

1. Reconstruction of $J\psi \rightarrow \mu^+\mu^-$
2. Photon candidate
3. Reconstruction of χ_c
with anti - π^0 cut
4. Reconstruction of χ_c
using the most energetic photons in event.
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Reconstruction of $J\psi \rightarrow \mu\mu$

$$P_1 P_2 < 0$$

$$L_{\mu\mu} > 0.001$$

$$\text{Prob}(VX) > 0.005$$

clone remove if

$$\sqrt{\left(\frac{P_{X1}}{P_{Z1}} - \frac{P_{X2}}{P_{Z2}}\right)^2 + \left(\frac{P_{Y1}}{P_{Z1}} - \frac{P_{Y2}}{P_{Z2}}\right)^2} < 0.003$$

(from Olya)

$$\left|\frac{P_1 - P_2}{P_1}\right| < 0.05$$

Photon candidate

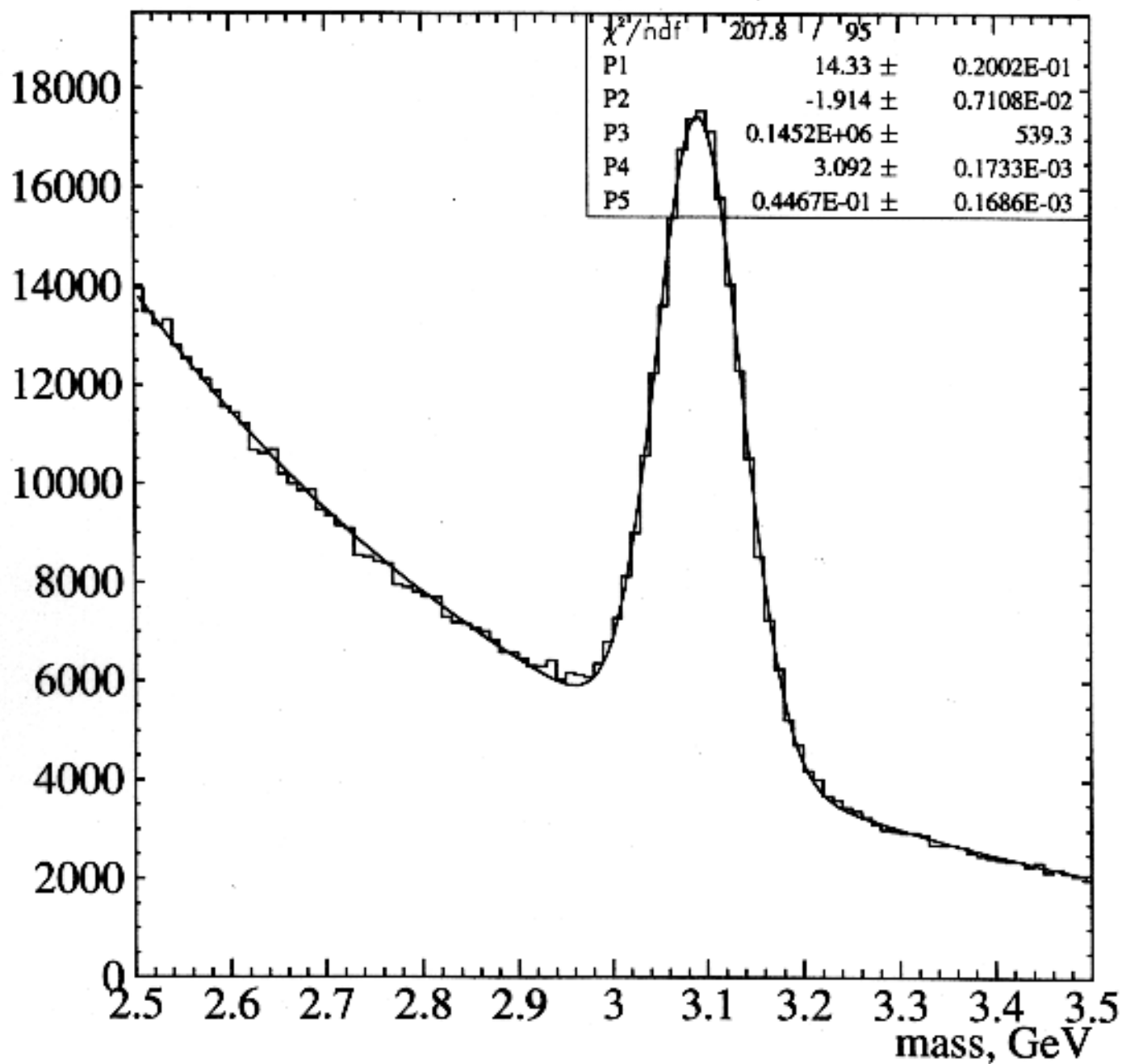
$$E > 0.3 \text{ GeV}$$

$$E_t > 0.05 \text{ GeV}$$

Clusters which match with charged tracks are removed except potential candidates to photon conversion after the magnet:

