Measurement of π/K/p spectra with ALICE in proton-proton collisions at √s = 900 GeV and √s = 7 TeV
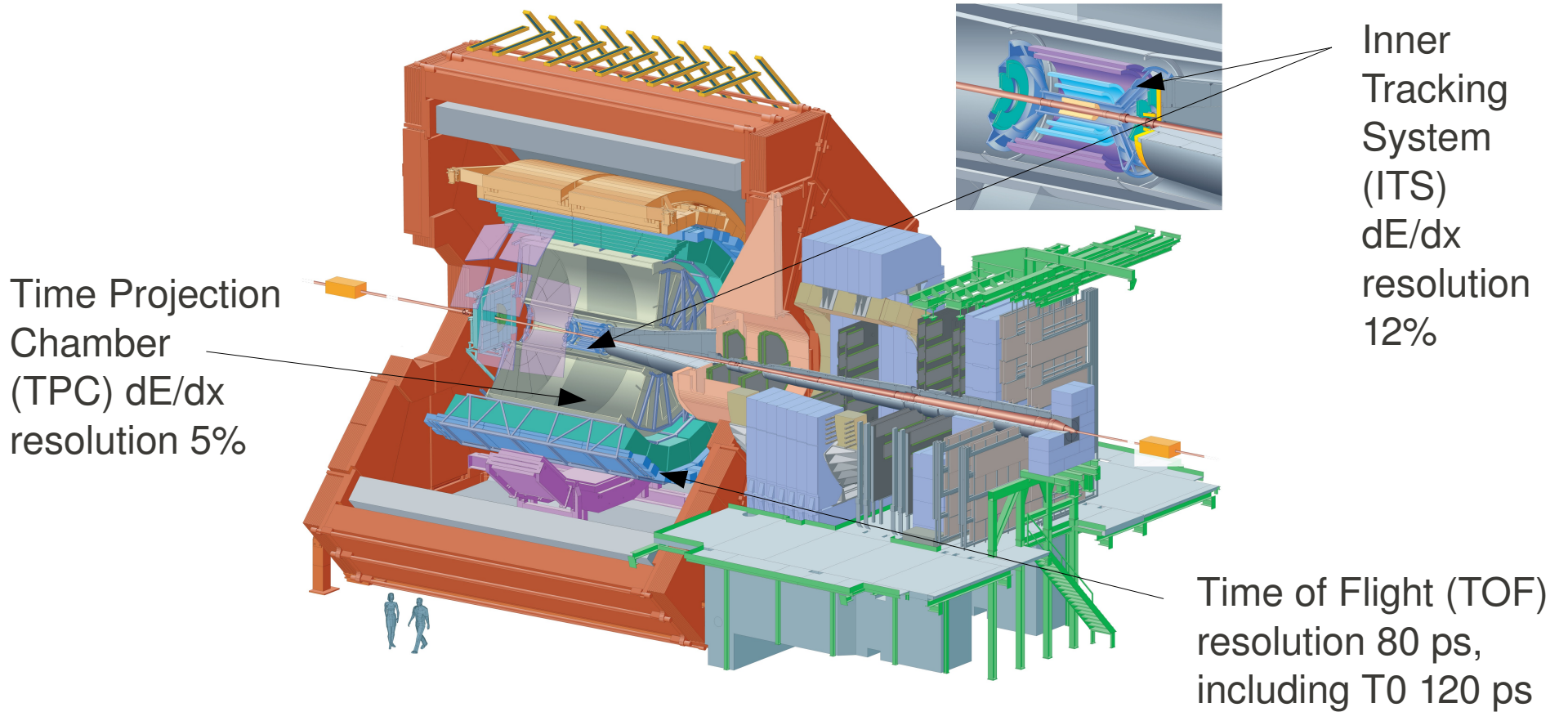
Marek Chojnacki
Utrecht University
for the ALICE Collaboration

