

# RICH GEMC GEOMETRY

Contalbrigo Marco &  
Luciano Pappalardo & Luca Barion

INFN Ferrara

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# LH results for positive hadrons

Aerogel:

- $n=1.05$ ,  $\lambda=5.5$  cm
- thick. increasing with radius:  
2-4-6-8-10 cm

Mirror:  $14^\circ - 35^\circ$

- 90% reflectivity

MA-PMTs: H8500

eff=0.65

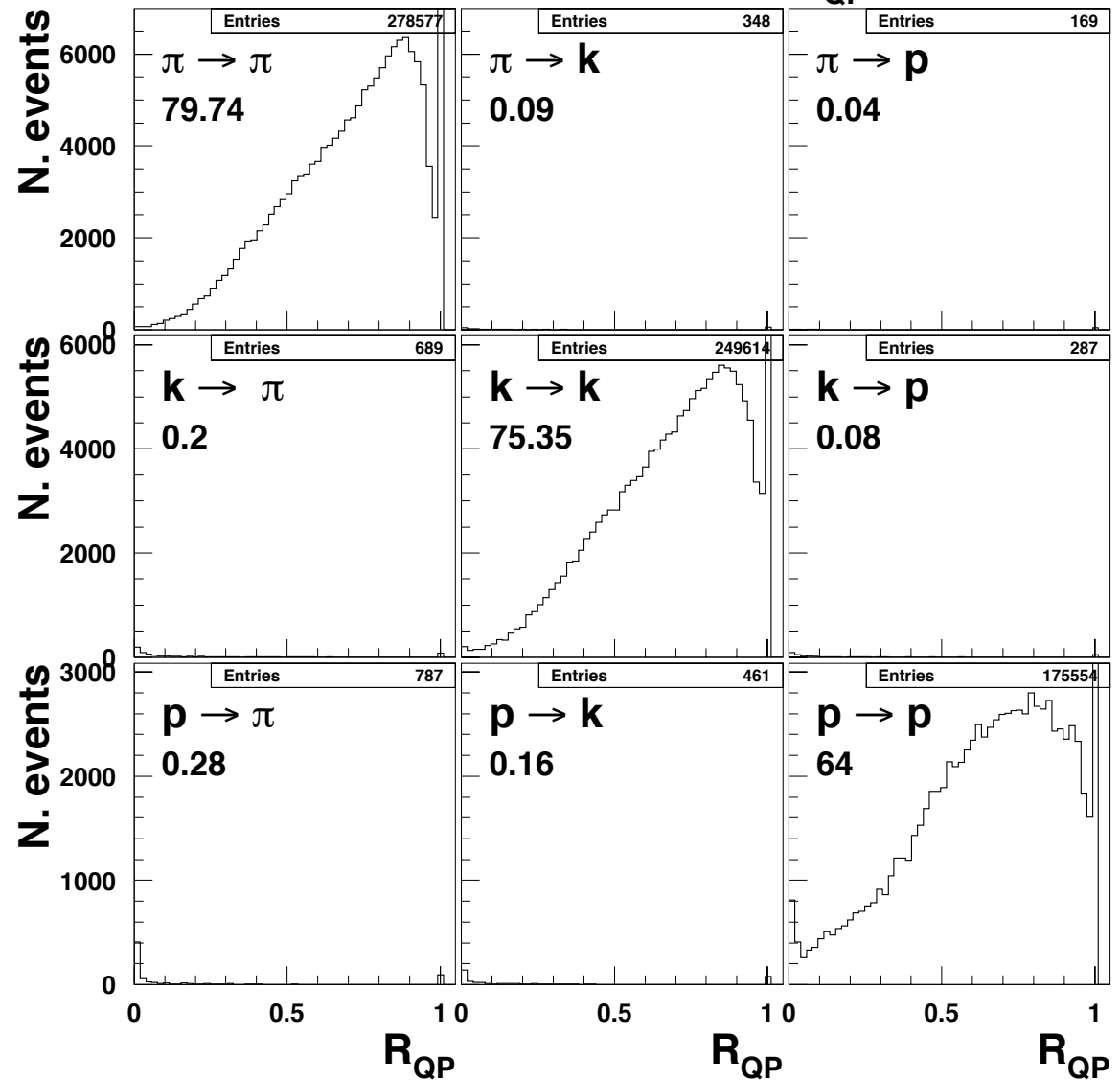
Contamination  $\sim$  few per mill

Efficiency  $\sim$  80 %

previous tables based on *only* events with  $n_{hit} > 2$

Identification quality:  
in average good

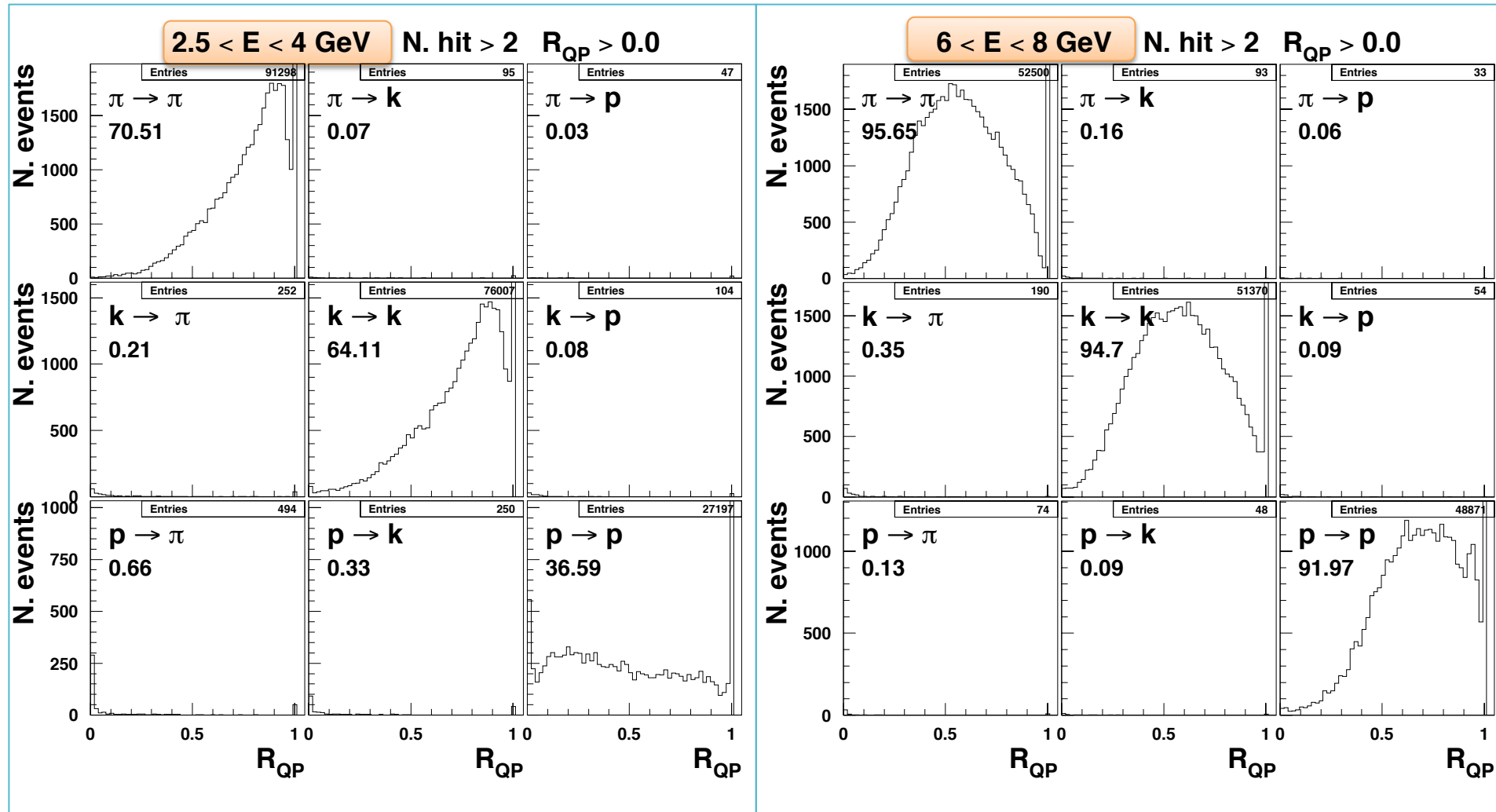
$3 < E < 8$  GeV  $N. hit > 2$   $R_{QP} > 0.0$



# LH performances: Jan 13<sup>th</sup> ( $R_{QP} > 0$ )

Low momentum: smaller efficiency due to angular spread and small  $N_{q.e.}$

High momentum: high uniform efficiency, ID more challenging (broader  $R_{QP}$ )