- no VDS segment
- OTR segment is allowed if it points to main vertex:

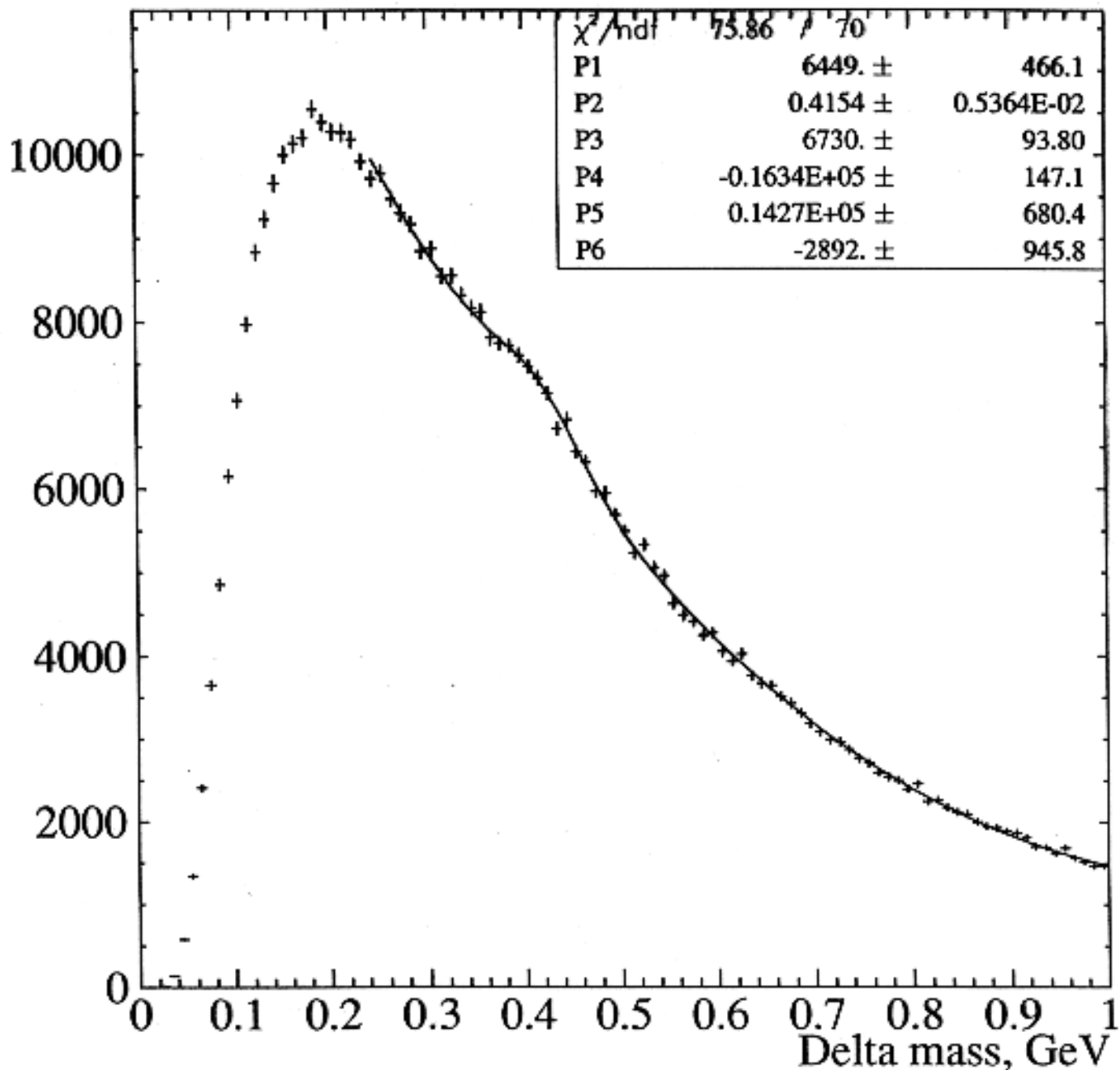
$$(|tq_x| < 0.01) \ \&\& \ (|tq_y| < 0.01)$$