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ALICE detector

Inner Tracking System (ITS) dE/dx resolution 12%

Time Projection Chamber (TPC) dE/dx resolution 5%

Time of Flight (TOF) resolution 80 ps, including T0 120 ps

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4 PID methods

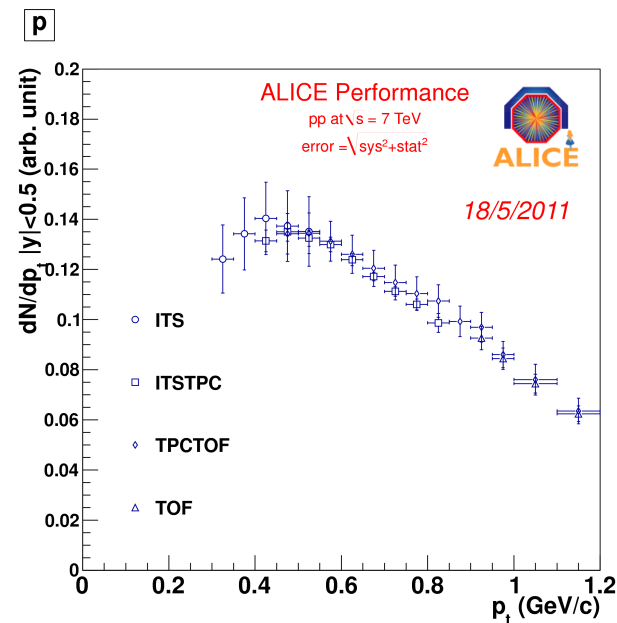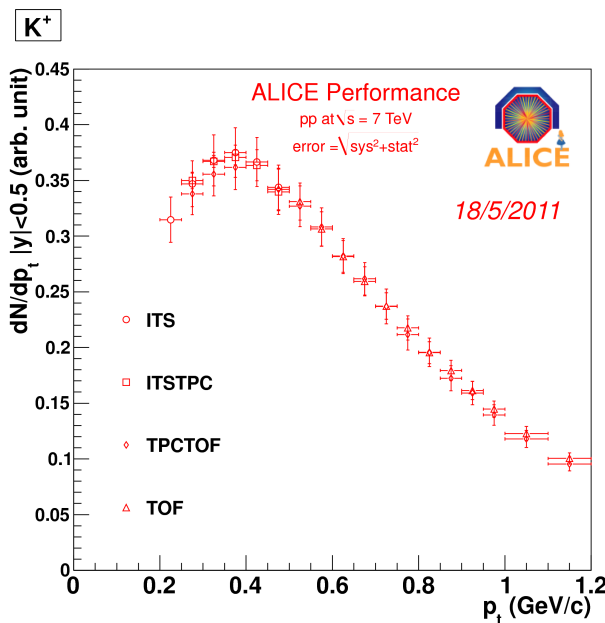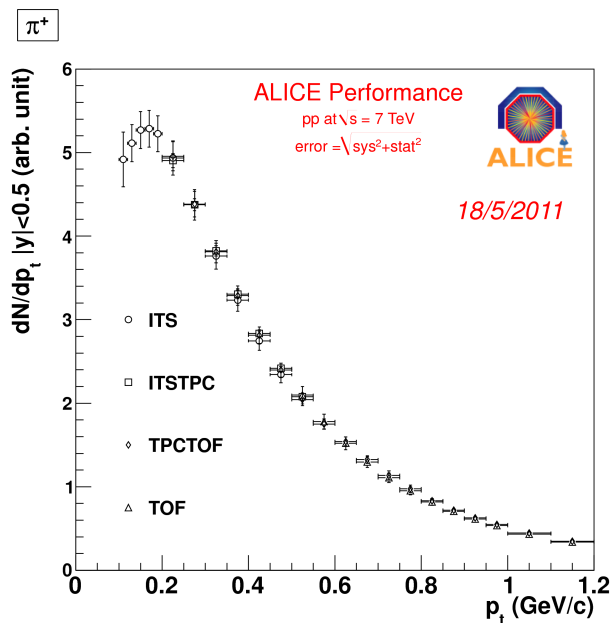|	ITS	ITSTPC	TPCTOF	TOF
Tracks	standalone[1]	global	global	global
Type of PID signal	dE/dx	dE/dx	dE/dx, time	time
Method of extraction	σ cut	unfolding	σ cut	unfolding
Ranges in p_t [GeV/c]	0.1-0.5 (π) 0.2-0.5 (K) 0.3-0.55 (p)	0.2-0.55 (π) 0.25-0.5 (K) 0.4-0.85 (p)	0.2-1.4 (π) 0.25-1.4 (K) 0.45-1.7 (p)	0.5-1.6 (π) 0.5-1.6 (K) 0.9-2.5 (p)

[1]poster by Leonardo Milano

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4 PID methods

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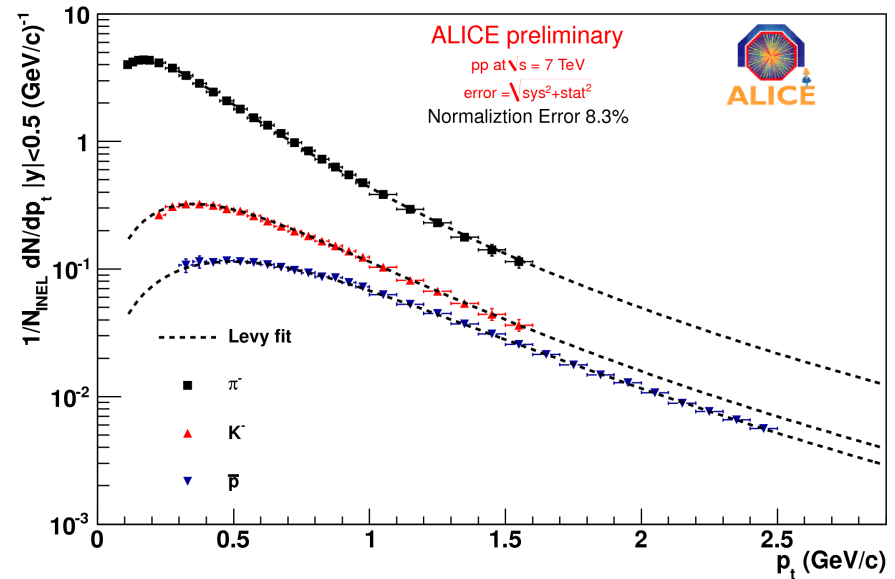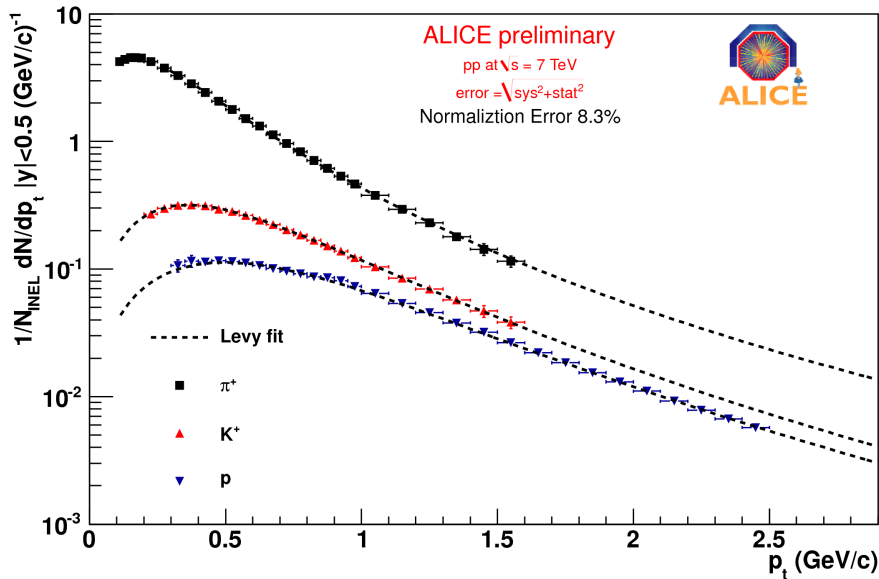
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4 PID methods

