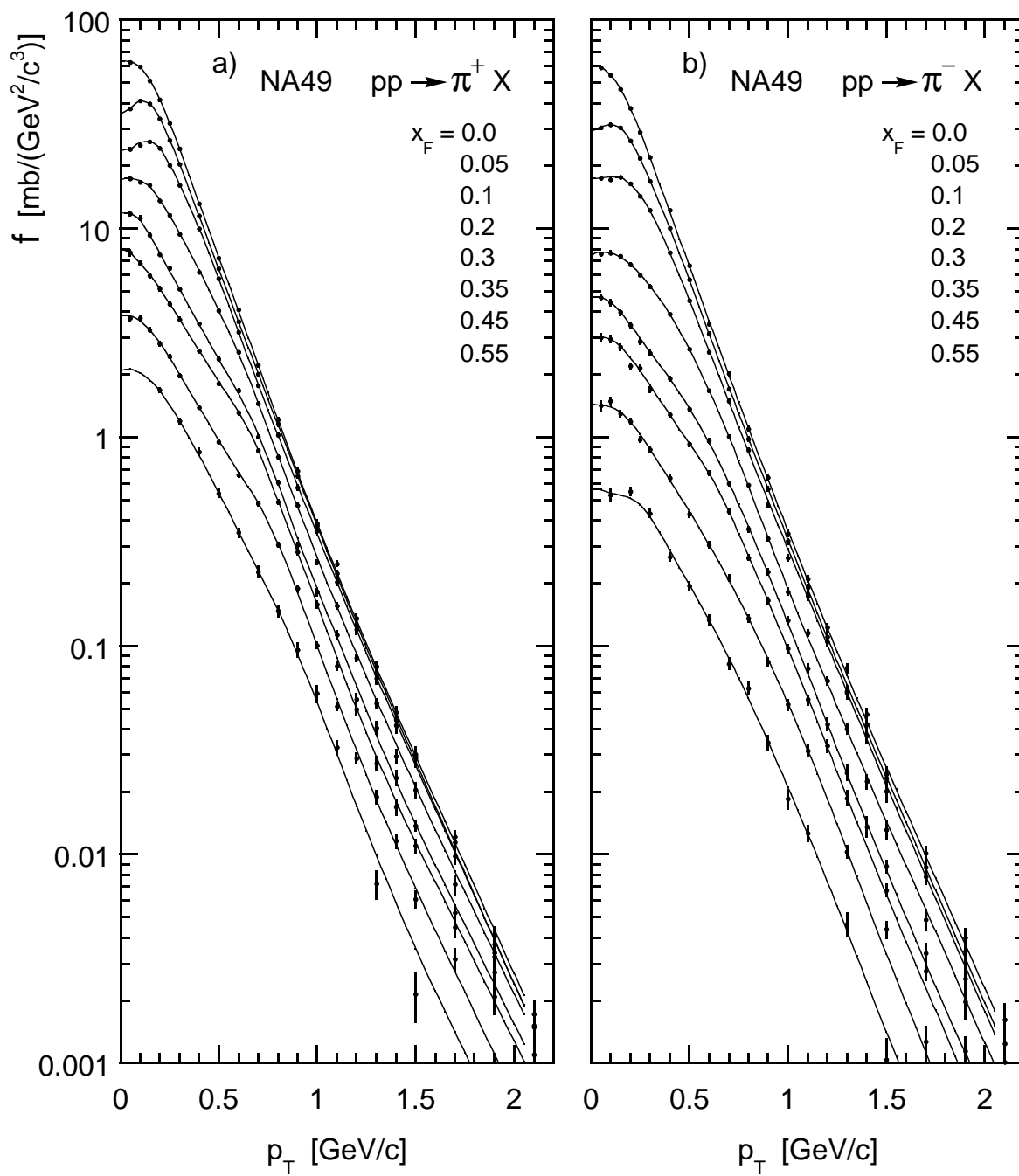
Open questions:

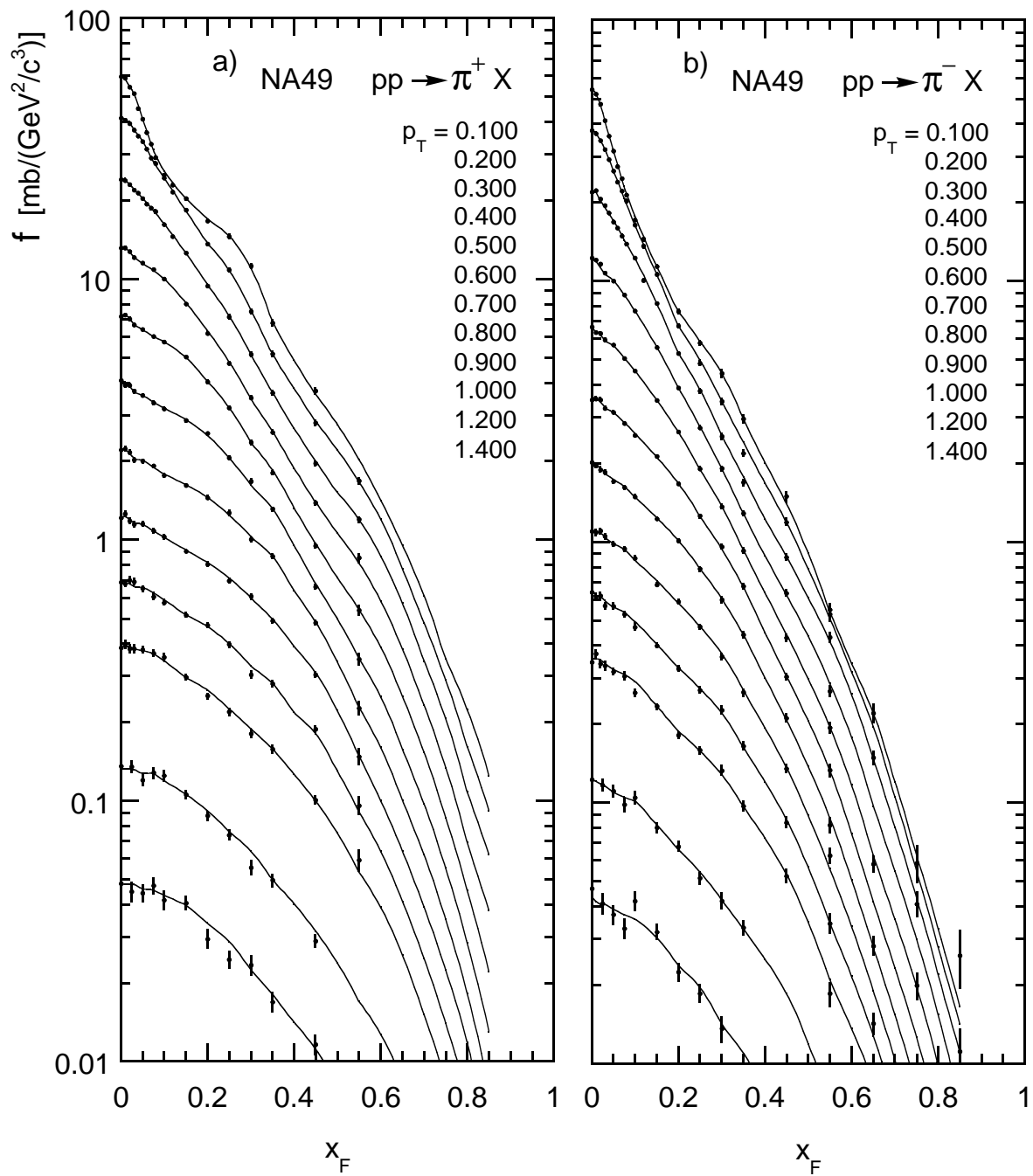
- what is behind baryon number transfer?
- what is behind transverse activity?
- what is behind strangeness increase?