Reconstruction of χ_c
with anti- π^0 cut

no π^0

0.045 fixed

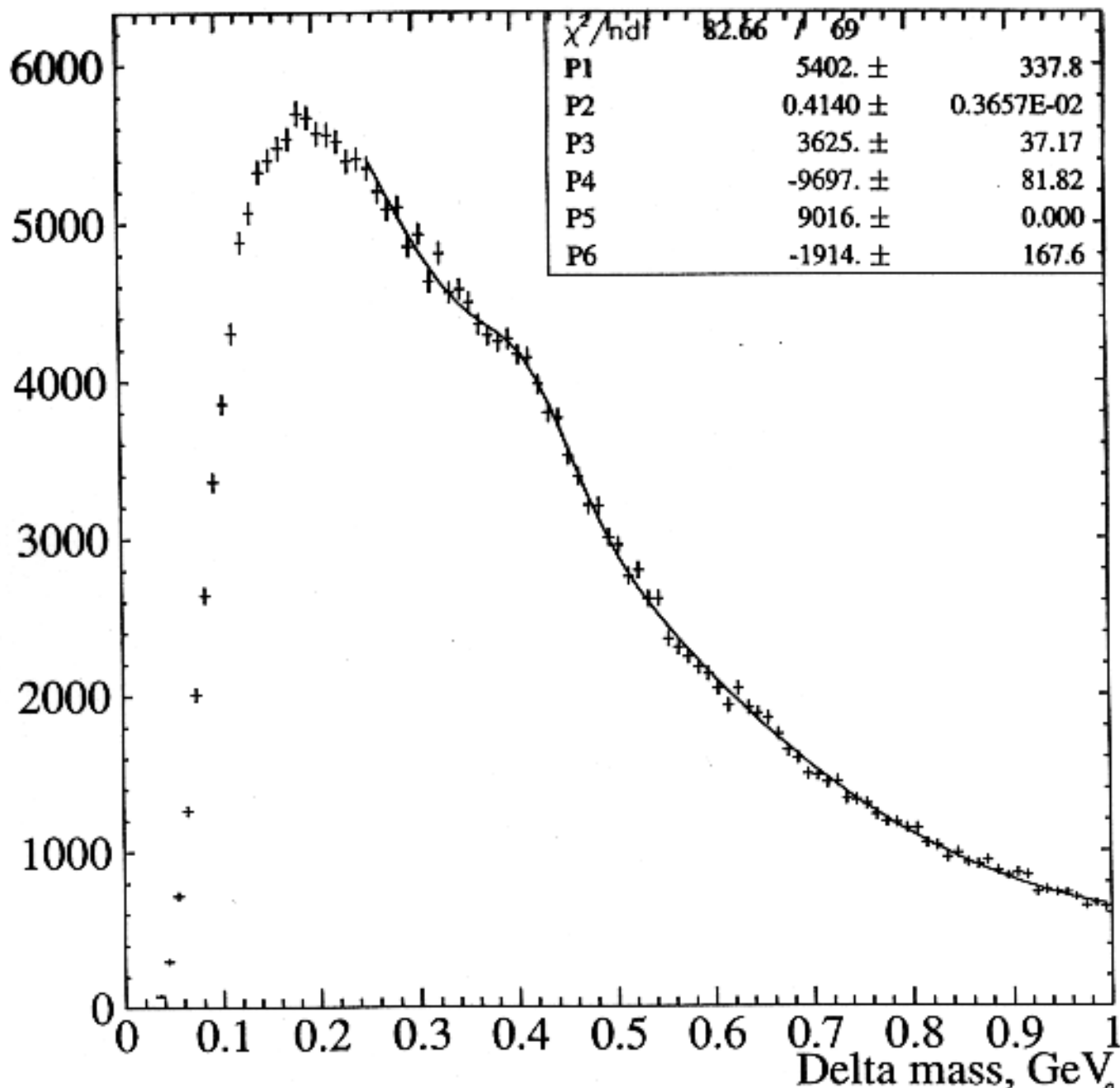


$|m_{\gamma\gamma} - 0.135| > 0.015$ with any other γ in event
(E_{γ} & E_{\pm} cuts for second γ are not applied)