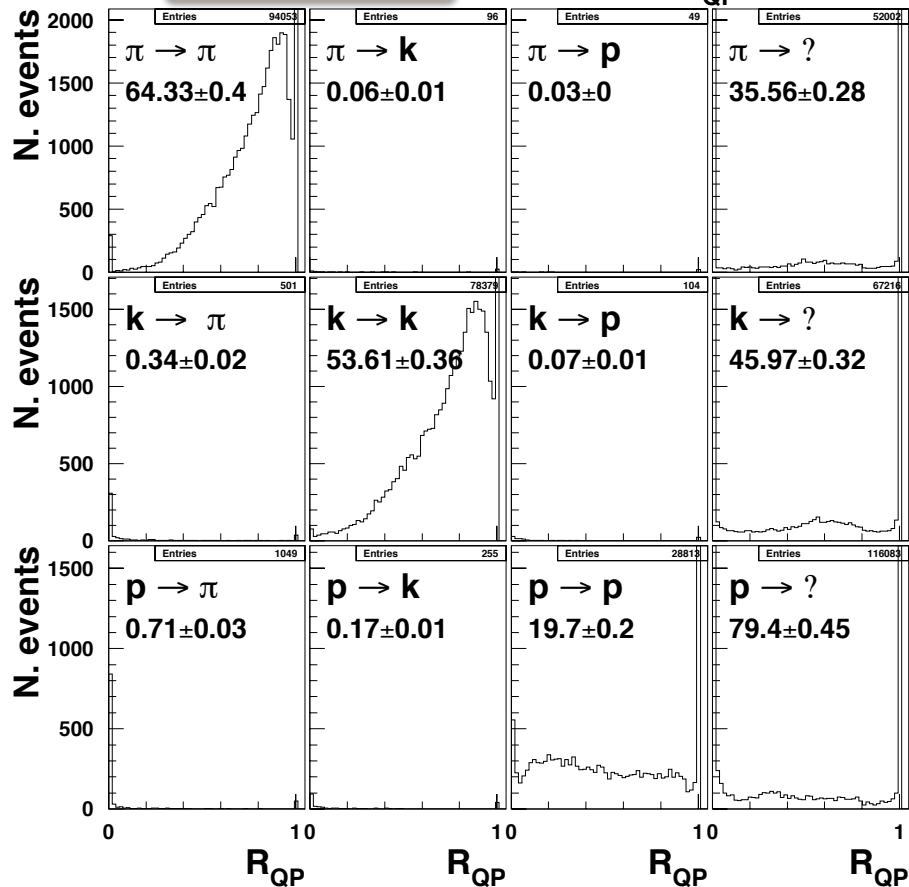


# LH performances: Feb 17<sup>th</sup> ( $R_{QP} \geq 0$ )

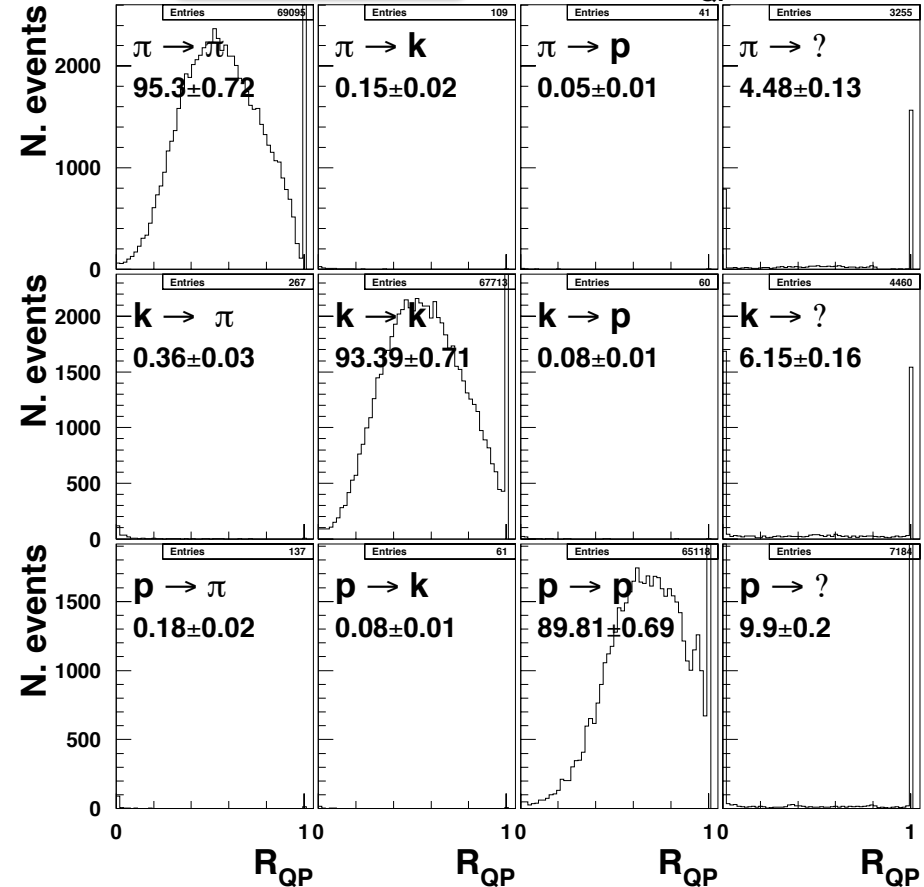
Low momentum: smaller efficiency due to angular spread and small  $N_{q.e.}$

High momentum: high uniform efficiency, ID more challenging (broader  $R_{QP}$ )