- **8M pp events $\sqrt{s}$ = 7 TeV used for this analysis, uncertainties dominated by systematics**

- **4 methods agree on the level of the systematic uncertainties (<5%)**

- **Protons are feed-down corrected**

Method, corrections: presentation by Alexander Kalweit
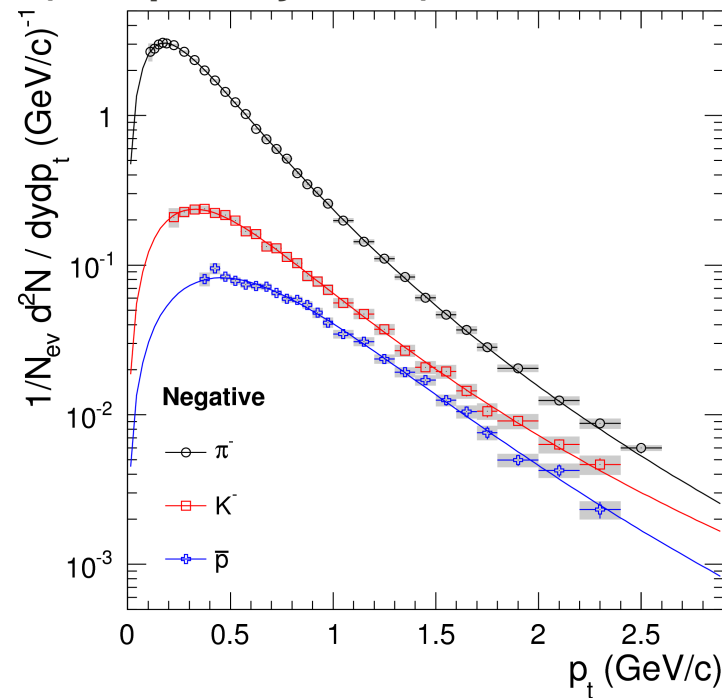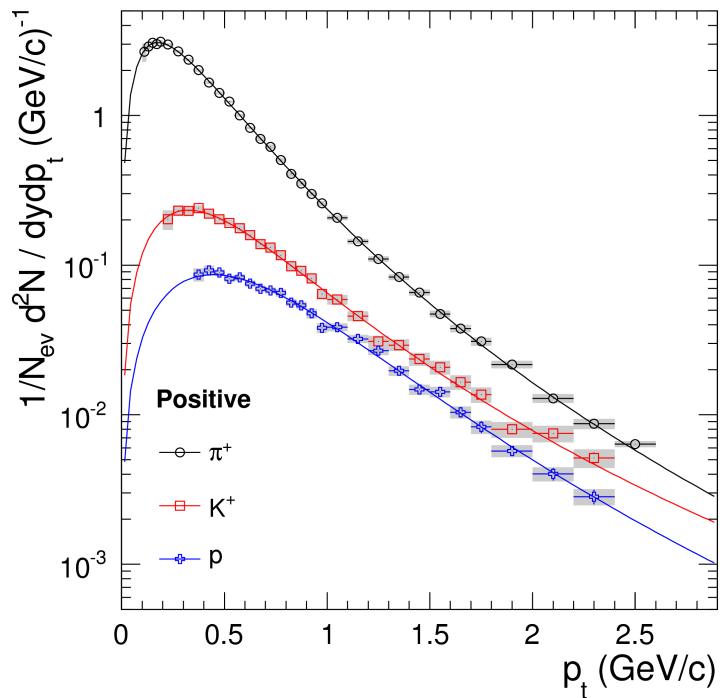
Lévy fits 7 TeV spectra

$$\frac{dN^2}{dp_t\, dy} = p_t \frac{dN}{dy} \frac{(n-1)(n-2)}{nC(nC + m_0(n-2))} \left(1 + \frac{m_t - m_0}{nC}\right)^{-n}$$