$$20 < R < 150 \text{ cm}$$

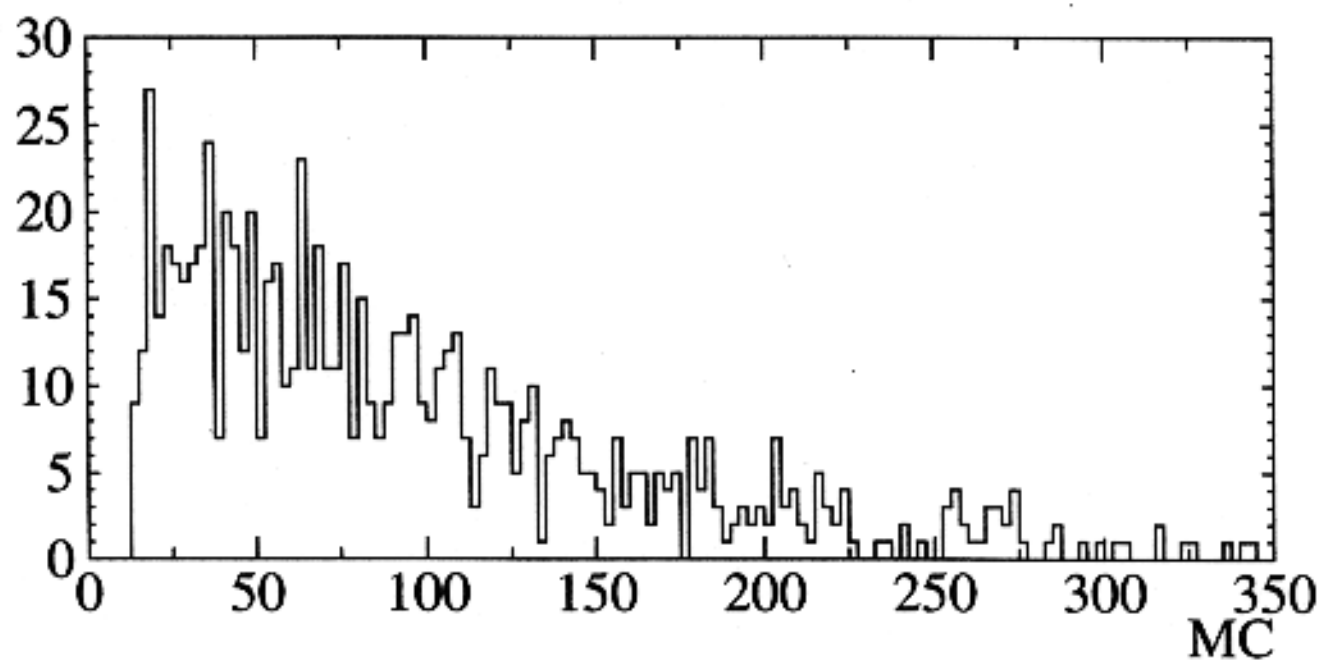
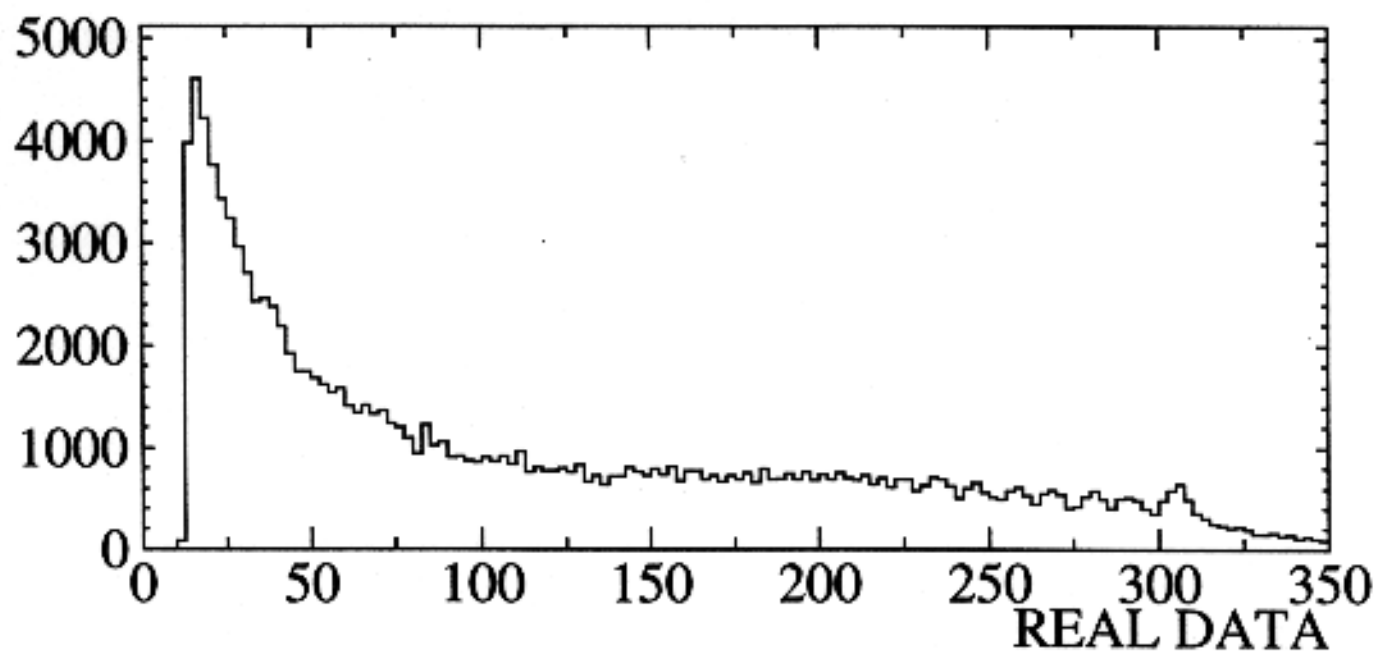
R - distance from (0,0) at ECAL