$2.5 \leq E \leq 4$  GeV N. hit > 2  $R_{QP} \geq 0.0$



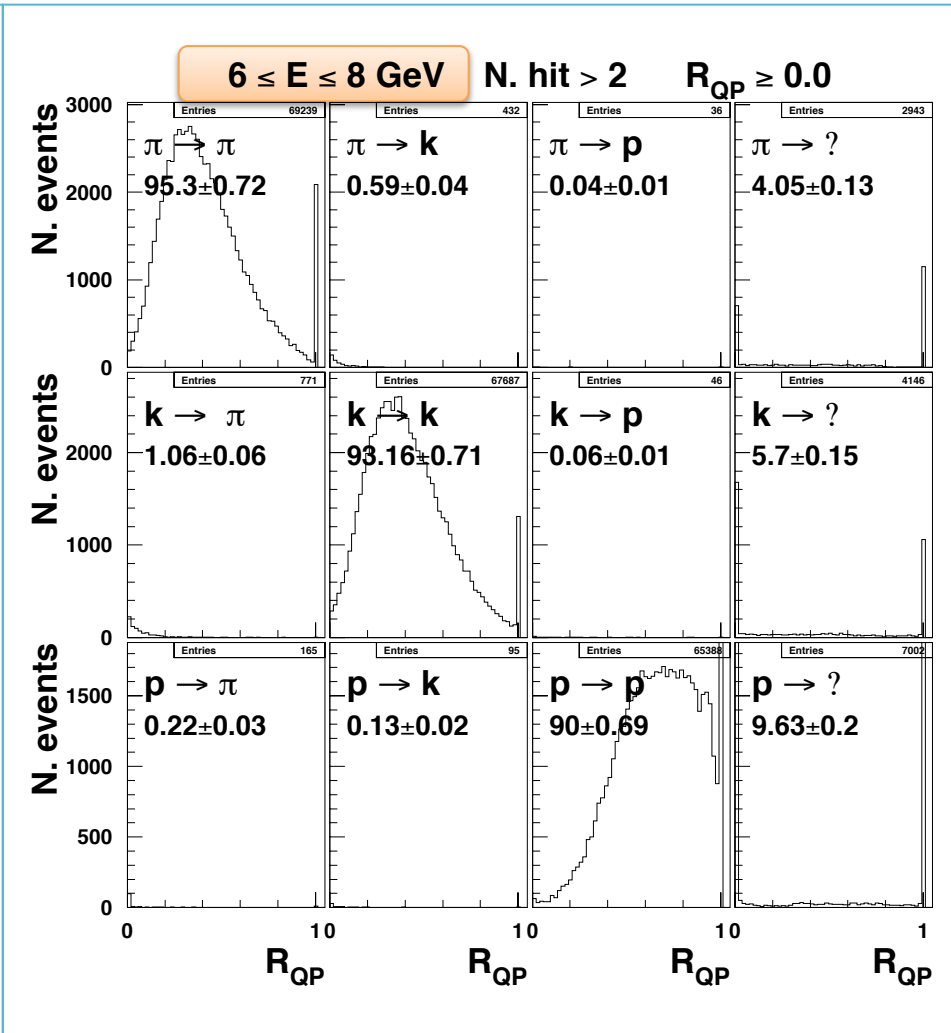
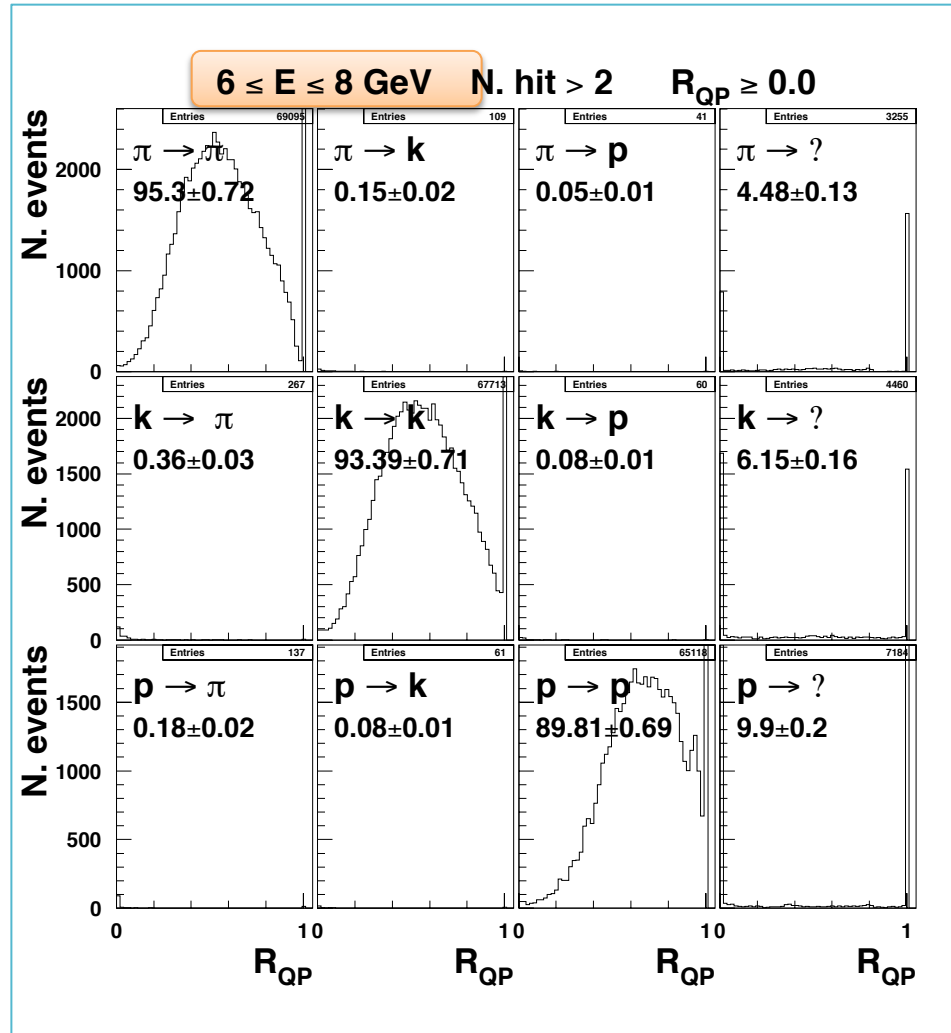
$6 \leq E \leq 8$  GeV N. hit > 2  $R_{QP} \geq 0.0$