- **Lévy functions describe the spectra shapes (extrapolation 10% - 20%)**

- **Normalization to the number of INEL (presentations by Martin Poghosyan and Ken Oyama)**
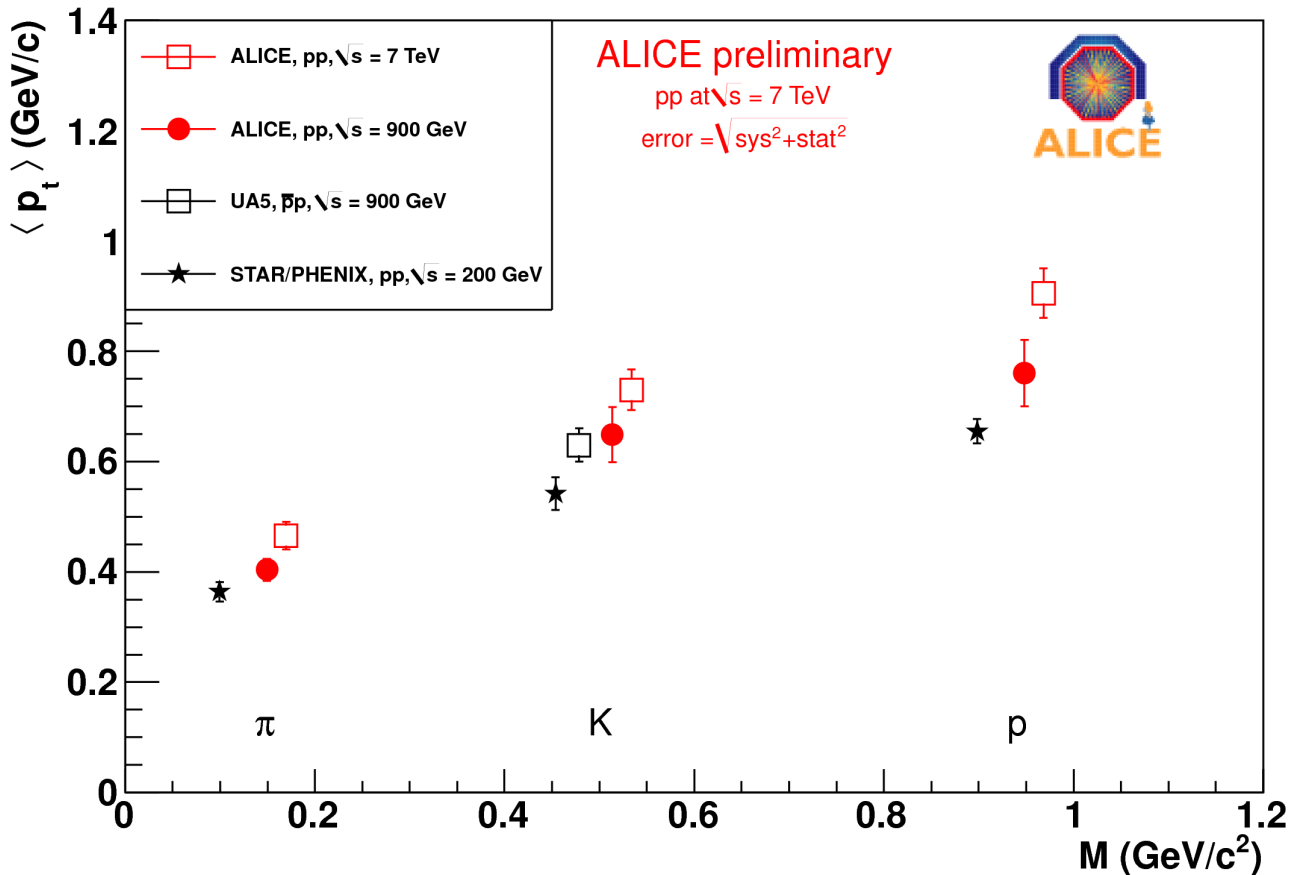
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900 GeV data

Published: arXiv:1101.4110v3 (accepted by EPJC)

- **900 GeV data used for comparison**

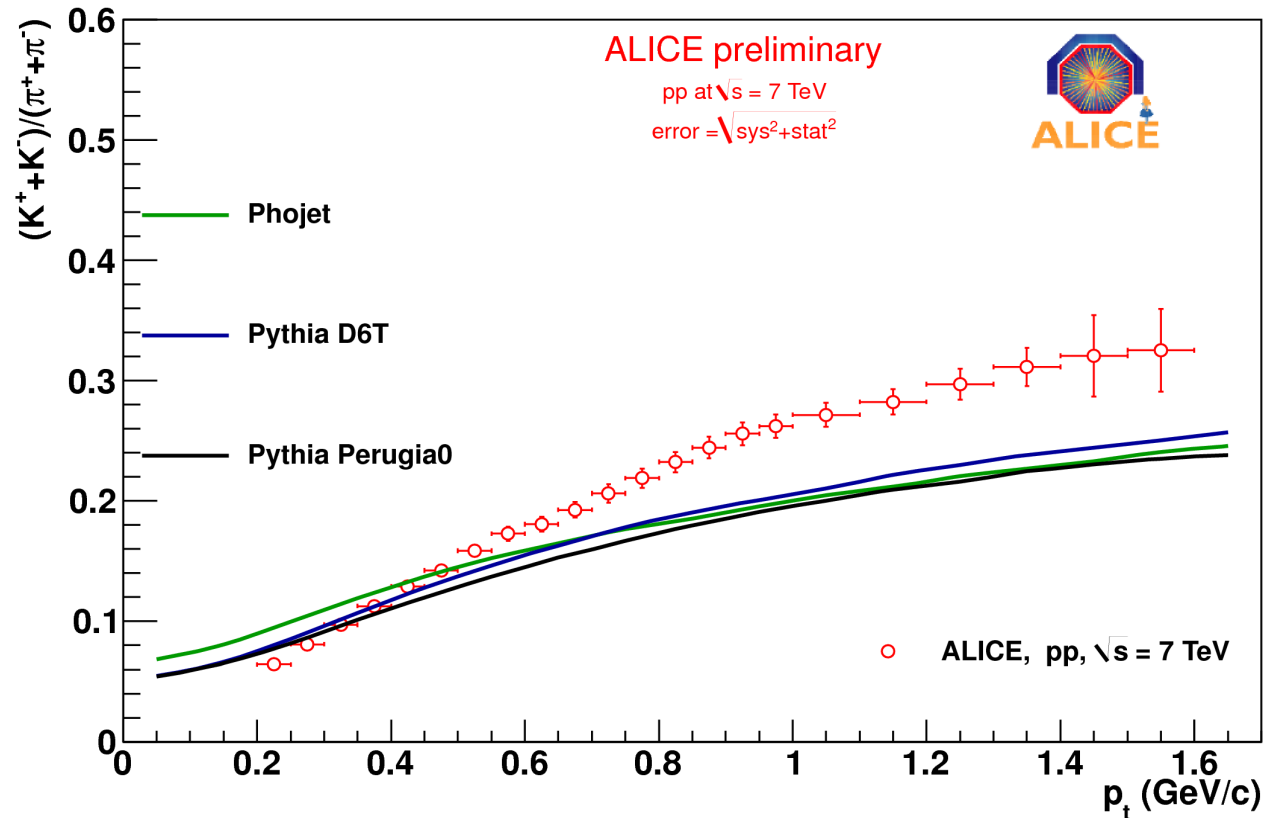- **Lévy functions also described the spectra in pp at 900GeV**