R 20 150, no pi0

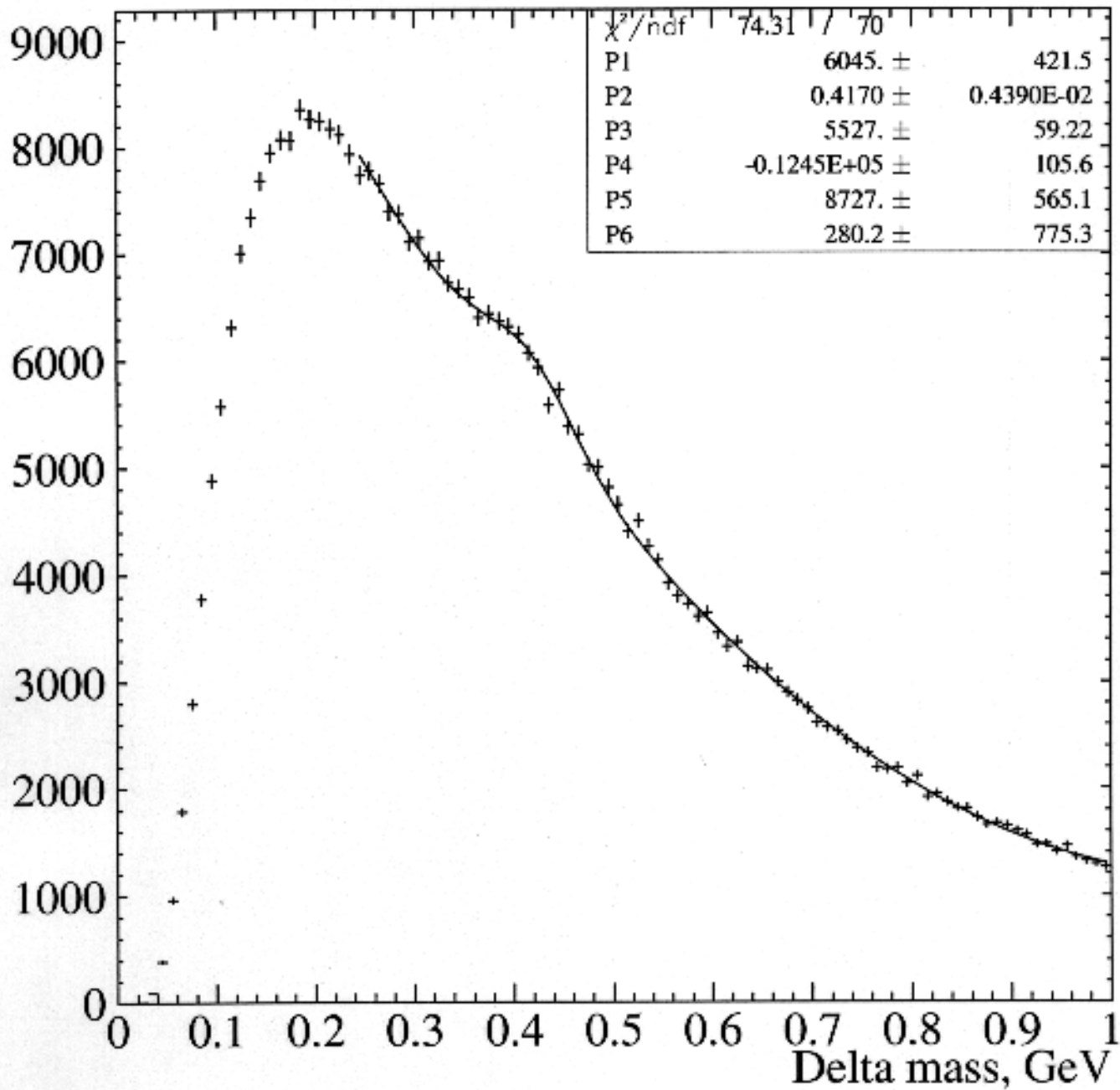


- azimuthal symmetry if tracks are removed;
- in outer region second photon can be outside the acceptance $\Rightarrow R < 150 \text{ cm}$;