# + Dispersion law at $n=1.05$ (High P)

Small impact on the efficiency

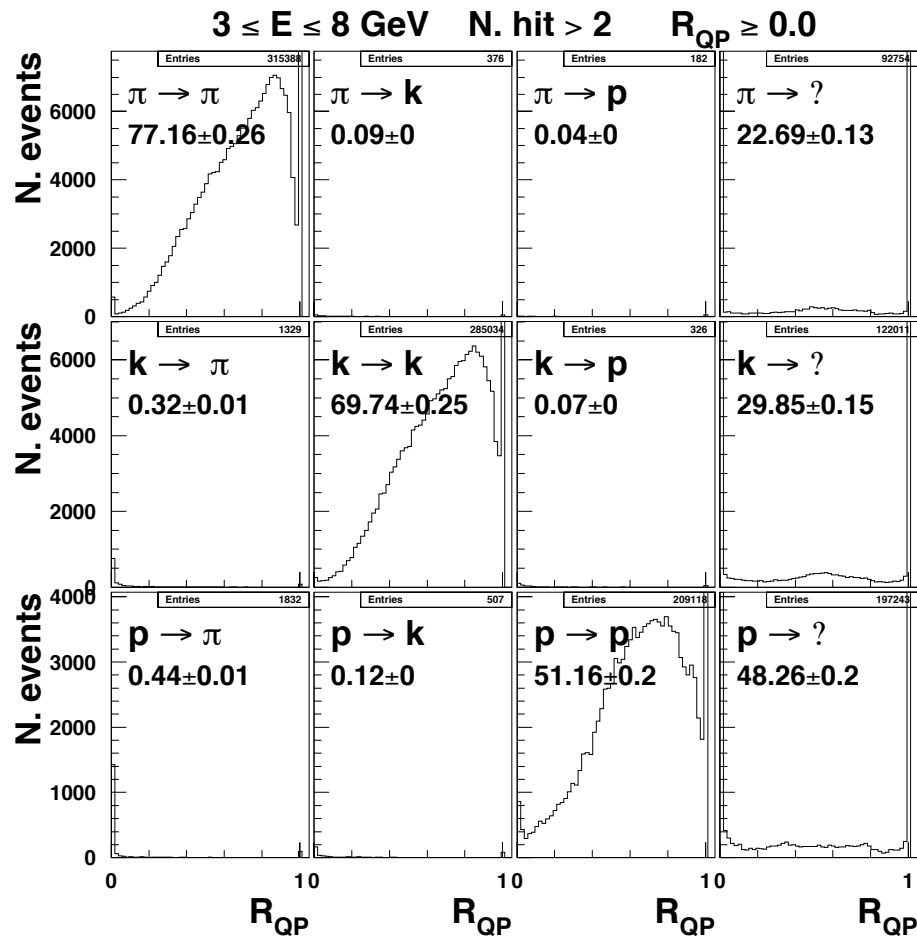
Significant increase of the contamination to a still manageable level



