$\pi\pi\gamma$ trigger studies out of 2002 data

Federico Nguyen, Graziano Venanzoni

- motivation: the $\pi\pi\gamma$ / $\mu\mu\gamma$ ratio
- single particle method
- the rest of the event
- first glance at the $\mu\mu\gamma$ trigger efficiency

The data sample: reproc'd 2002 events

- new FILFO (Bhabha rej. dropped)
- enlarged m_{trk} 90 MeV → 80 MeV
- $\pi^+\pi^-\pi^0$ prescaled (1/1000) m_{miss} > 120 MeV

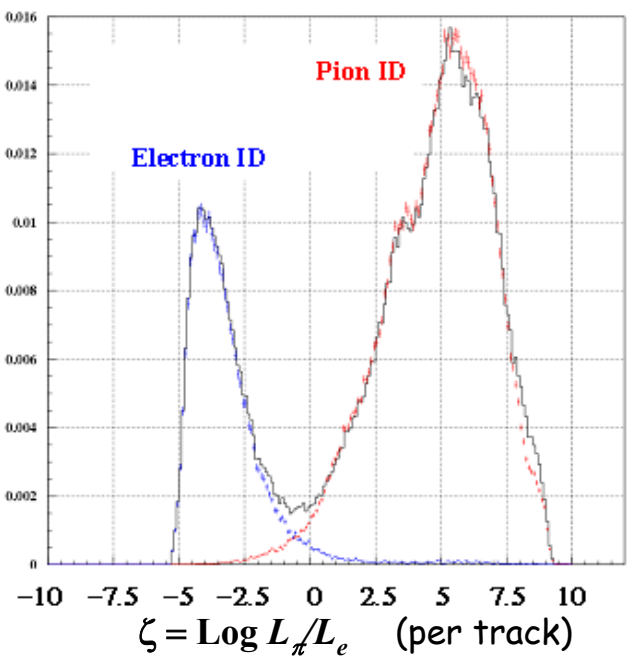
datarec version ≥ 22

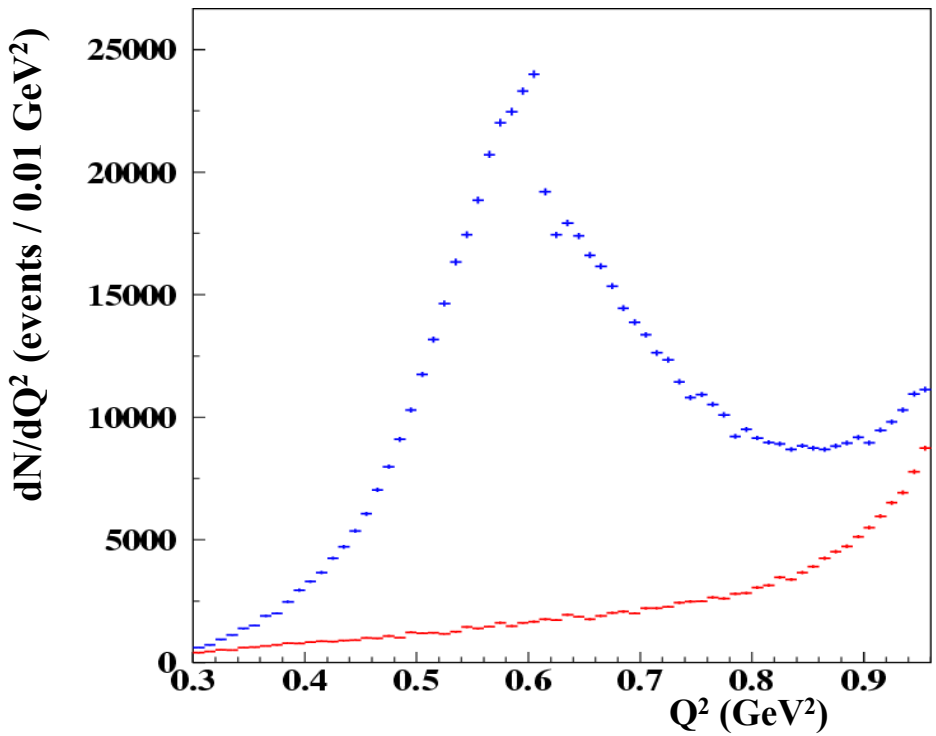
working point: events with

130 MeV < m_{trk} < 190 MeV are $\pi\pi\gamma$

m_{trk} < 113 MeV are $\mu\mu\gamma$

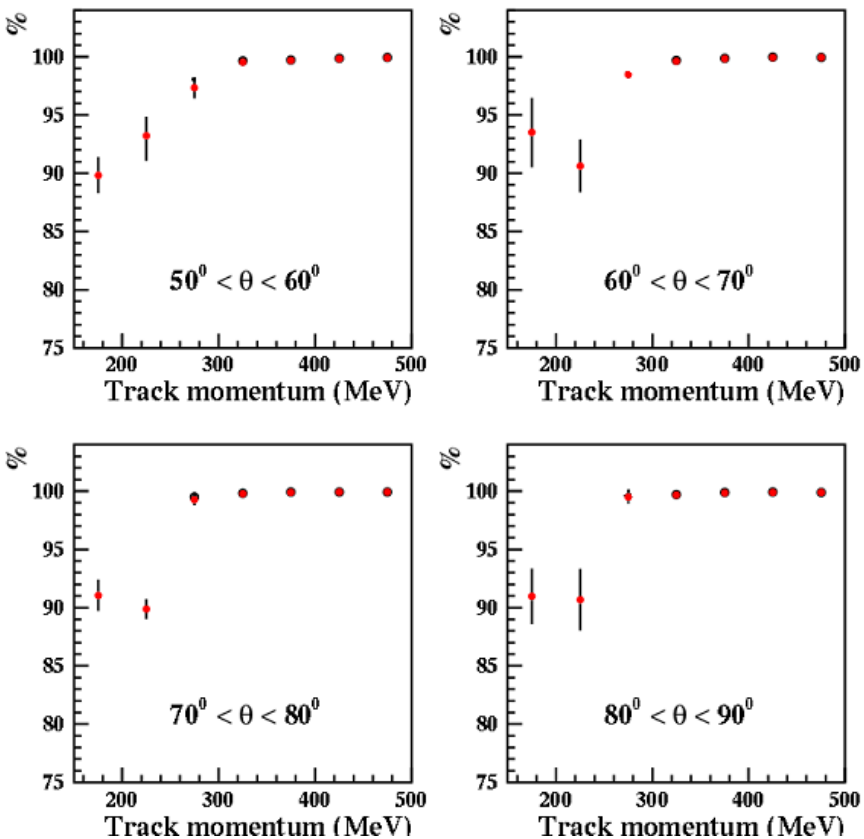
1. small angle photon $\theta_{\pi\pi} < 15^o$
2. each track with $50^o < \theta_{track} < 130^o$
3. at least one track with $\zeta > 0$