- same + high background in inner region $\Rightarrow R > 20 \text{ cm}$

Cluster distance from (0,0)

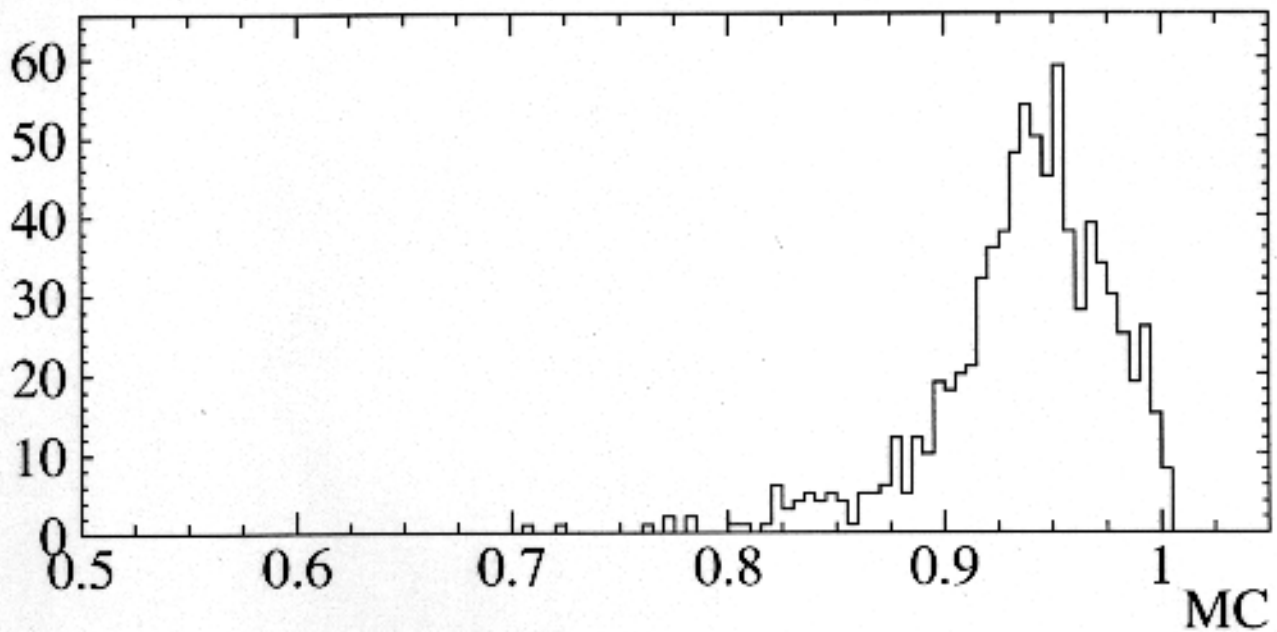
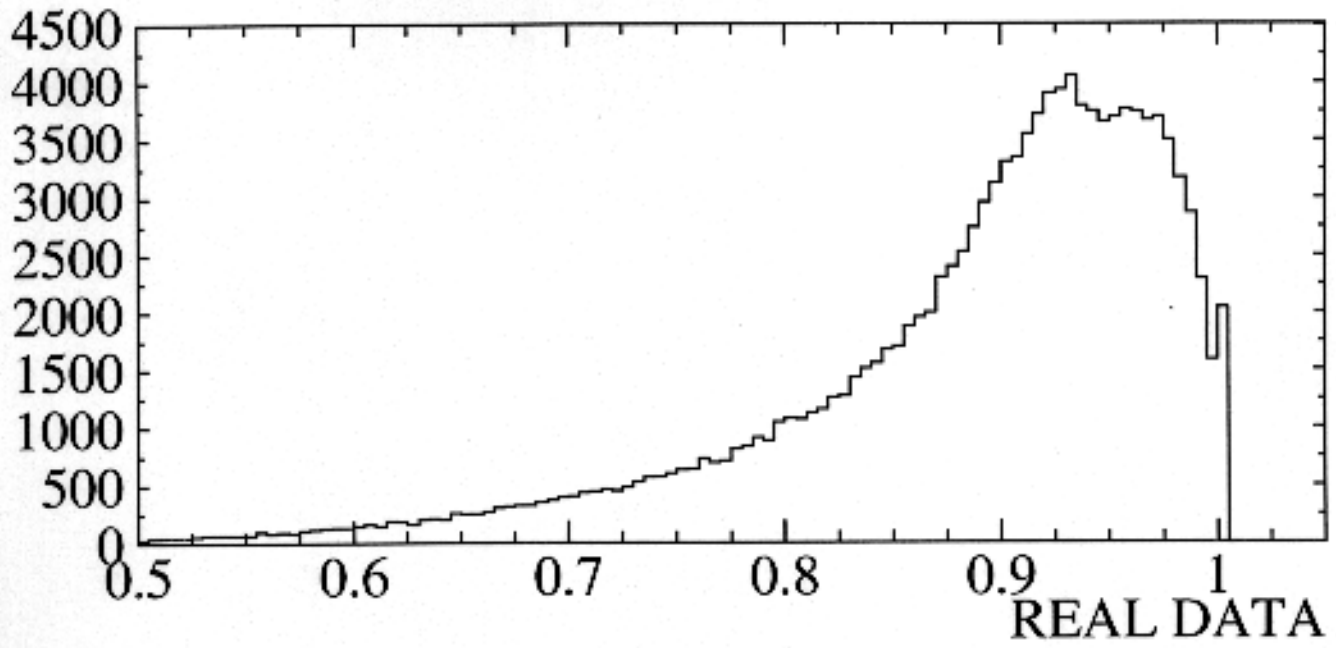


