

Hadron purities of the 2007/2011 data

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- Asymmetry calculation:
 - Inclusive A_1 (only scattered muon)
 - Identified Hadron asymmetry A_1^π (additional hadron)
- Identification of hadrons
 - RICH efficiencies (detector property)
- Handle misidentifications to get true result
 - Purity (physics dependent)

- Quantities:
 - Number of identified hadrons: I
 - Number of true hadrons: N
 - Number of true hadrons t identified as i : $N^{t \rightarrow i}$
- (Mis)Identification probability: $P^{t \rightarrow i} = \frac{N^{t \rightarrow i}}{I}$
- Purity / Contamination: $Q^{t \rightarrow i} = \frac{N^{t \rightarrow i}}{I} = \frac{N}{I} P^{t \rightarrow i}$
- Result: Efficiency/Purity Matrix

RICH comparison I (LH cuts)

- 2011

- Pions

- $LH(\pi) > LH(K)$
- $LH(\pi) > LH(p)$
- $LH(\pi) > LH(bg)$

- Kaons

- $LH(K) > 1.08LH(\pi)$
- $LH(K) > LH(p)$
- $LH(K) > 1.24LH(bg)$

- Protonen ($p > p_{thr}$)

- $LH(p) > LH(\pi)$
- $LH(p) > LH(K)$
- $LH(p) > LH(bg)$

- Protonen ($p < p_{thr}$)

- $LH(bg) > LH(\pi)$
- $LH(bg) > LH(K)$

- 2007

- Pions

- $LH(\pi) > LH(K)$
- $LH(\pi) > LH(p)$
- $LH(\pi) > LH(bg)$

- Kaons

- $LH(K) > LH(\pi)$
- $LH(K) > LH(p)$
- $LH(K) > 1.07LH(bg)$

- Protonen ($p > p_{thr}$)

- —
- —
- —

- Protonen ($p < p_{thr}$)

- —
- —

RICH comparison II (RICH table)

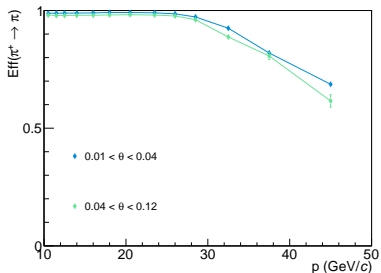
- 2011

- Range

- Entrance angle θ :
0.01 – 0.12 (2 Bins)
- Momentum p :
10 – 50 GeV (13 Bins)

- RICH pipe

- Removed



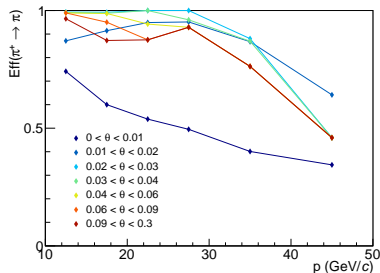
- 2007

- Range

- Entrance angle θ :
0.0 – 0.3 (7 Bins)
- Momentum p :
10 – 60 GeV (7 Bins)

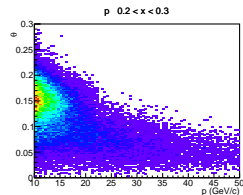
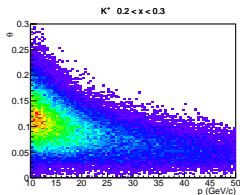
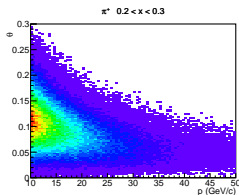
- RICH pipe

- ??

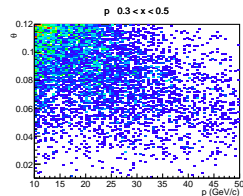
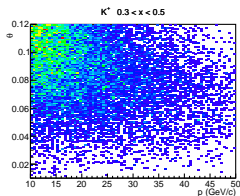
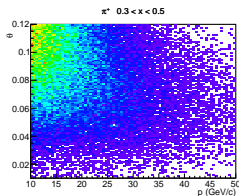