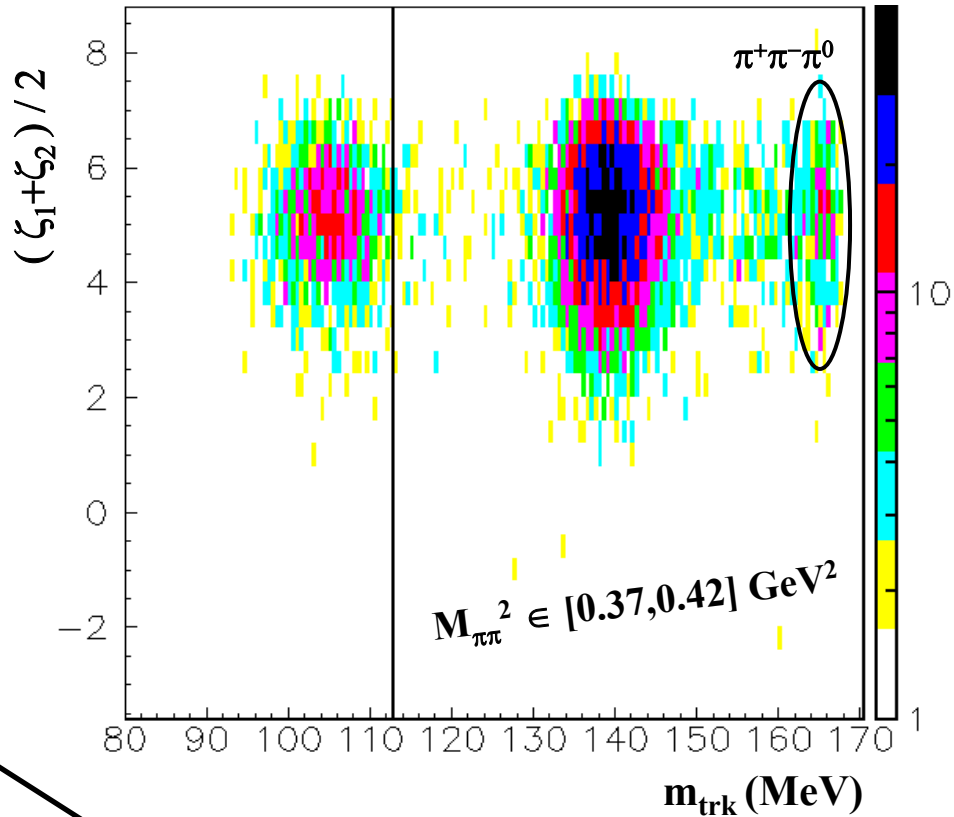




Definition of μμγ events (I)