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$<p_t>$ vs. m

- **Linear increase of the $<p_t>$ with mass**
- **Increase of the $<p_t>$ with collision energy**

Systematics evaluated using different fit functions and MC models : Pythia (perugia0, D6T), Phojet , Levy, $\exp(p_t)$, $\exp(m_t)$
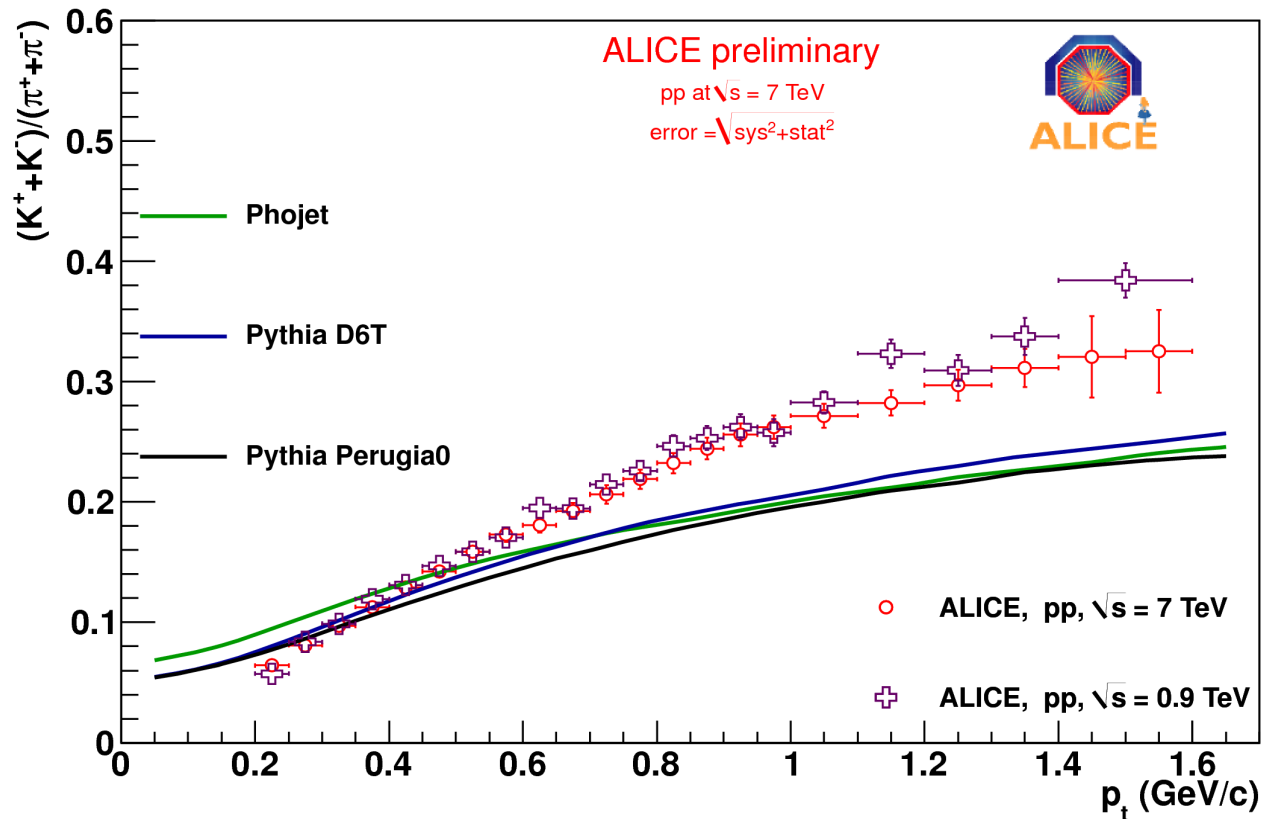
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K/π vs. p$_t$