Hadrons for asymmetry calculation

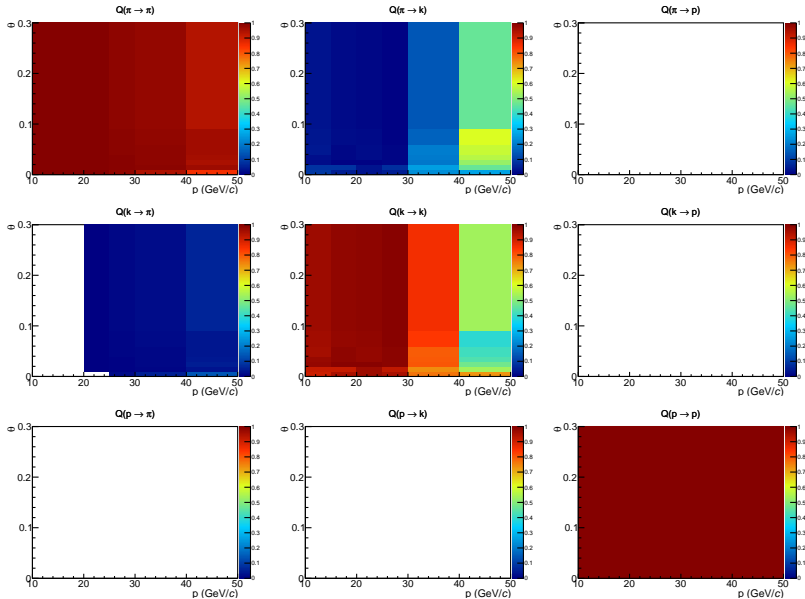
- Coverage in the angle θ and momentum p
- Shown for the range of RICH tables
- 2007