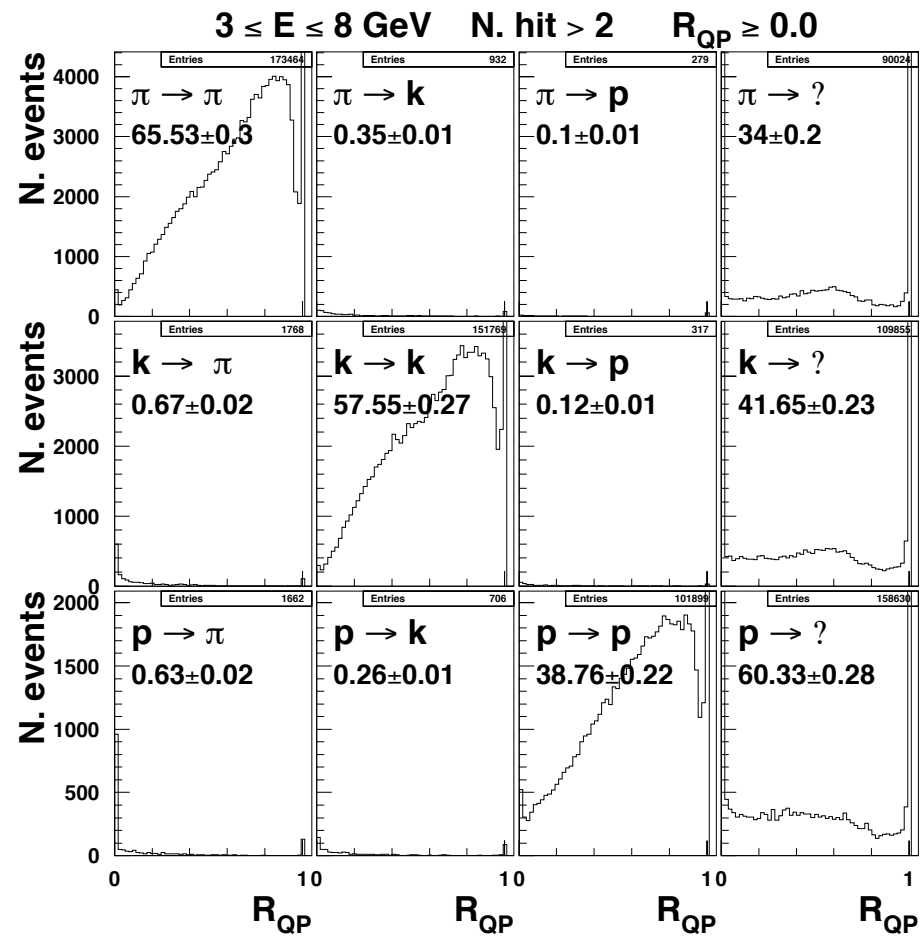
# + Rayleigh scattering

In the LH, Rayleigh scattering is treated as background  
 Significant increase of events with too few photoelectrons: to be investigated