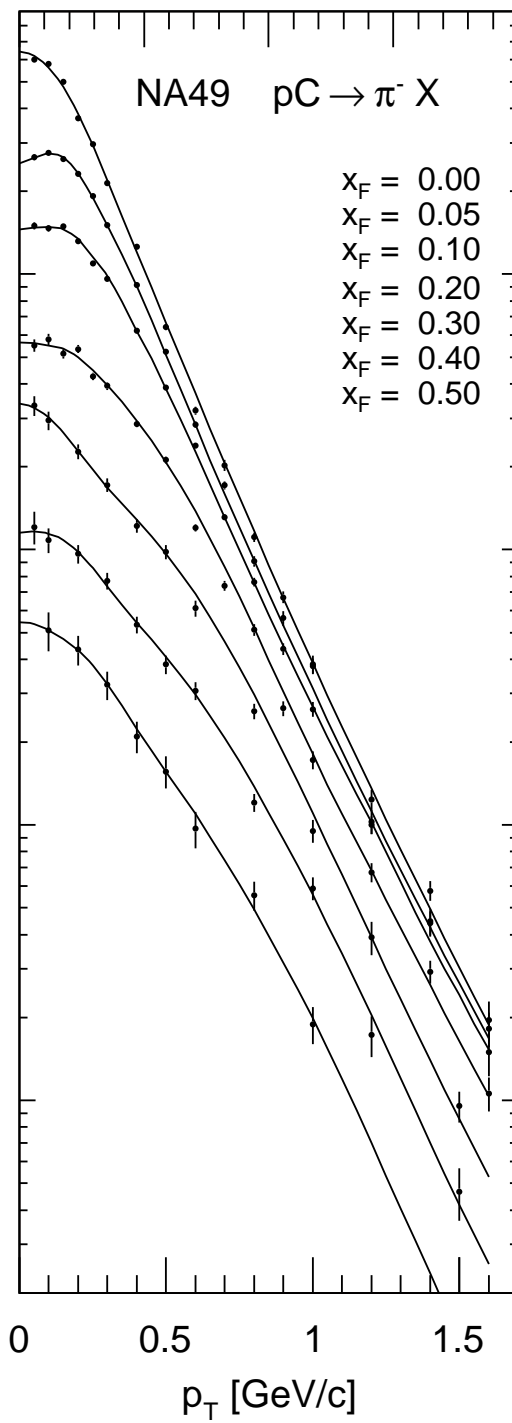
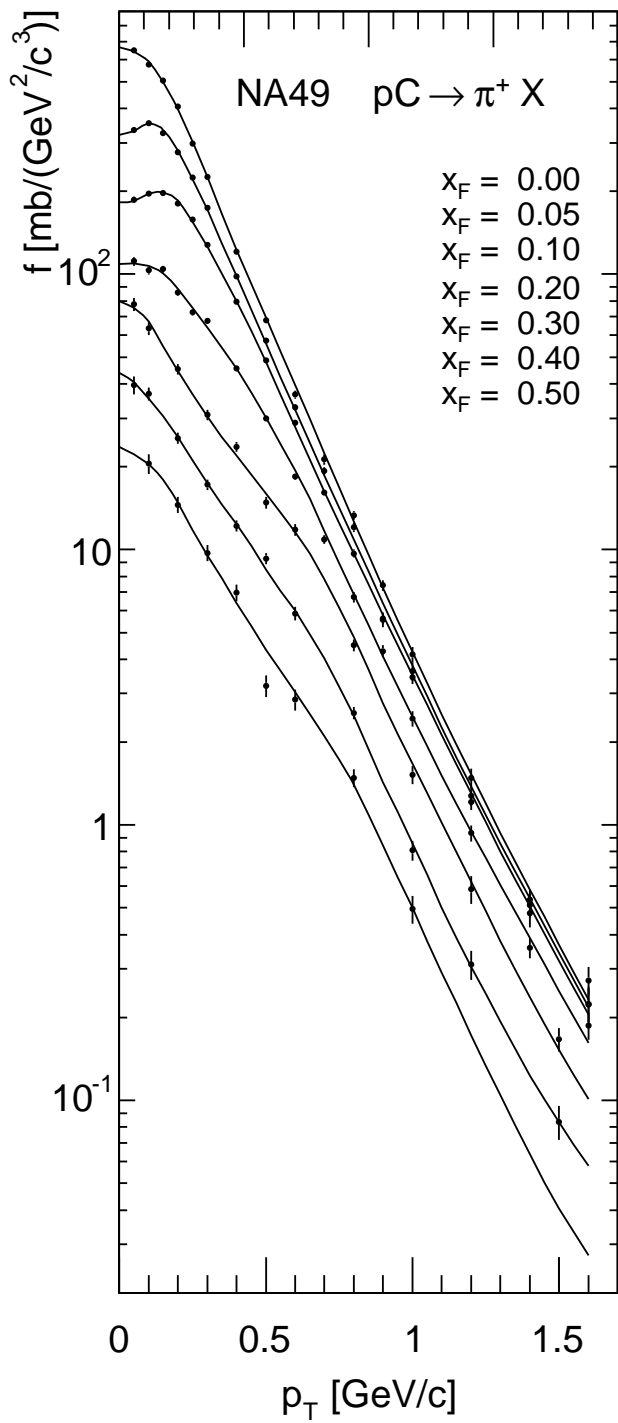
Part II.