the assumption is that the Likelihood efficiency is high for μμγ event

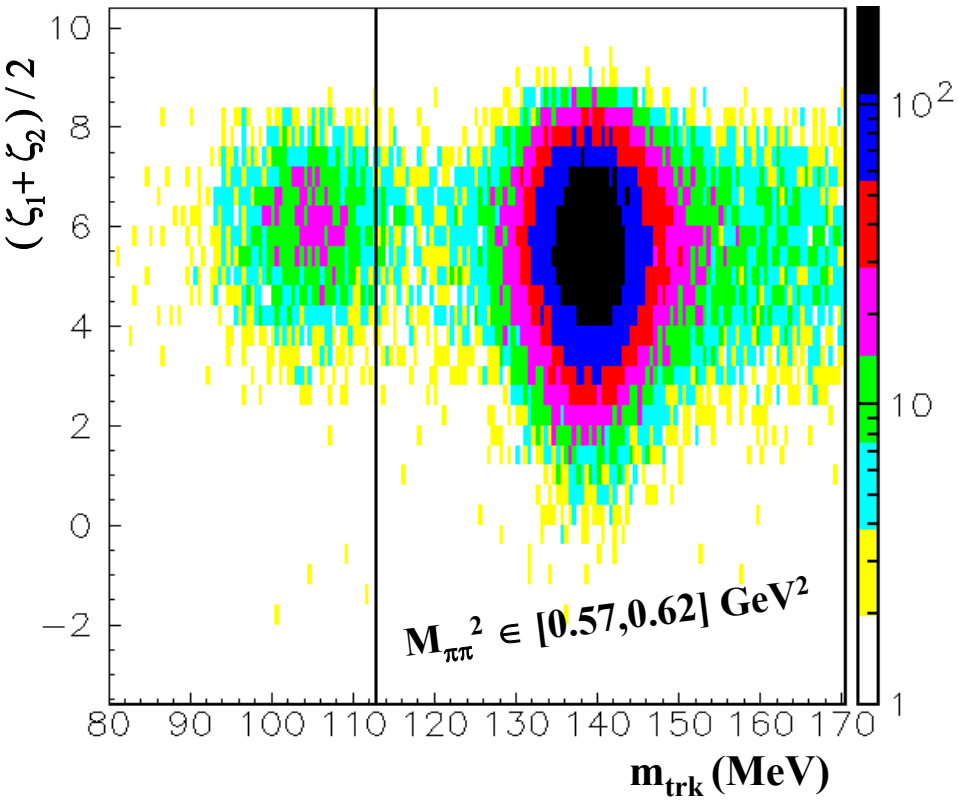




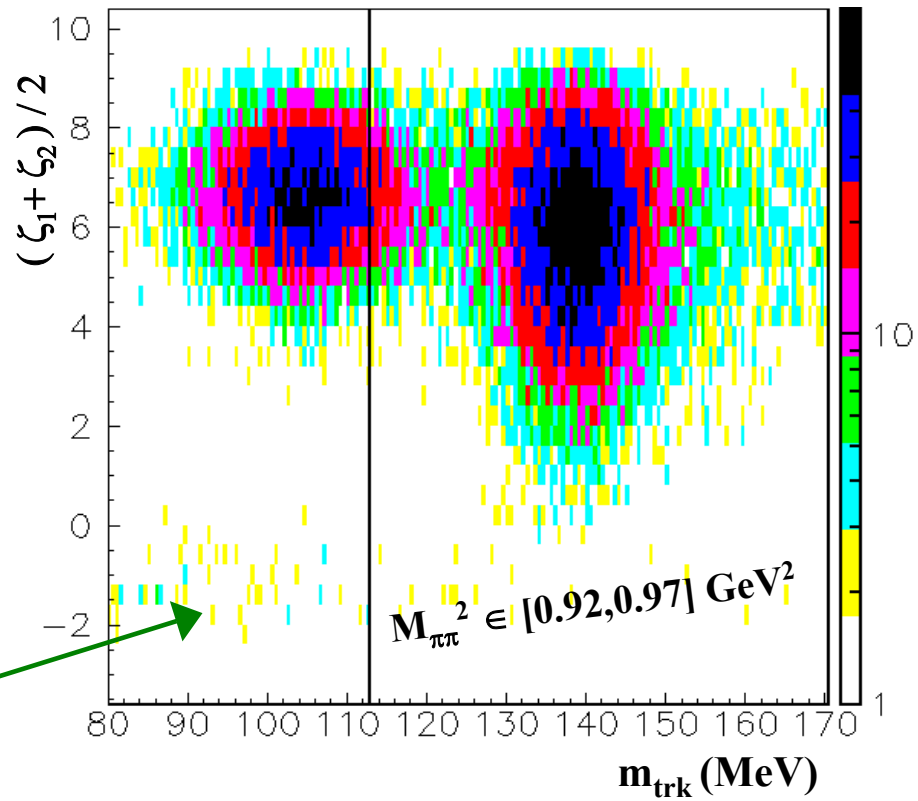
probability for the μ track to have log $L_\pi/L_e > 0$, conditioned to the track-to-cluster association

from B. Valeriani PhD Thesis

Definition of μμγ events (II)



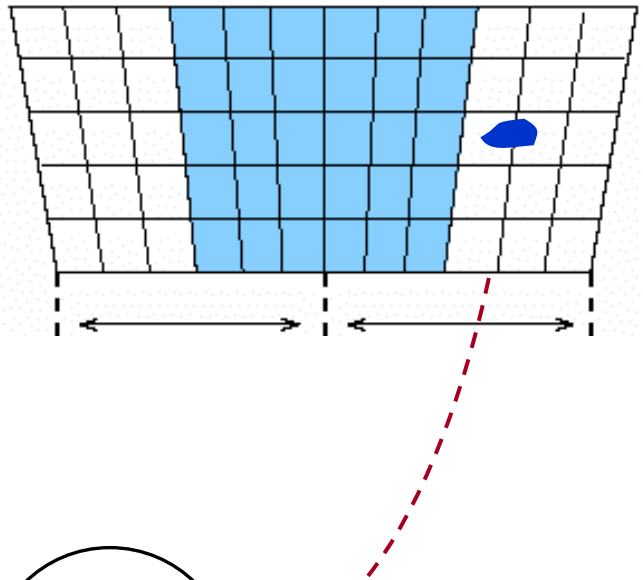
$m_{trk} < 113$ MeV is a safe choice near the ρ peak



eeγ contamination @ high $M_{\pi\pi}^2$ can be neglected to 1st order

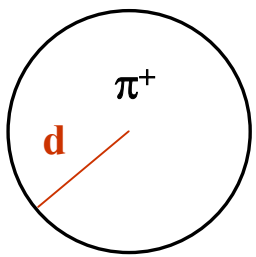
ECAL trigger efficiency

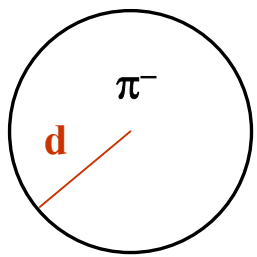
based on the single particle method
by M. Incagli (KLOE Memo n. 278)



data sample size: $L \sim 53\ pb^{-1}$

- 1 and only 1 vertex in $\rho < 8cm$, $|z| < 15cm$ with 2 tracks
- each track extrapolated to the ECAL à la T. Spadaro
- classify all clusters such that they belong to:

either 

or 

or 

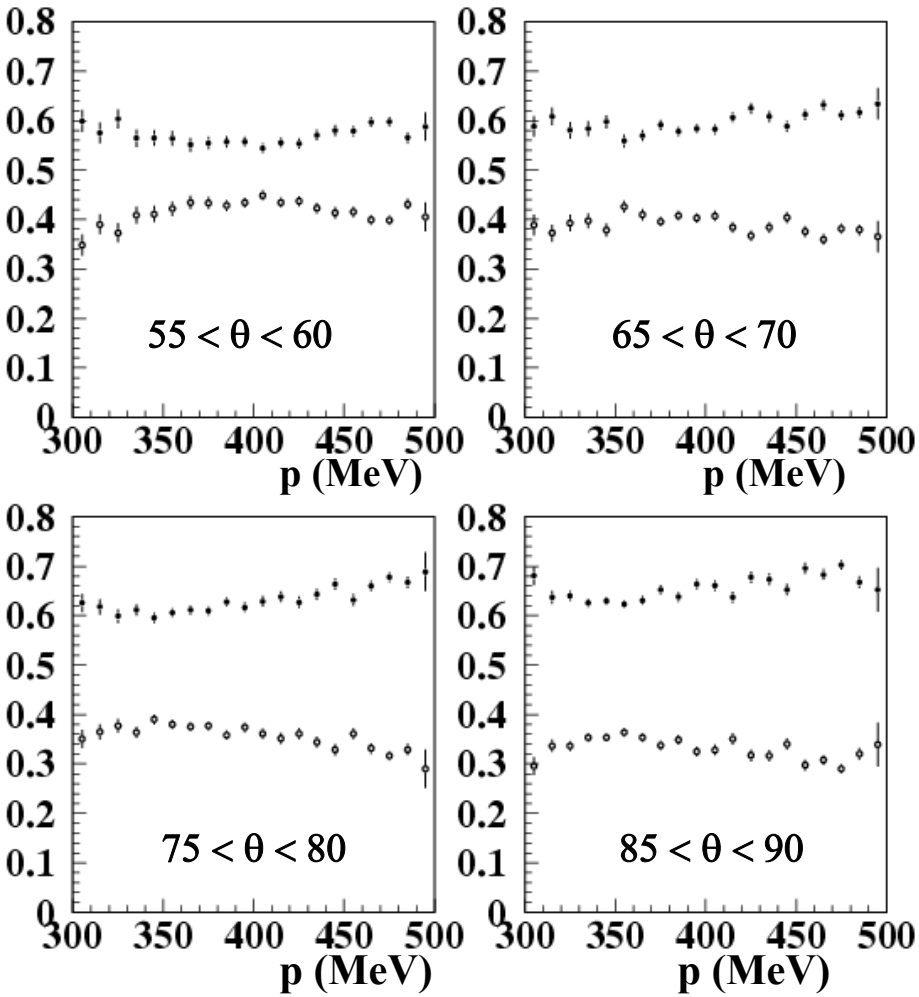
- each category may have associated 0, 1, 2 trigger sectors
- small angle photon, $\theta_{\pi\pi} < 15^o$

(retrieved with the CTRG bank)

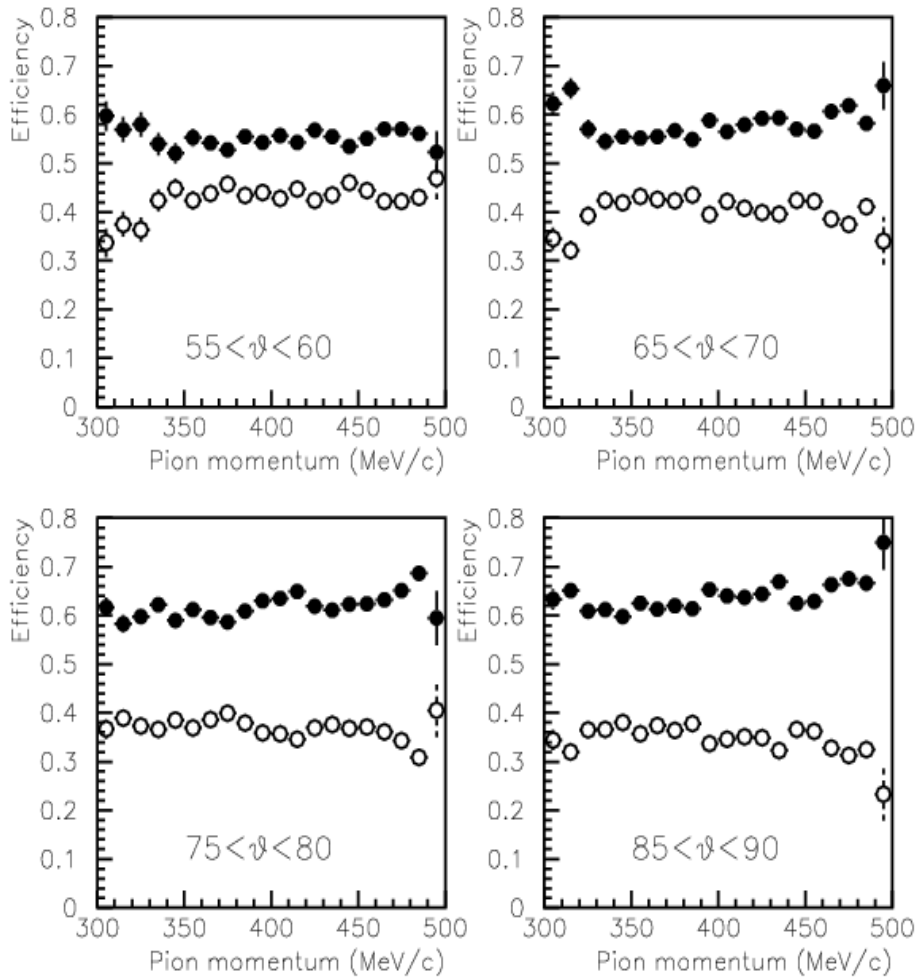
d = distance btw cluster centroid and the extrap'd point of the track