asym 0.8 1, no pi0

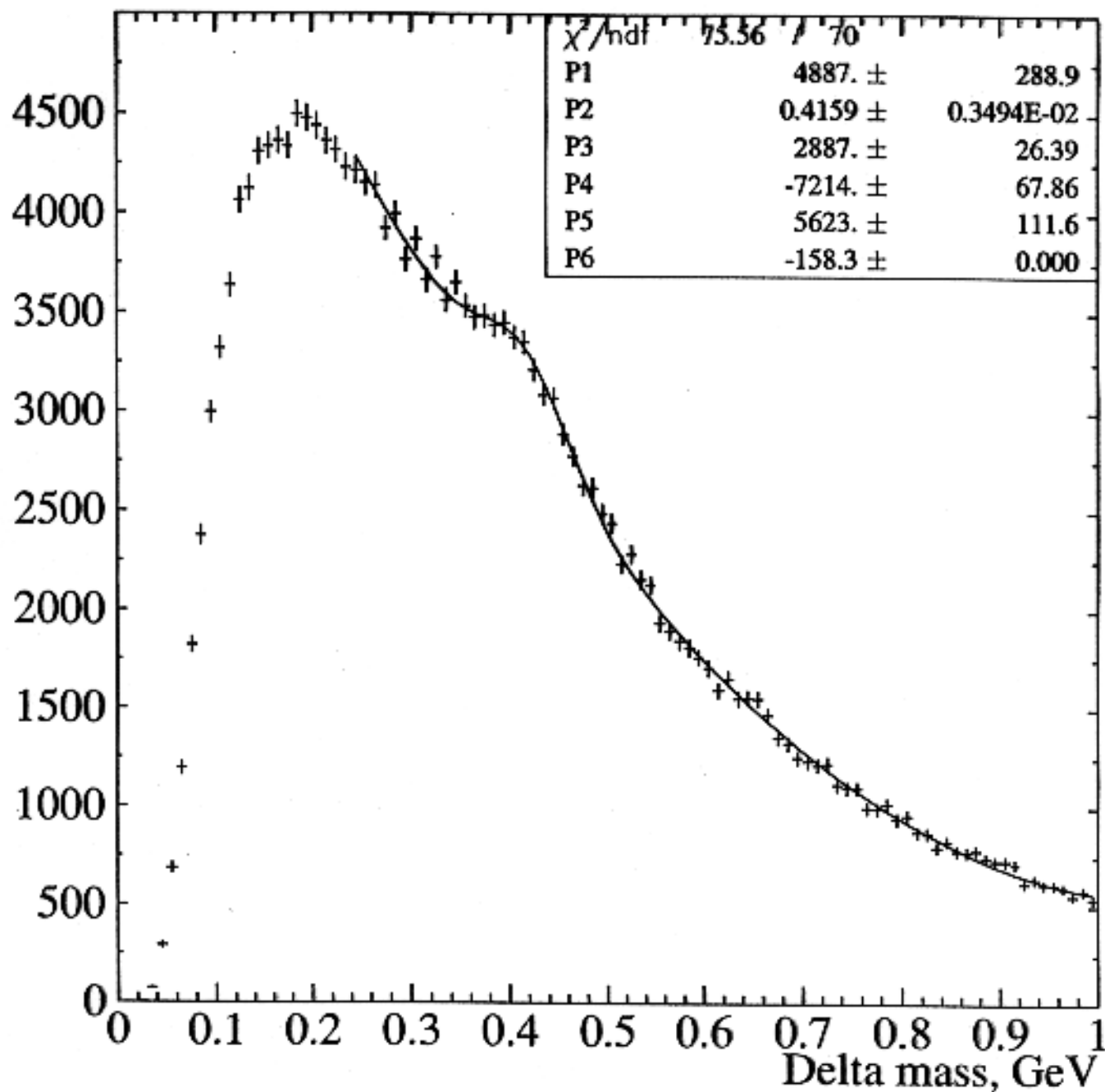