Precision studies of particle distributions

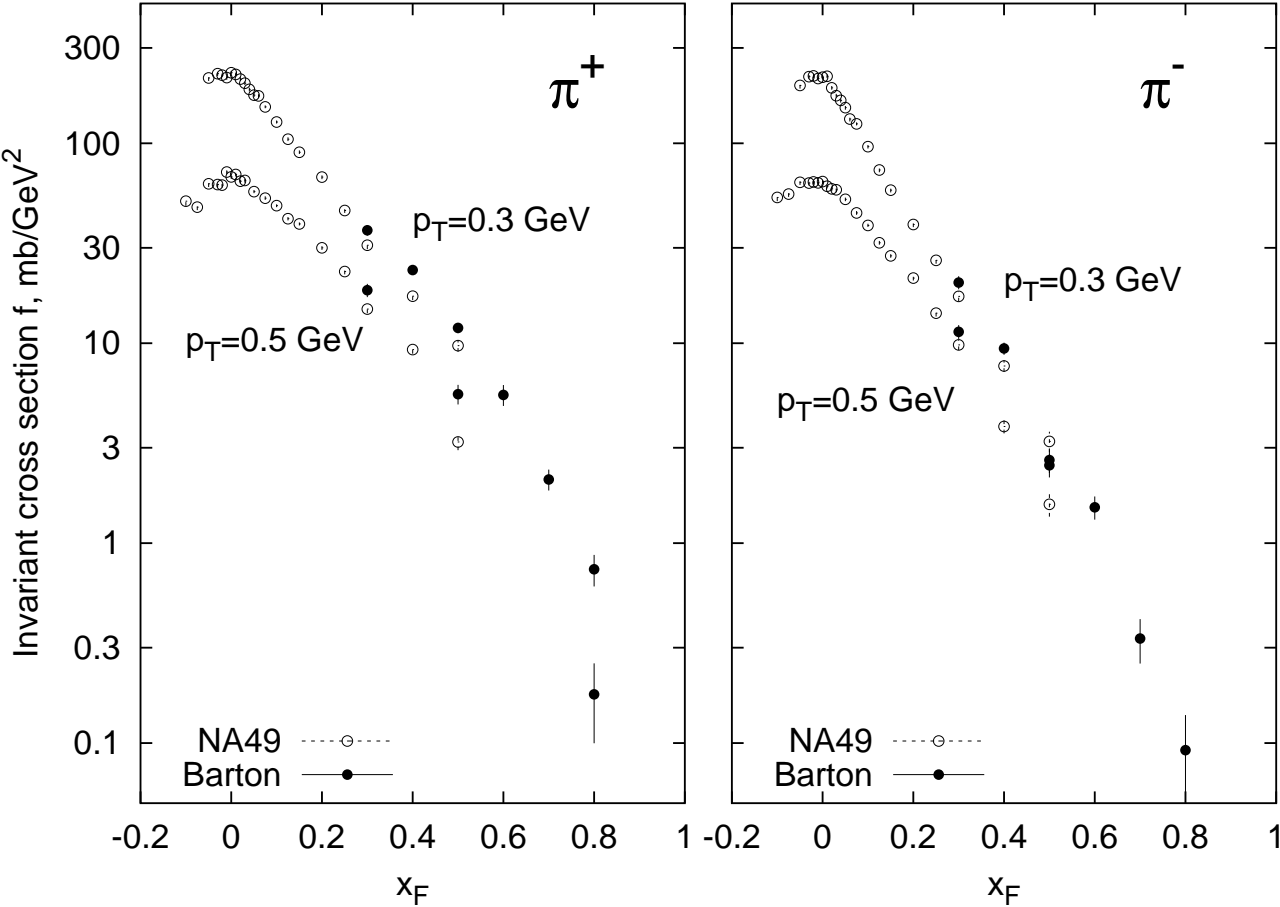
- inclusive π^\pm distributions
from 5MeV sample in p+p
- inclusive π^\pm distributions
from 0.5MeV sample in p+C
- a first step on detailed analysis of inclusive data