Rayleigh as absorption



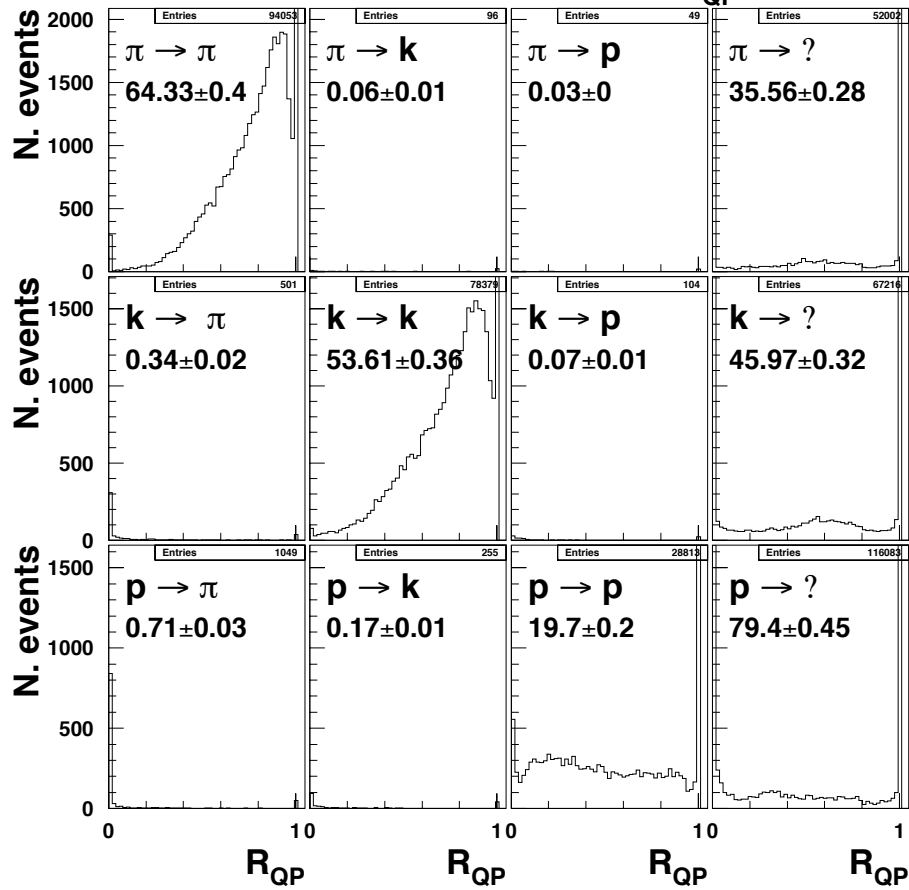
Rayleigh scattering



# +Rayleigh scattering: low momentum

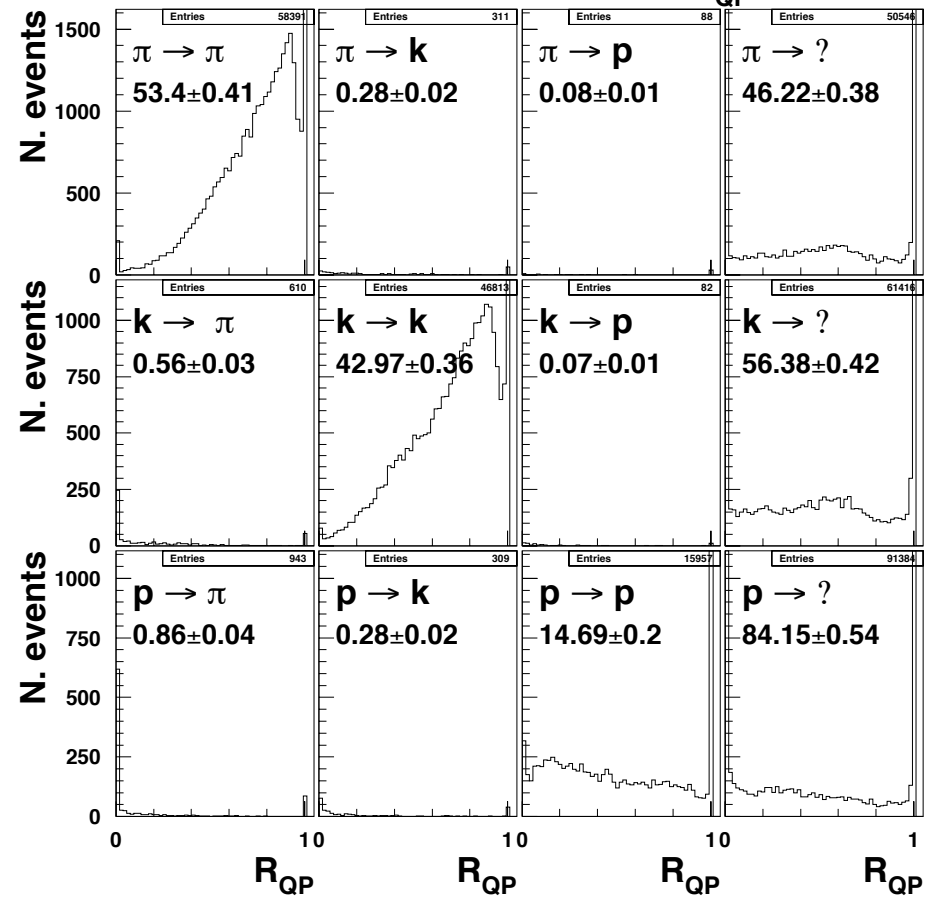
Rayleigh as absorption

$2.5 \leq E \leq 4 \text{ GeV}$   $N. \text{ hit} > 2$   $R_{QP} \geq 0.0$



Rayleigh scattering

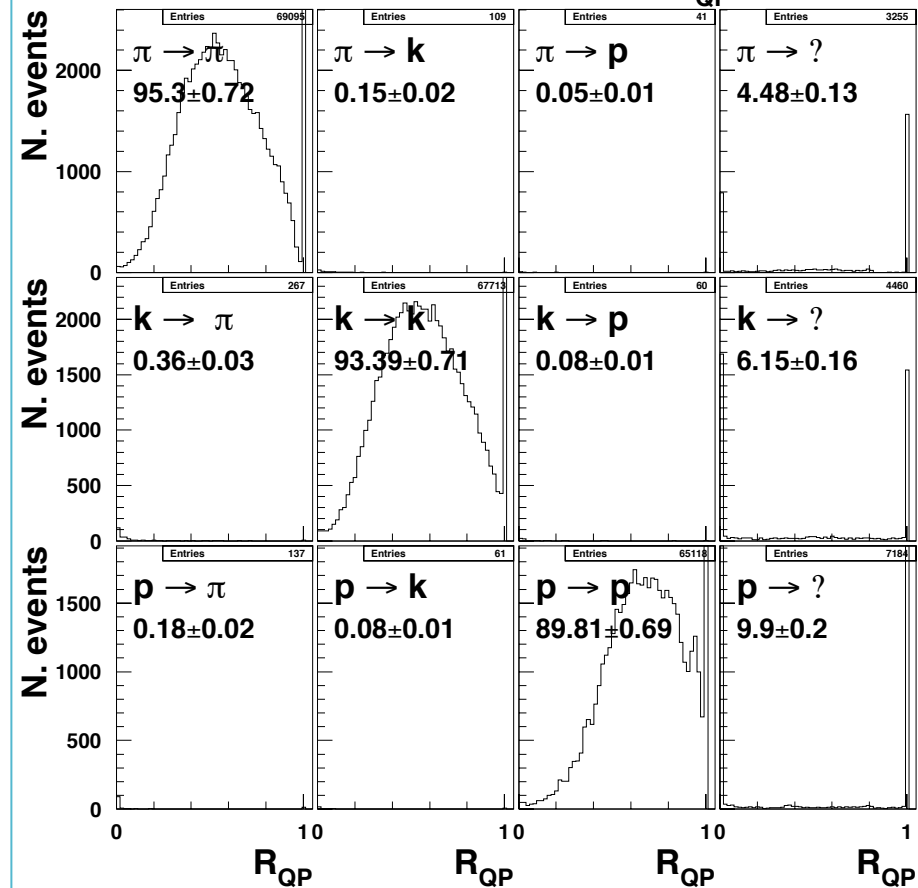
$2.5 \leq E \leq 4 \text{ GeV}$   $N. \text{ hit} > 2$   $R_{QP} \geq 0.0$