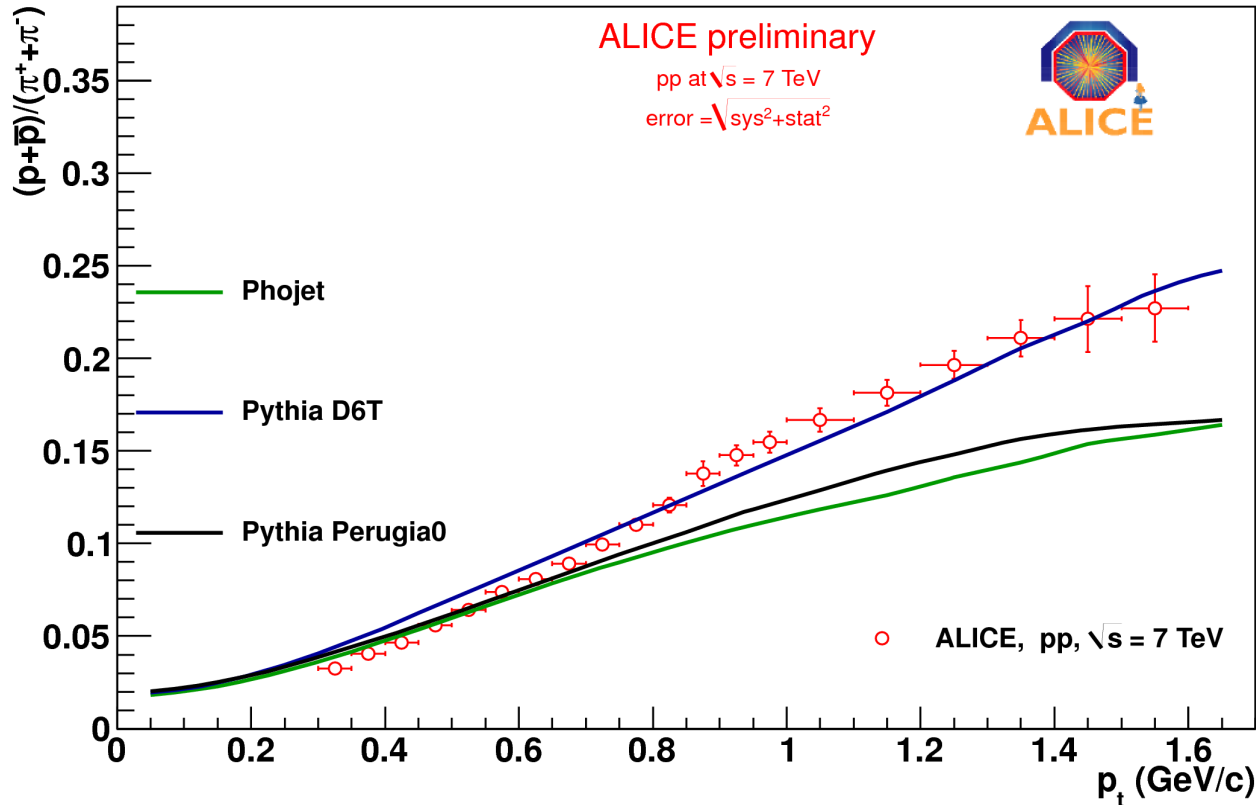- **Ratio for p$_t$>0.6 (GeV/c) is not described by the MC models**

Strangeness and resonance production, see also presentations by David Dobrigkeit Chinellato and Alberto Pulvirenti
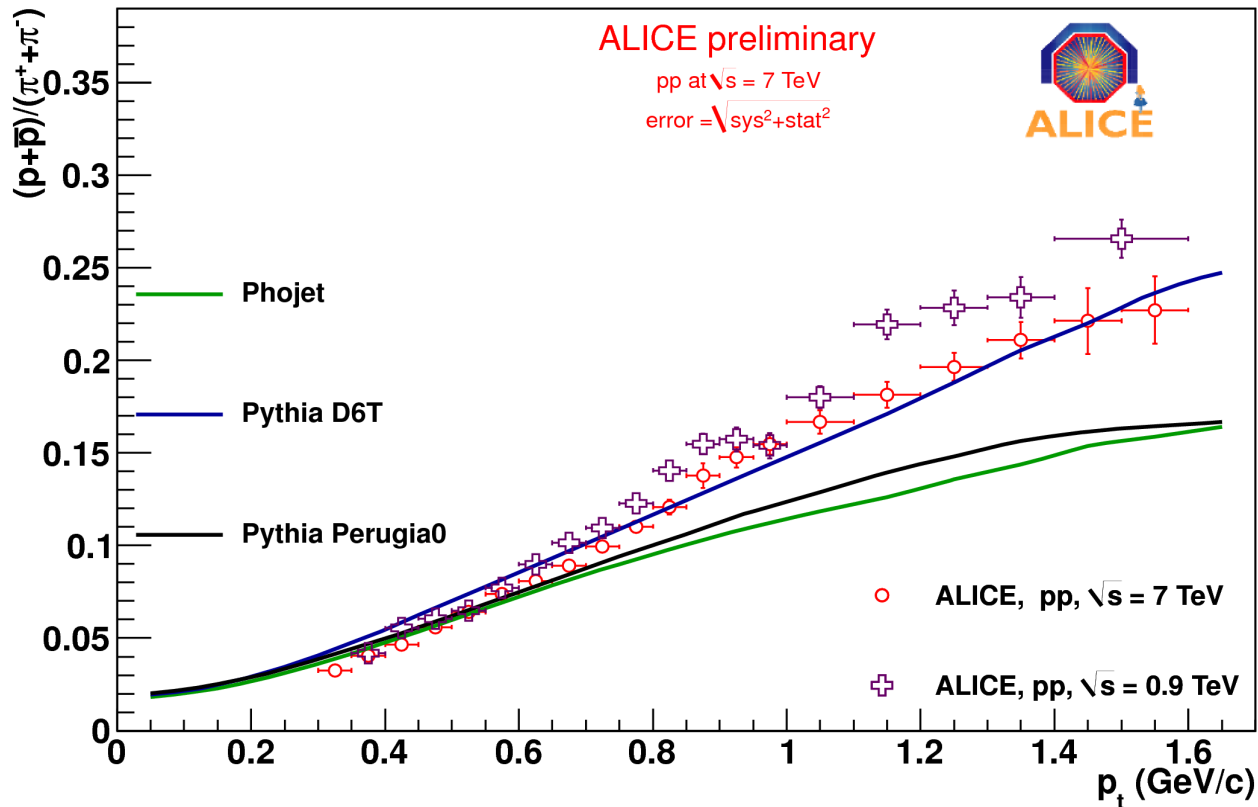
K/π vs. p$_t$