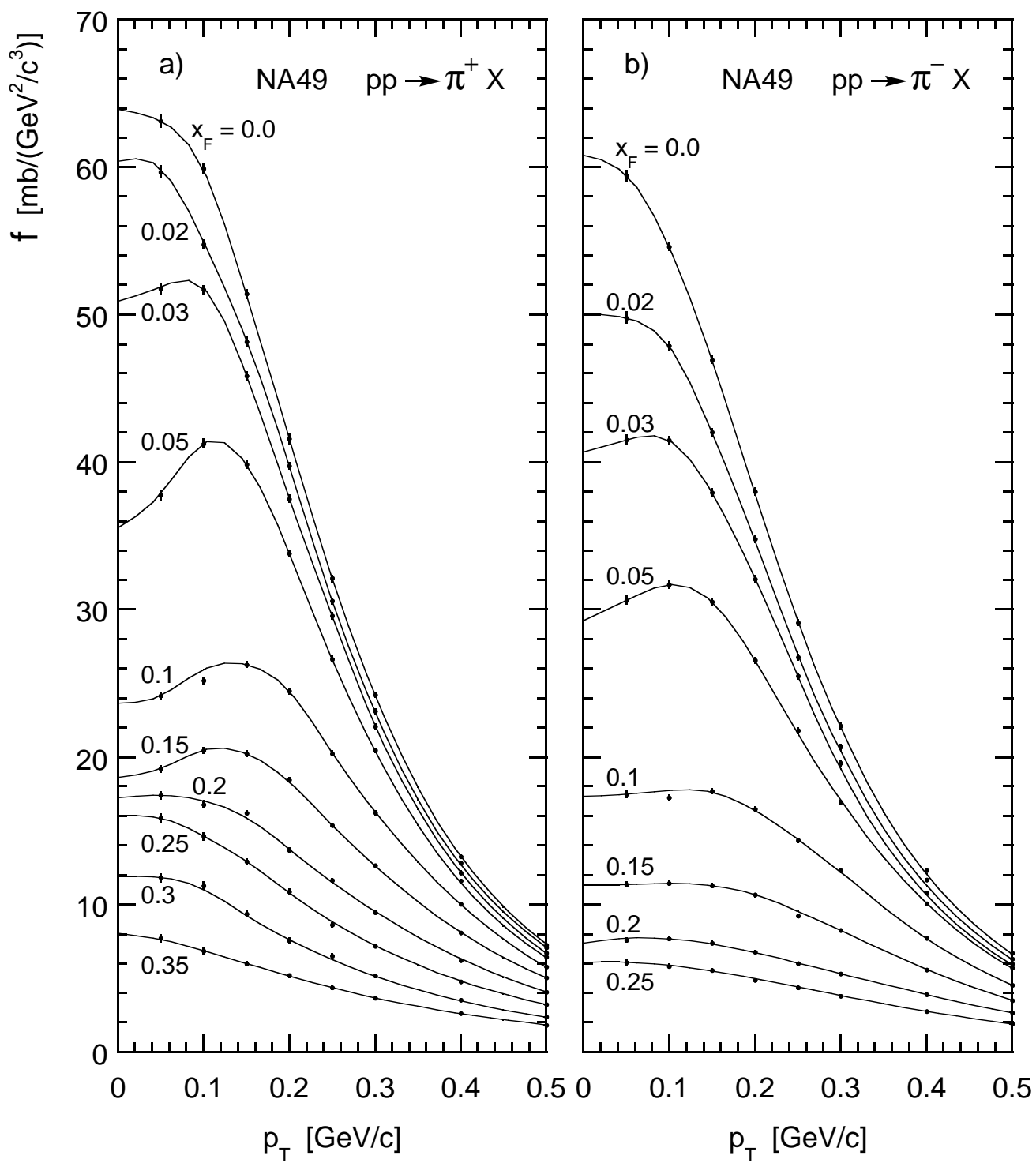


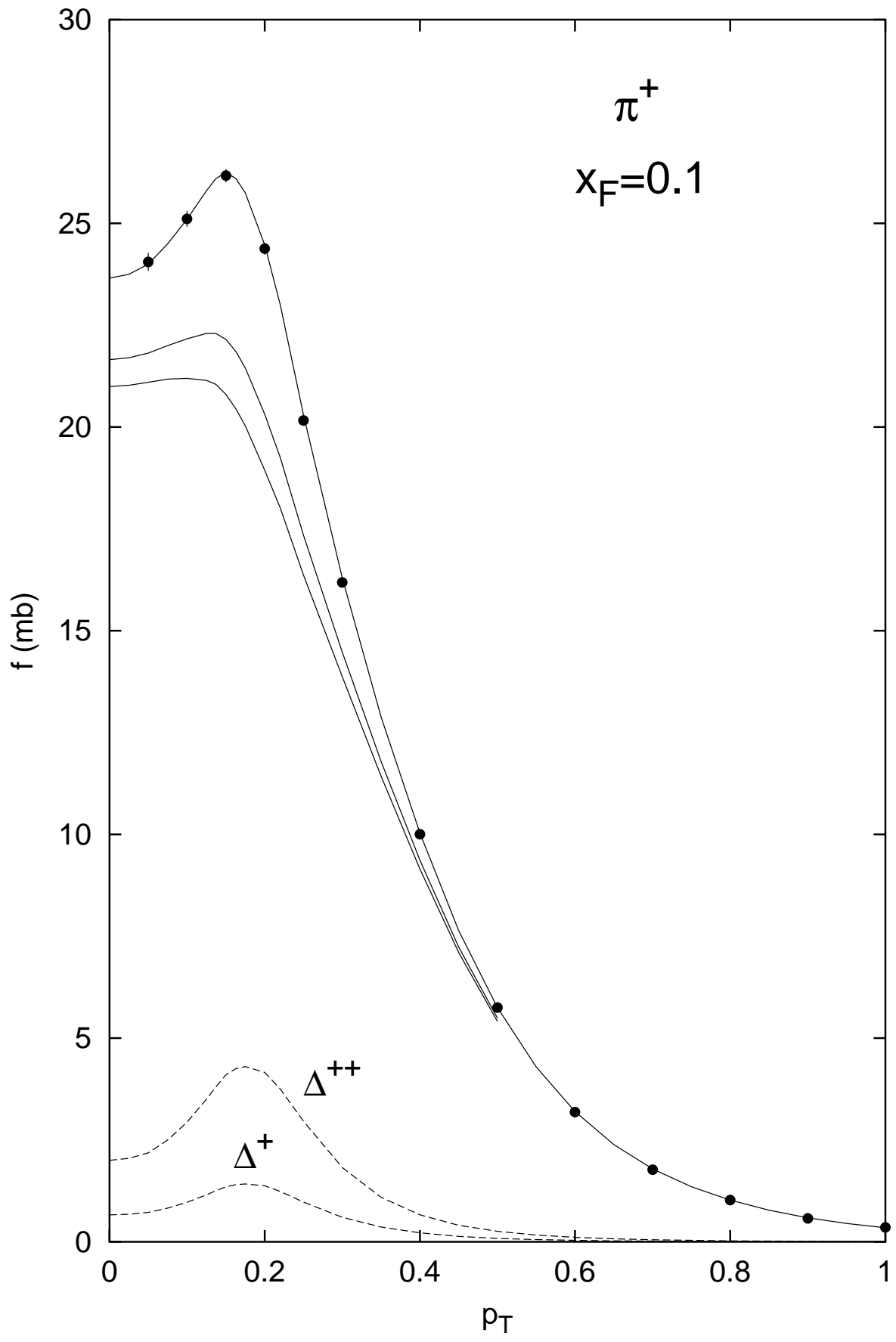


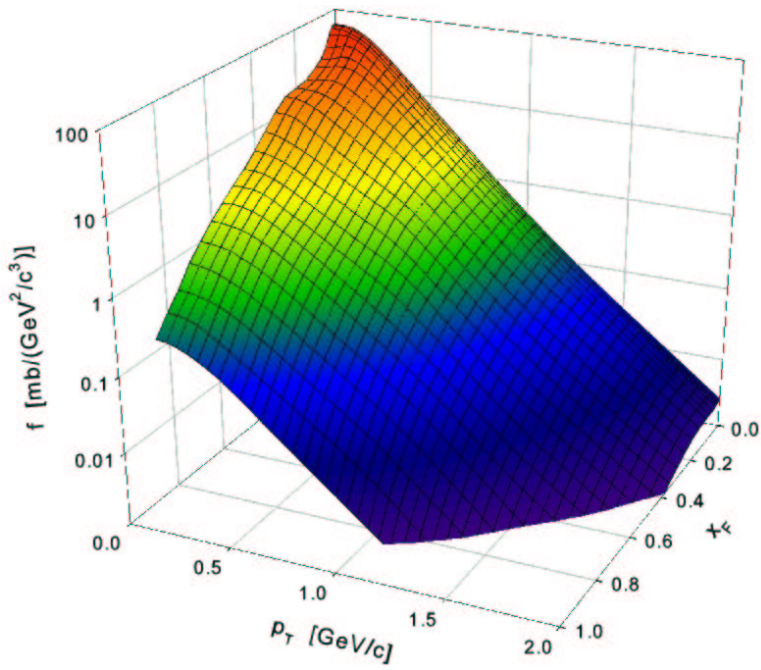


Comparison to the Barton dataset

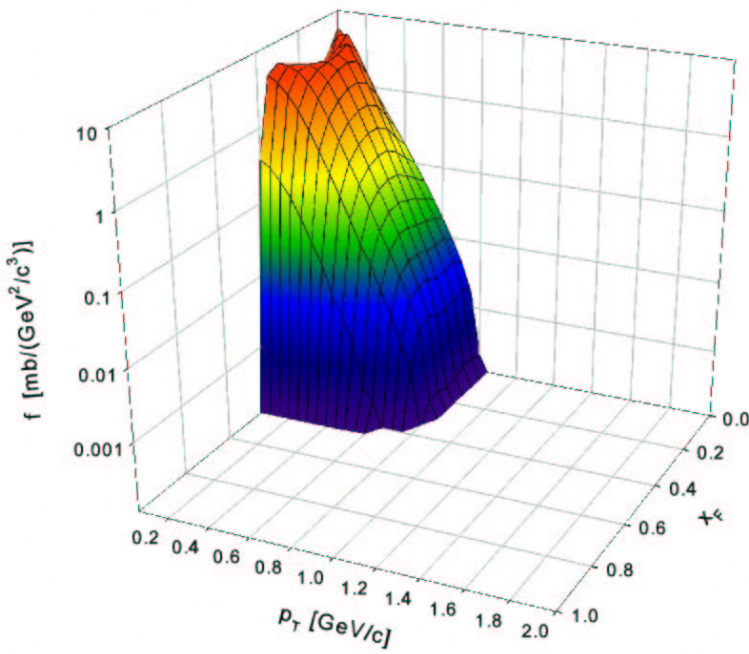