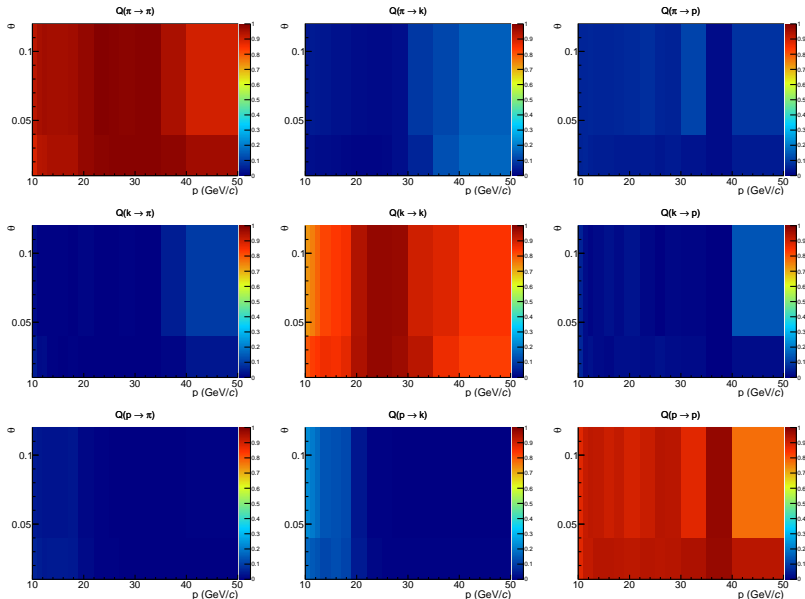
- 2011



Purity for 2007

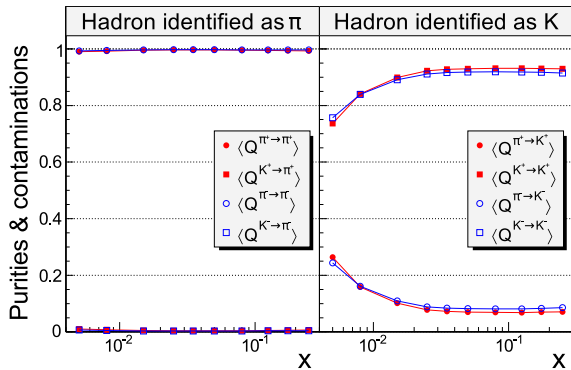


Purity for 2011

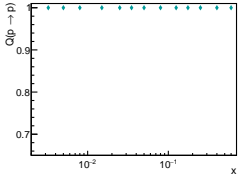
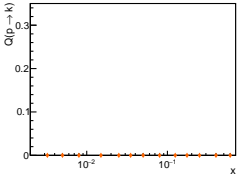
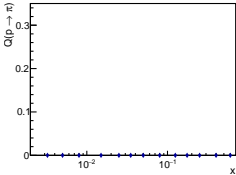
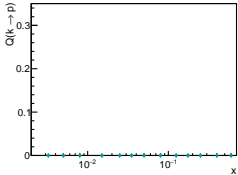
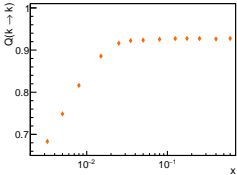
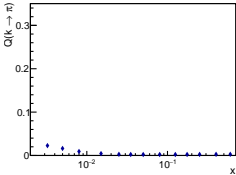
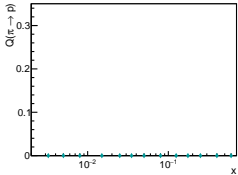
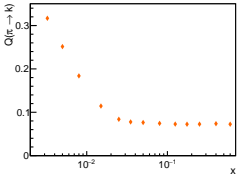
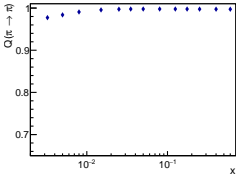


Purity as a function of x

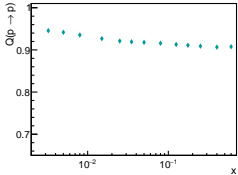
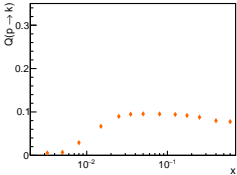
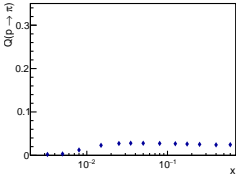
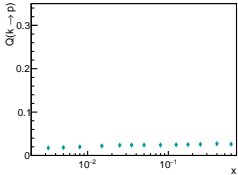
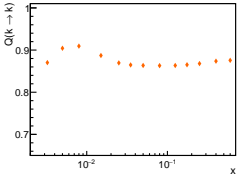
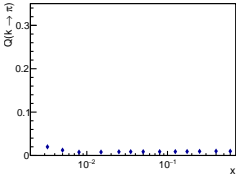
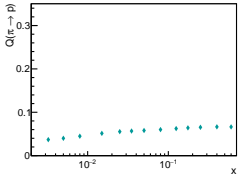
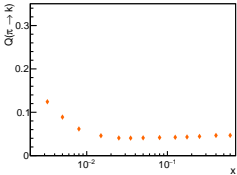
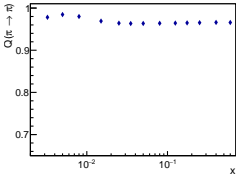
- Result as a function of x
→ Average of θ and p
- Already done for 2007



Results for 2007

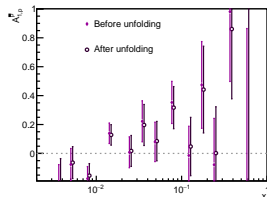
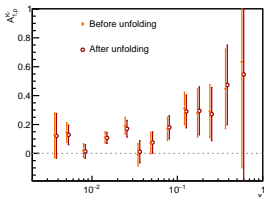
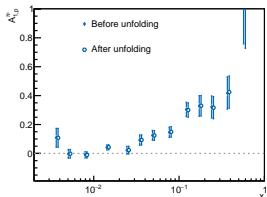
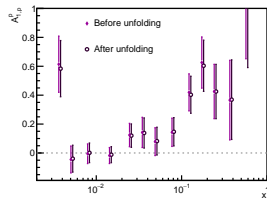
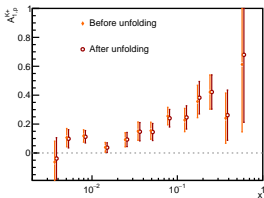
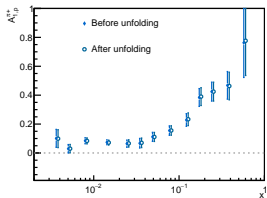