Single track efficiency

probability of firing 1 (•) or 2 (○) trigger sectors for the π^+ (2002)



to be compared with that from KLOE Note 192 (2001 data)



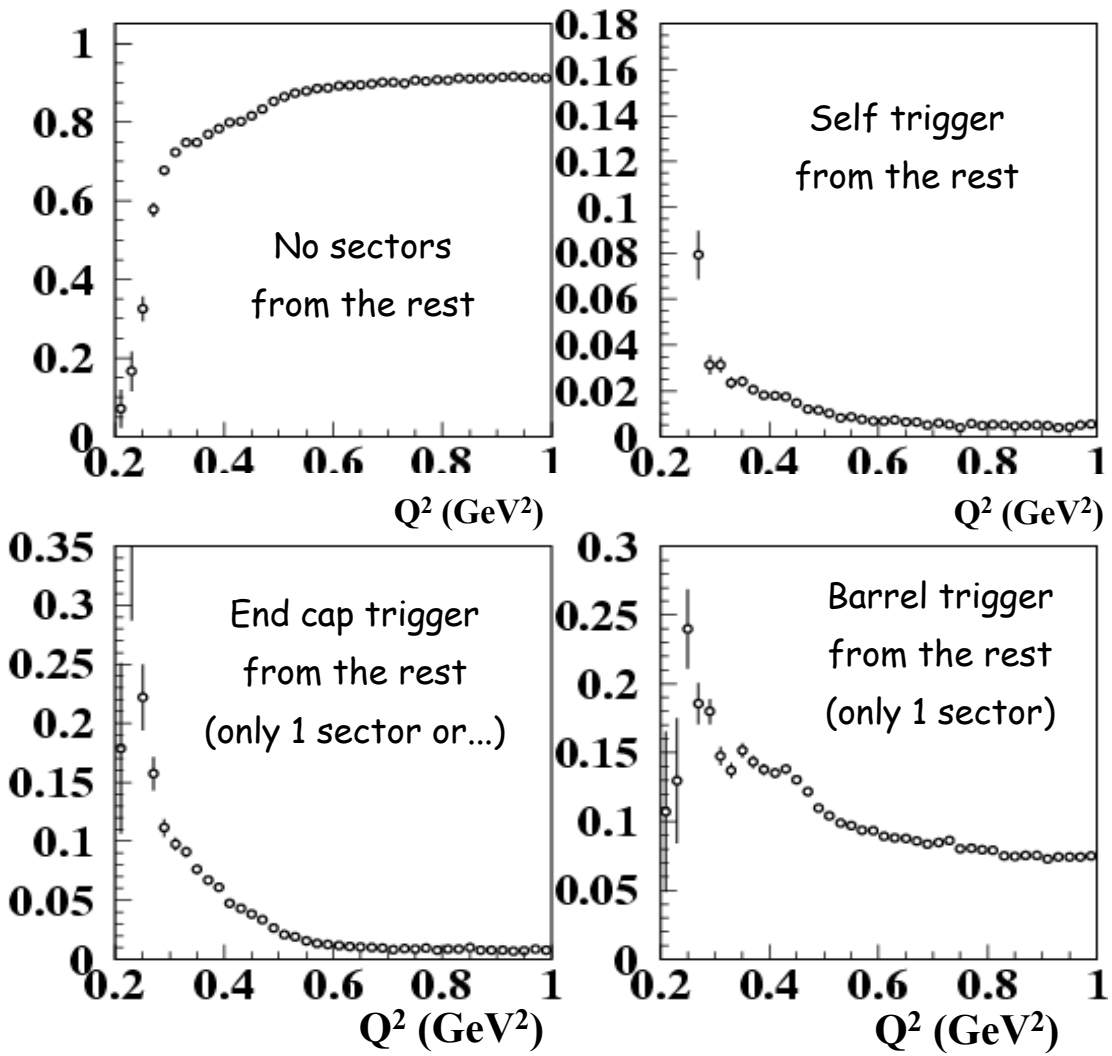
The rest of the event

it consists of:

- fragments of the π cluster
- large angle photons
- secondary particles created by photons hitting the quadrupoles
- pile up events

the normalization is provided by the events triggered by the π's

features and how to compare with 2001, still to be understood



Single muon efficiency

probability of firing 1 (•) or

2 (○) trigger sectors for the

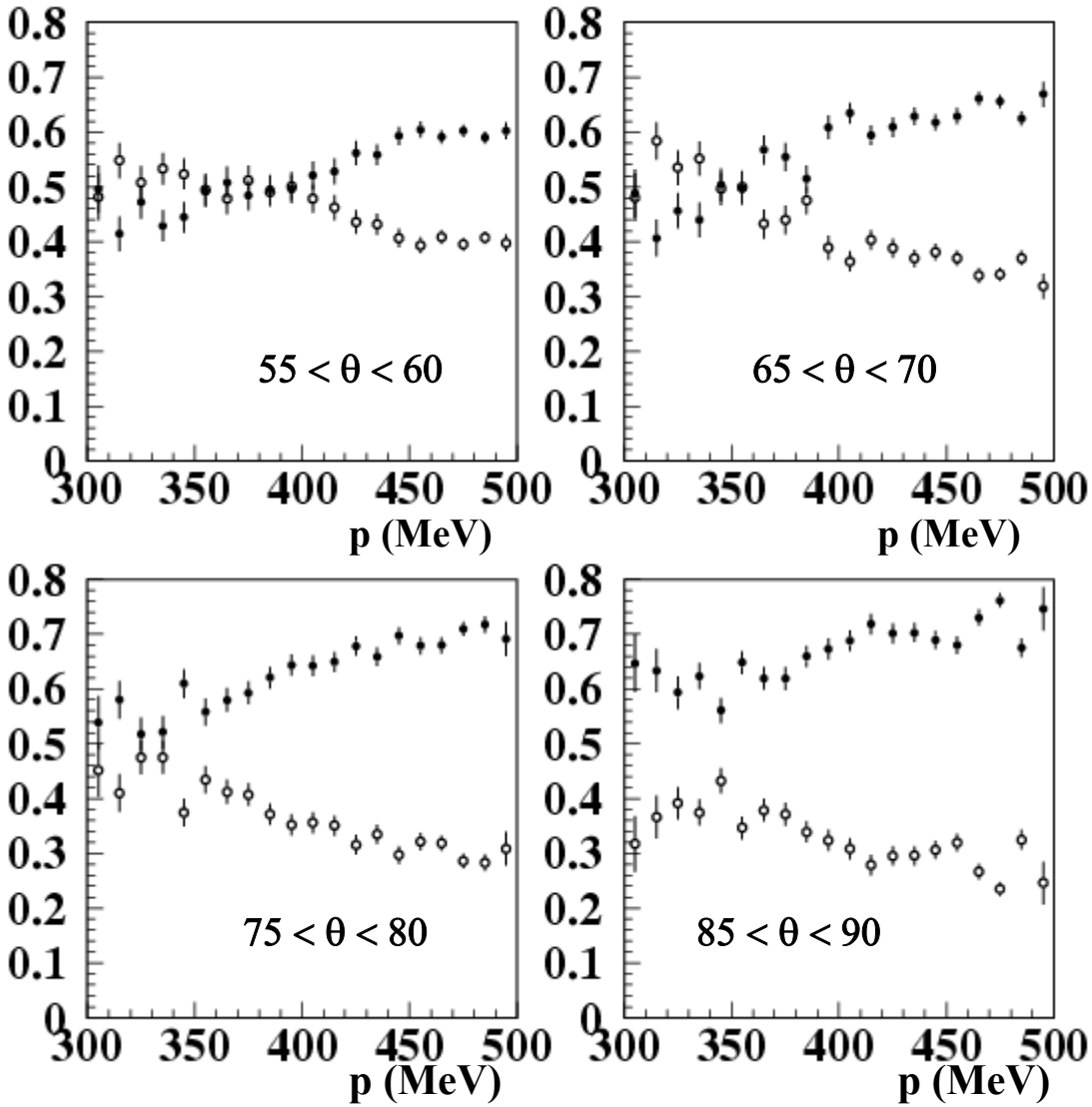
μ^+ (2002)