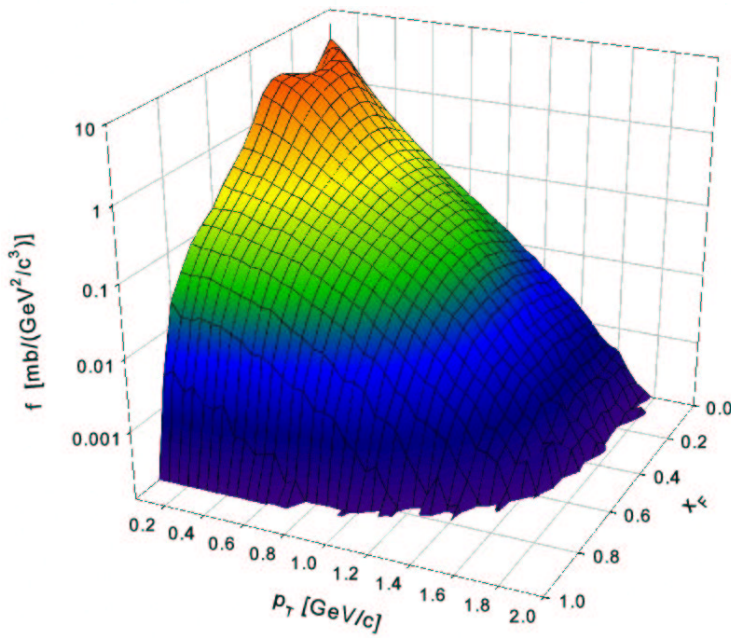




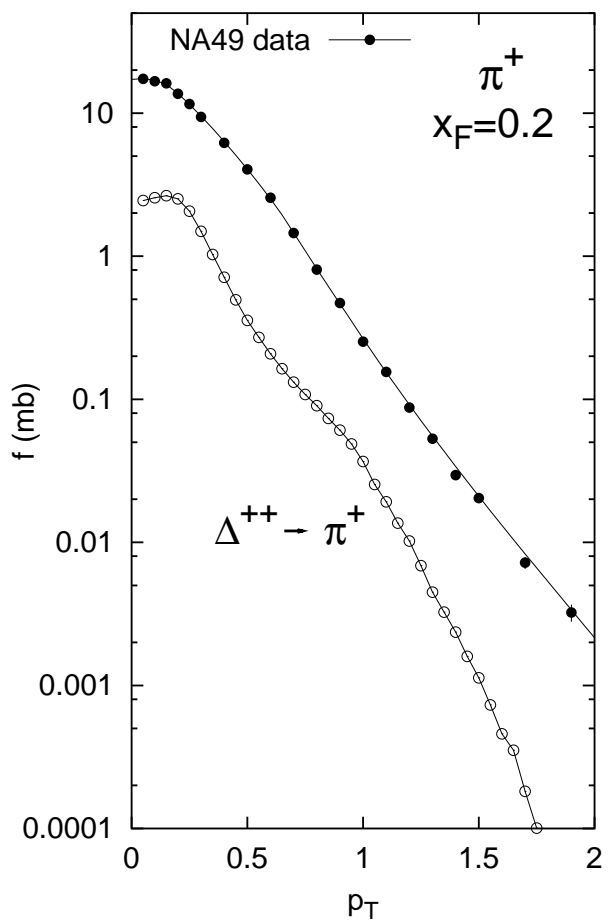
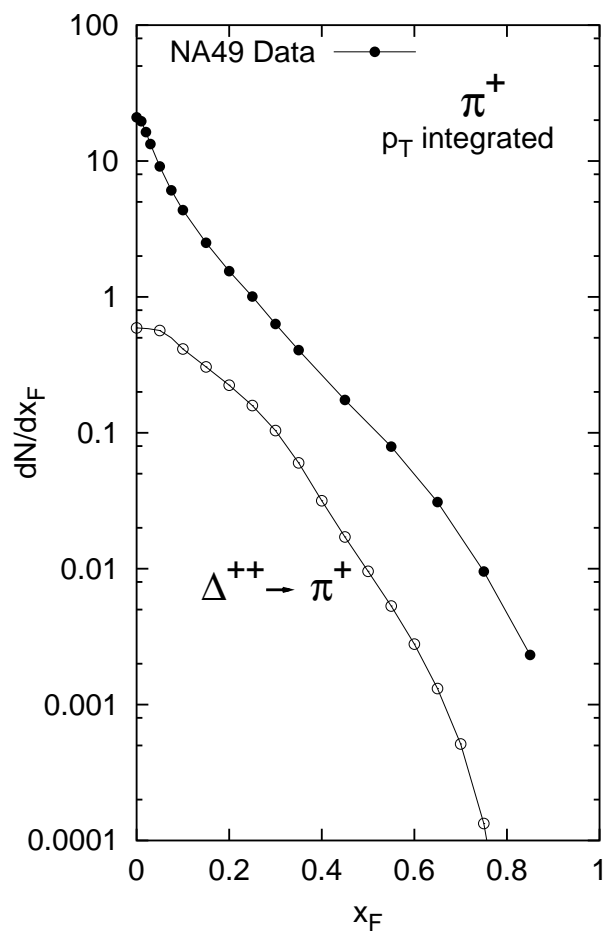
Data



$M = 1.232$ GeV
no Breit-Wigner



$M = 1.232$ GeV