# +Rayleigh scattering: high momentum

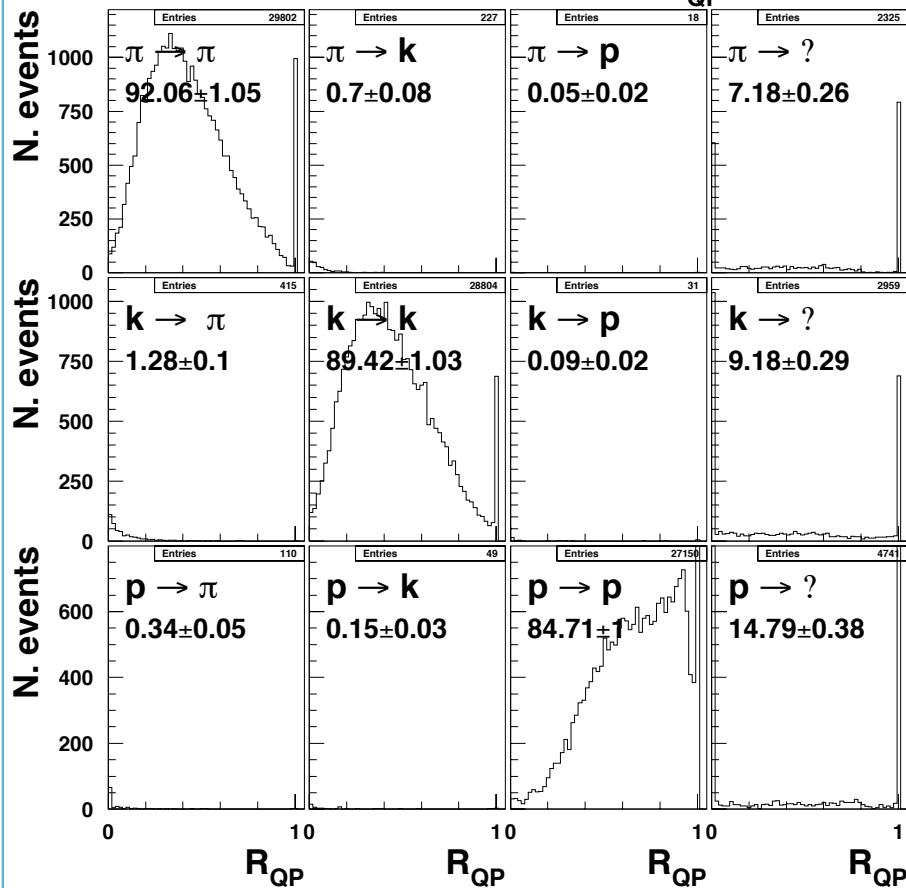
Rayleigh as absorption

$6 \leq E \leq 8 \text{ GeV}$   $N. \text{ hit} > 2$   $R_{QP} \geq 0.0$



Rayleigh scattering

$6 \leq E \leq 8 \text{ GeV}$   $N. \text{ hit} > 2$   $R_{QP} \geq 0.0$



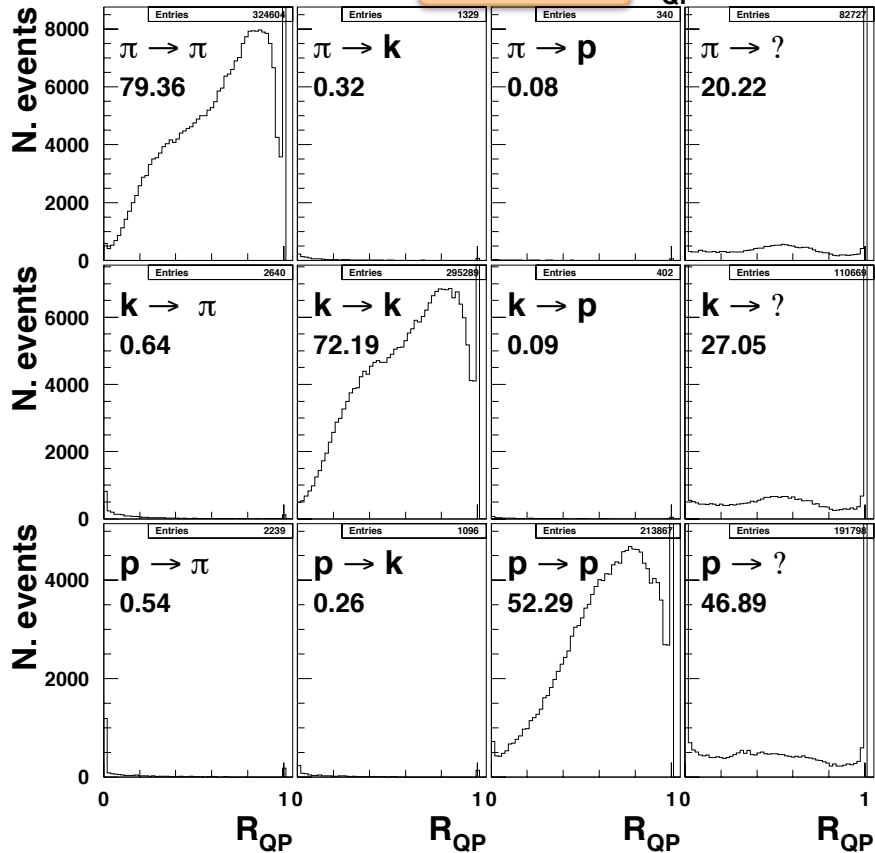


# LH performances: N. hits

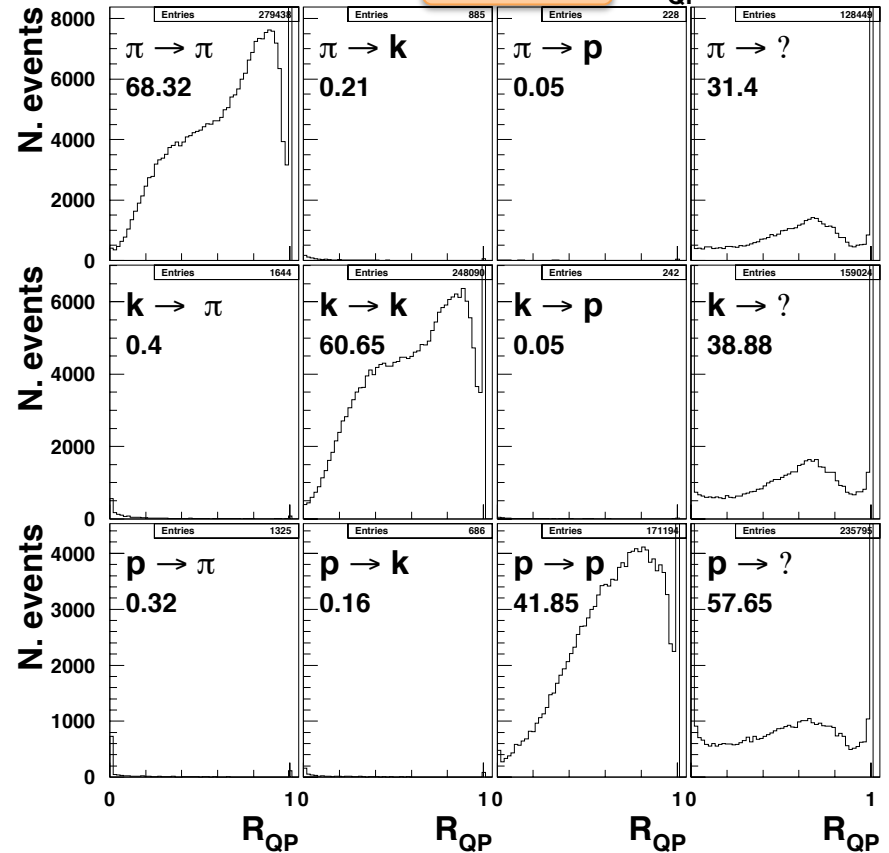
Up to 2 hits the RICH response is almost random

With 3 hits the identification start to be validated by  $R_{QP}$  goodness parameter