the probability of firing 0

sectors happens to be ~ 0

this explains the funny up-down

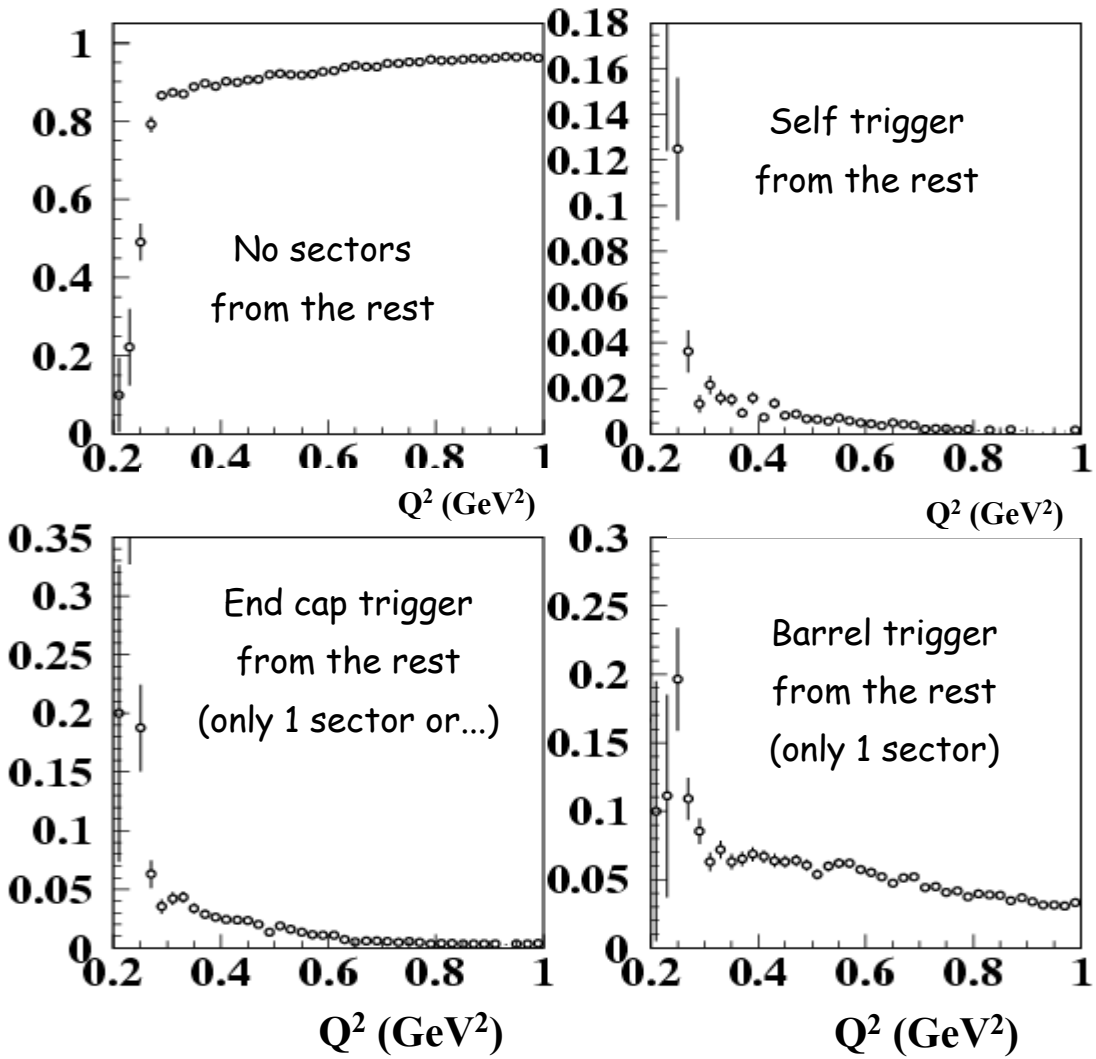
symmetric behaviour



The rest efficiency for μμγ events

as expected:

- the probability of cluster fragments from μ's is less than in the π's case
- lower self-triggering efficiency



Preliminary conclusions

- trigger studies from data have been addressed
- single particle efficiencies have been evaluated both in the π and in the μ case
- the rest of the event must be compared with the background rate in both cases