 p -wave
Breit-Wigner



No Breit-Wigner tail allowed:

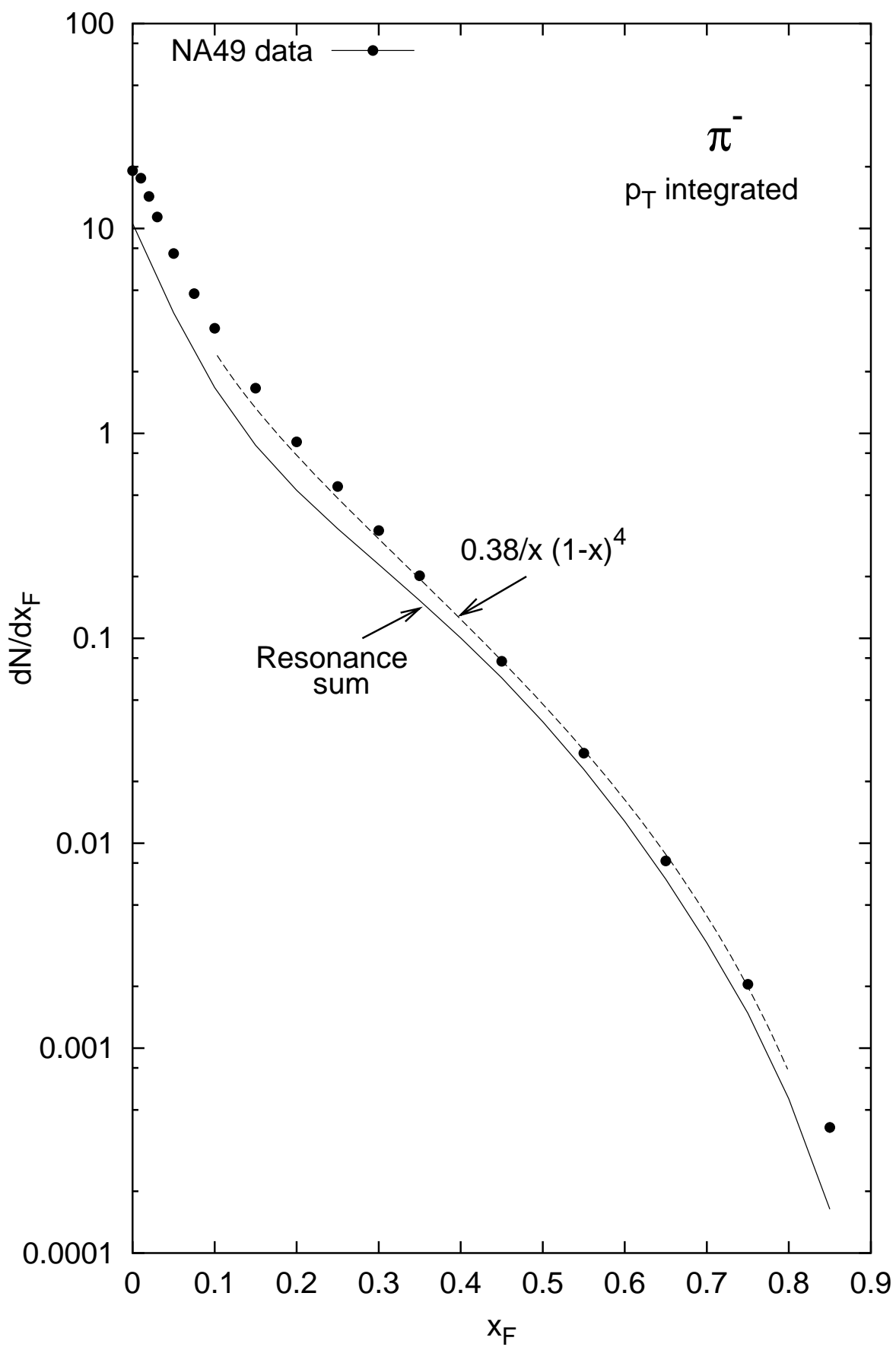
- Hagedorn
- Nova
- Anisovich/Shekhter
- Fritjof
- VENUS
- Pythia
- NEXUS
- EPOS
- UrQMD