- **Ratio is similar at both energies**
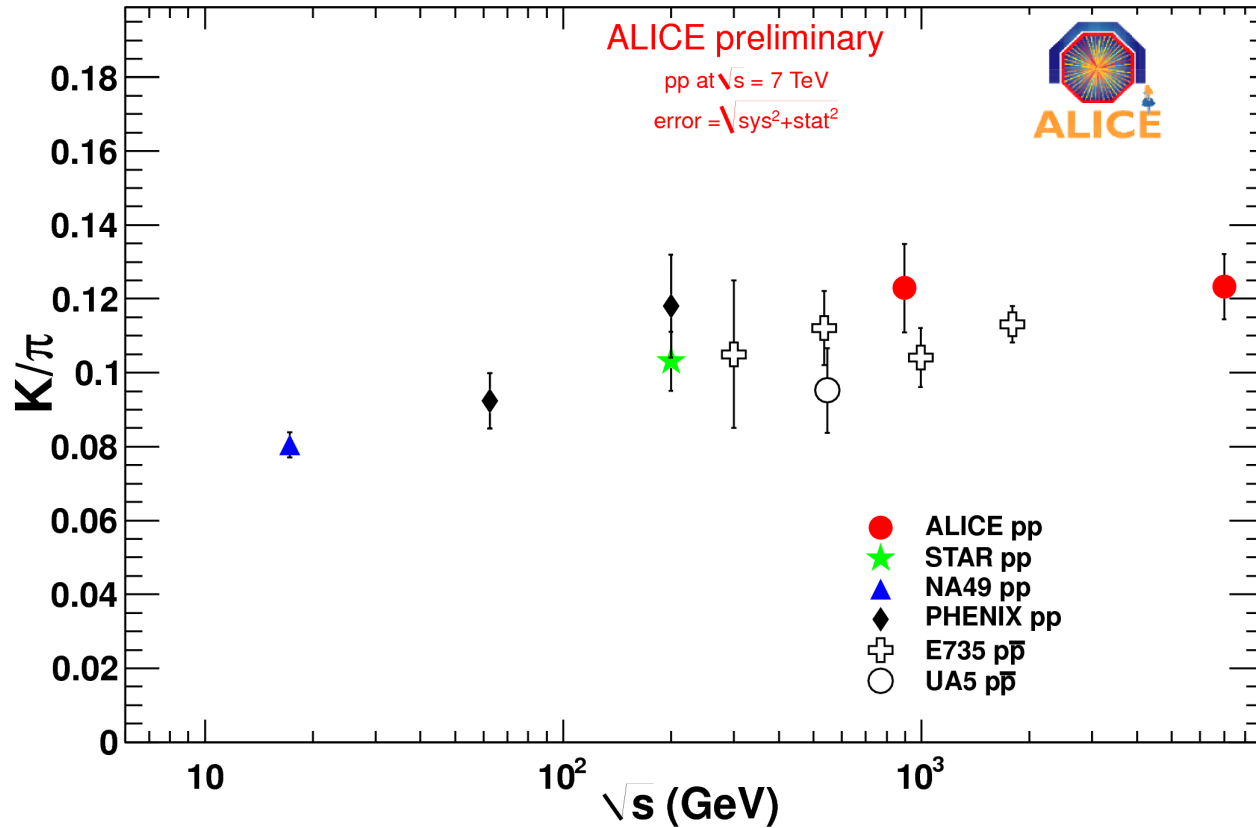
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p/π vs. p_t