Results for 2011



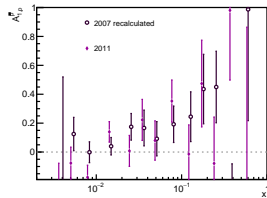
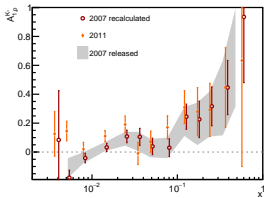
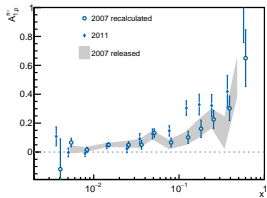
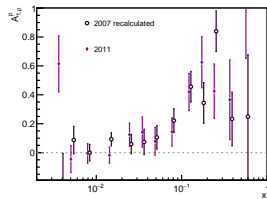
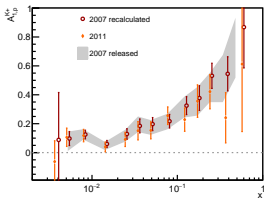
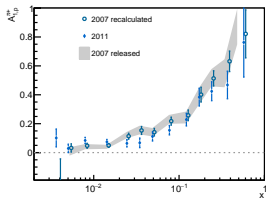
Unfolding the asymmetry

- Unfolding: $A_1^{\text{true}} = (Q^T)^{-1} A_1^{\text{id}}$
- 2011: Also take into account protons
- Not correlations for uncertainty taken into account

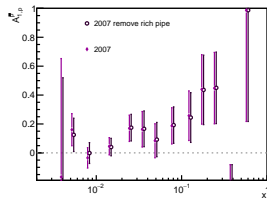
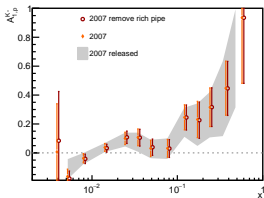
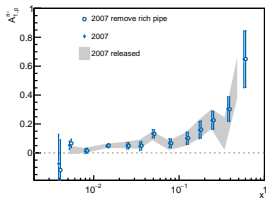
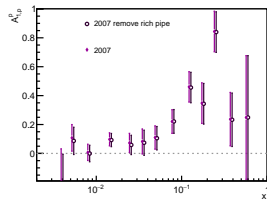
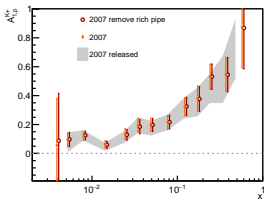
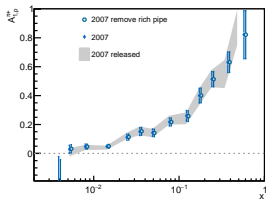


Comparison with 2007

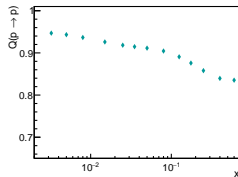
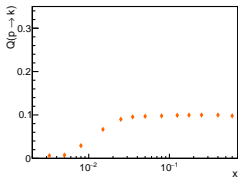
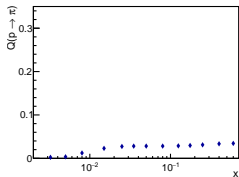
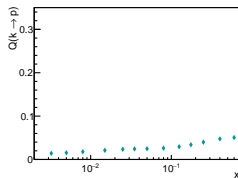
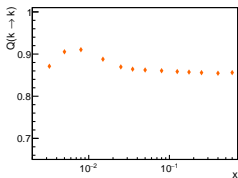
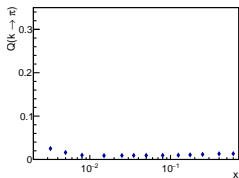
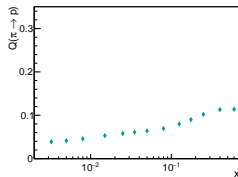
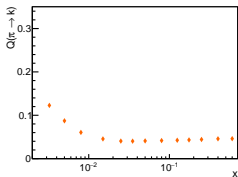
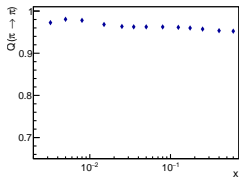
- Comparable after unfolding
- Some differences for π



Further test: RICH pipe in 2007



Further test: More θ bins in 2011



Further test: More θ bins in 2011