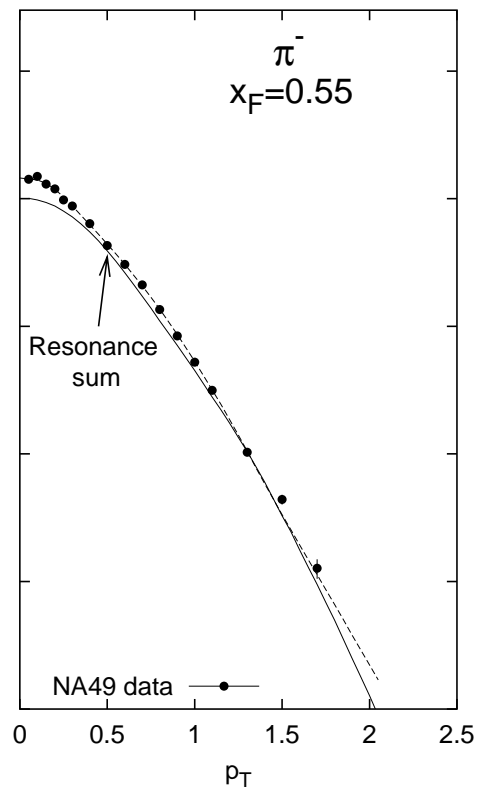
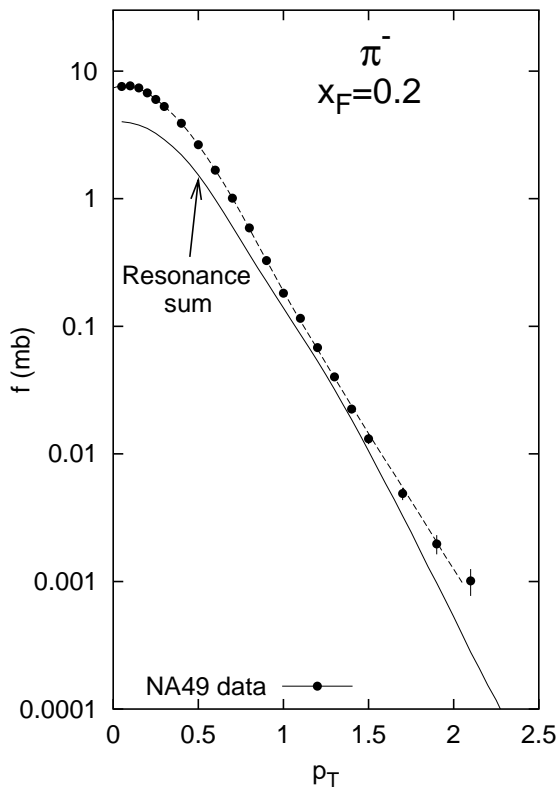
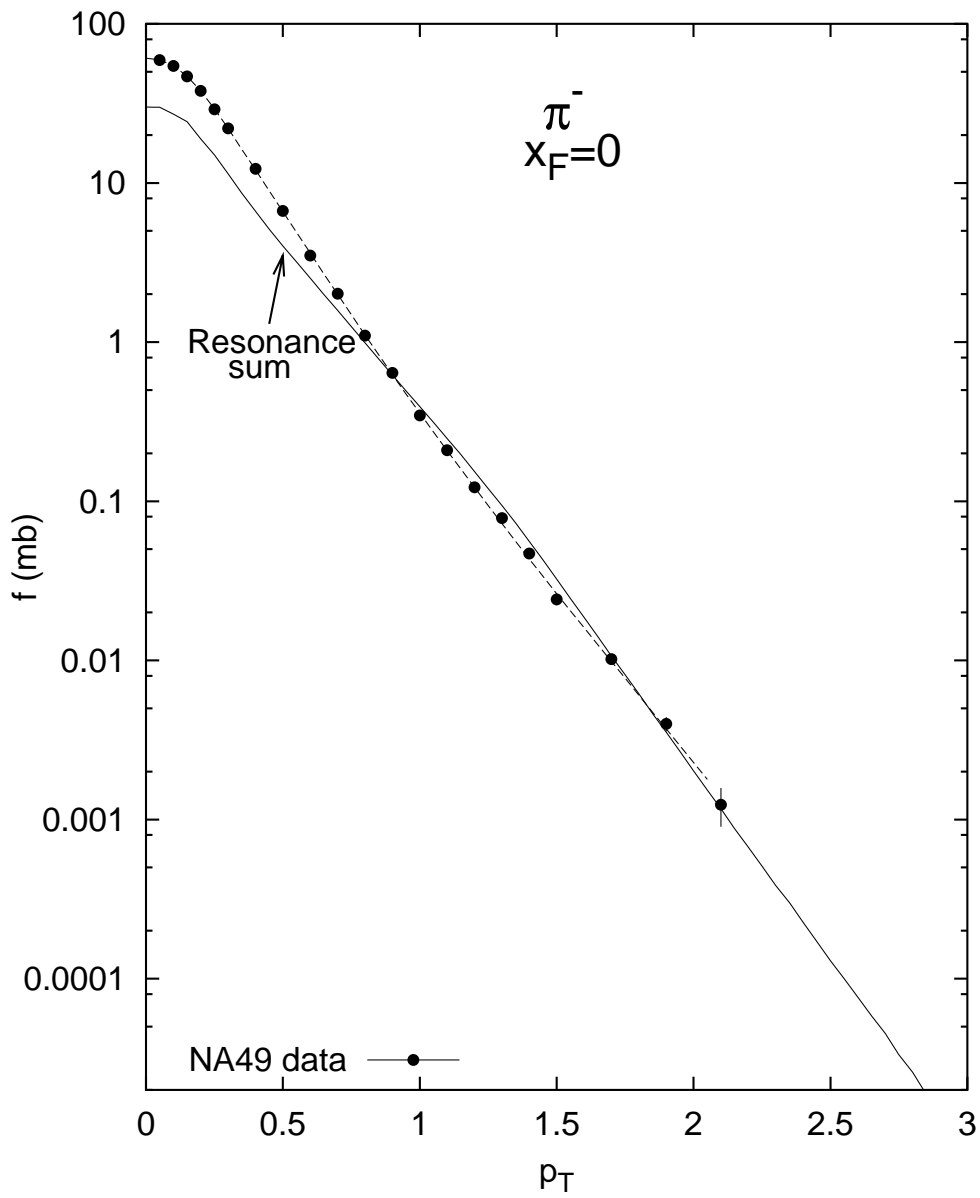
Resonance contribution to negative pions