- **Ratio is only described by the Pythia D6T tune, with some slight deviations in the low p_t region**
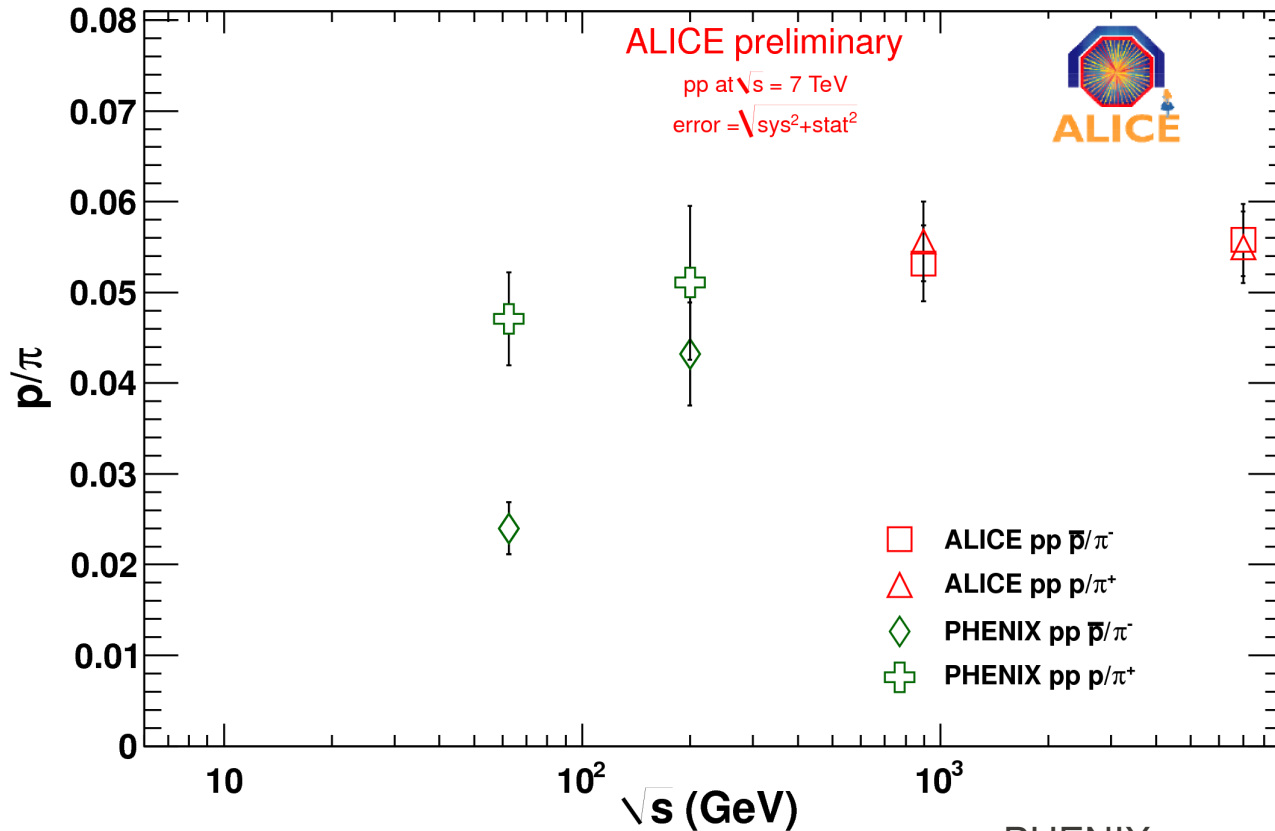
p/π vs. p_t

- **Ratio is similar at both energies**

K/π vs. energy

• K/π ratio (dN/dy) is constant between 900 GeV and 7 TeV

p/π vs. energy

- **At LHC energies p/π ratio is constant**
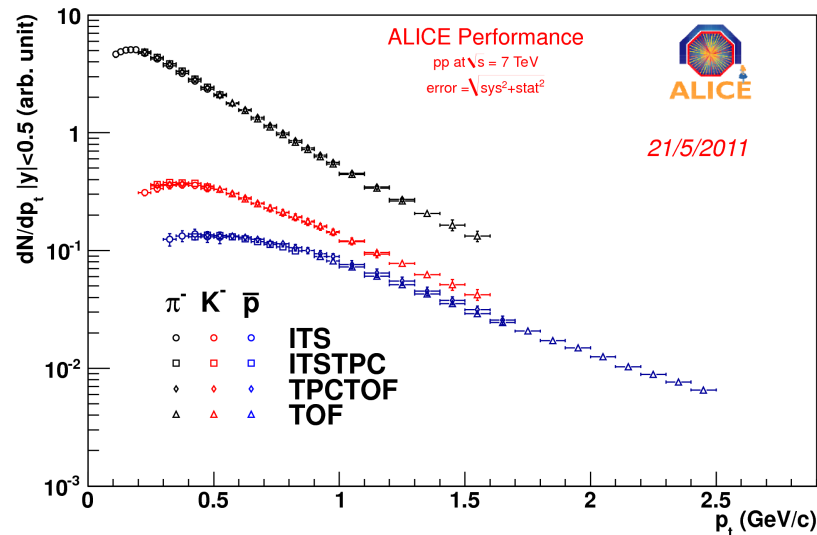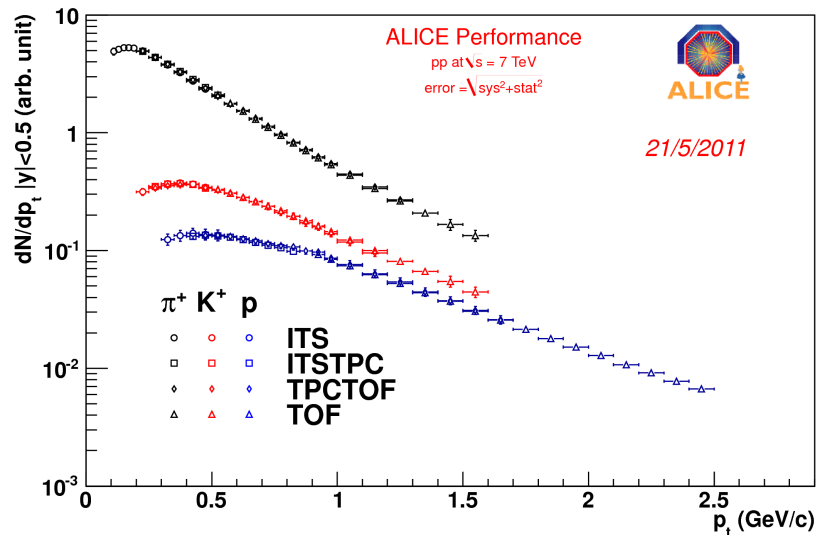- **Lower energies baryon/anti-baryon asymmetry**

PHENIX
arXiv:1102.0753v1

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Conclusion

- As the collision energy increases from 900 GeV to 7 TeV in proton-proton:
  - spectra become harder (increase of $<p_t>$)
  - K/π and p/π ratios as function of p_t are similar
  - ratios (dN/dy) K/π, p/π remain constant
- PbPb results, see the talk by Michele Floris

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4 PID methods

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