$3 \leq E \leq 8$  GeV **N. hit > 2**  $R_{QP} \geq 0.0$



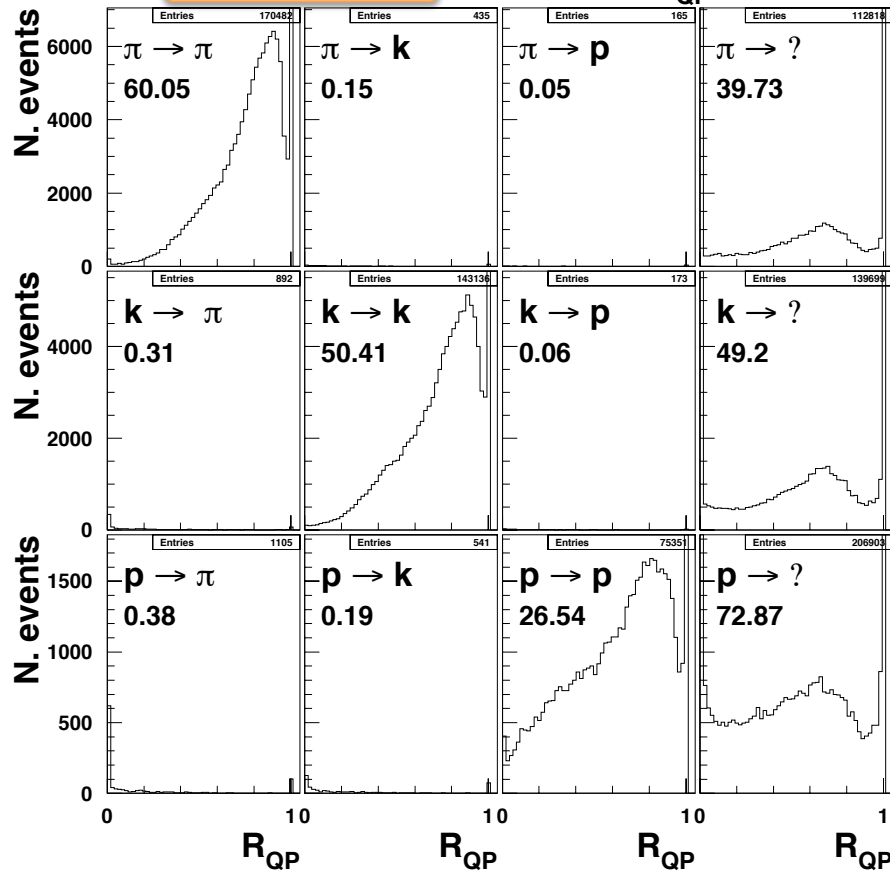
$3 \leq E \leq 8$  GeV **N. hit > 3**  $R_{QP} \geq 0.0$



# LH performances: N. hits

At high momentum 3-hit event are not really useful: there best separation power is needed but RICH gets higher average number of photon hits

$3 \leq E \leq 5 \text{ GeV}$  N. hit > 3  $R_{QP} \geq 0.0$



$6 \leq E \leq 8 \text{ GeV}$  N. hit > 3  $R_{QP} \geq 0.0$