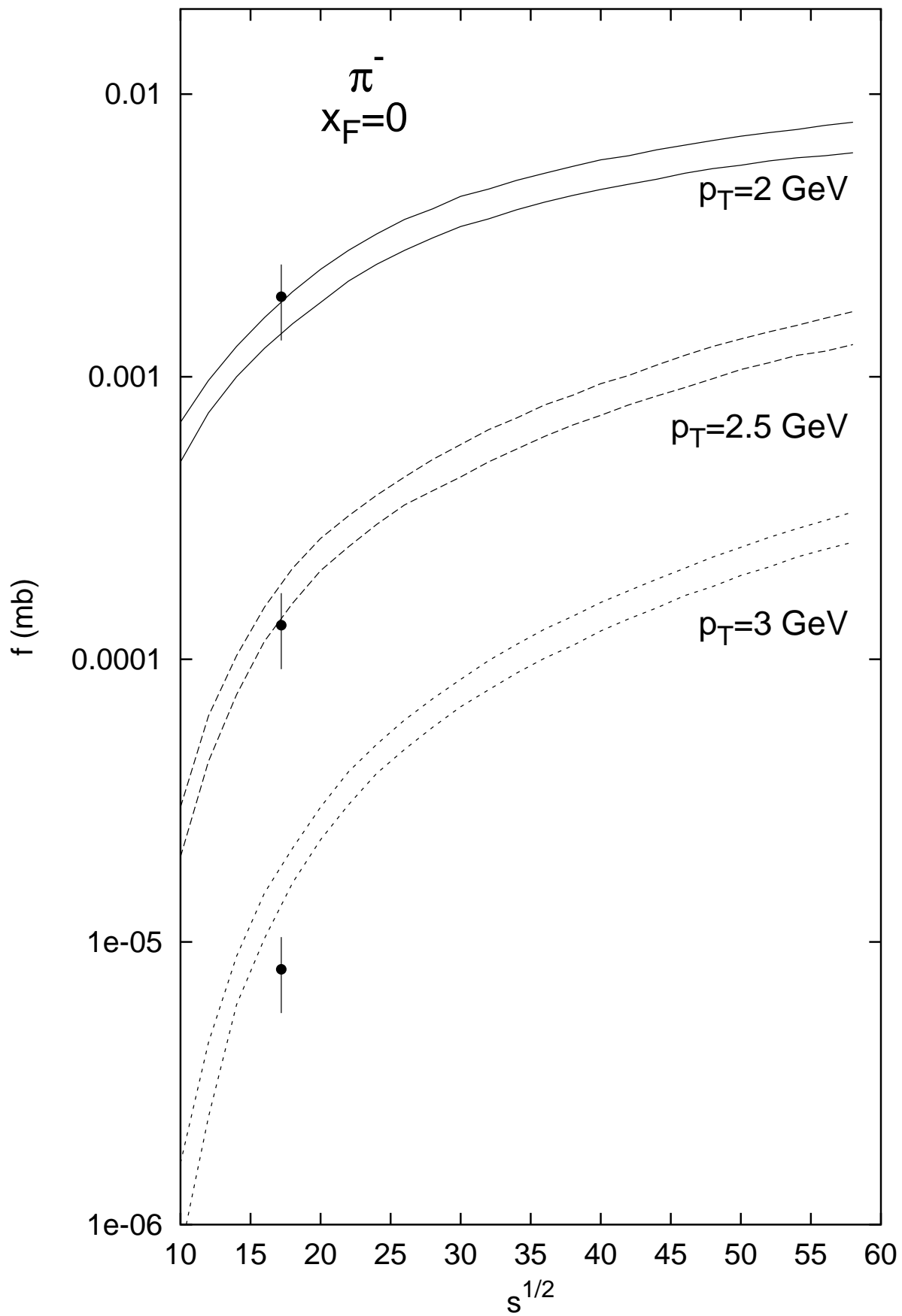
- Sum up measured resonances:

η^0	Δ^0
ω^0	Δ^-
ρ^0	$N^*(1440)$
ρ^-	$N^*(1520)$
f_2^0	$N^*(1680)$
ρ_3^0	
ρ_3^-	
f_4^0	

- Problem: Cascading $\rho_3 \rightarrow \omega\pi$, $N^* \rightarrow \Delta\pi$, etc.
- Take only 2-body decays, to avoid double counting (3π for η and ω)
- Lower limit
- Cascading expected to contribute to lower x_F , p_T







Conclusions

- no sign of “new” physics in A+A collisions
- smooth evolution in all quantities studied
- p+A, A+A essential extension of possibilities in studying soft hadronic physics
- fresh look at non-perturbative QCD possible with NA49

Studies lead to new questions:

- where is the intermediate partonic phase?
- what is the range of applicability of perturbative QCD?

We ask the Committee to support the continuation of this analysis effort