$0.8 < a_{SYM} < 1$

ECAL cluster ASYM



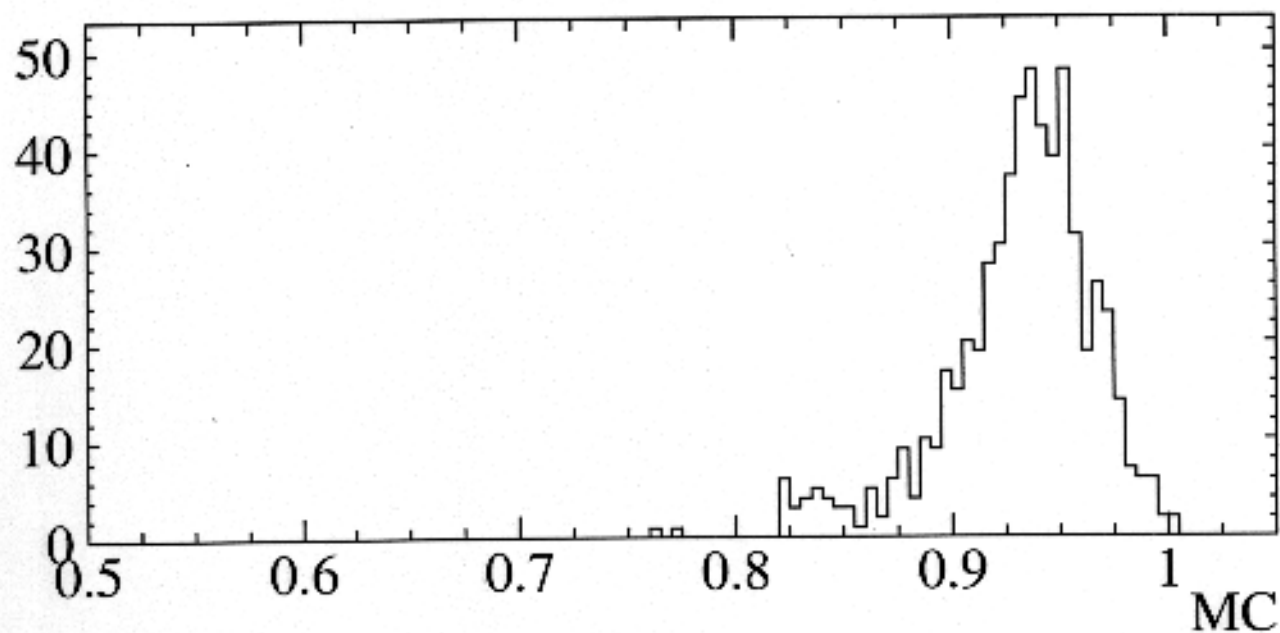
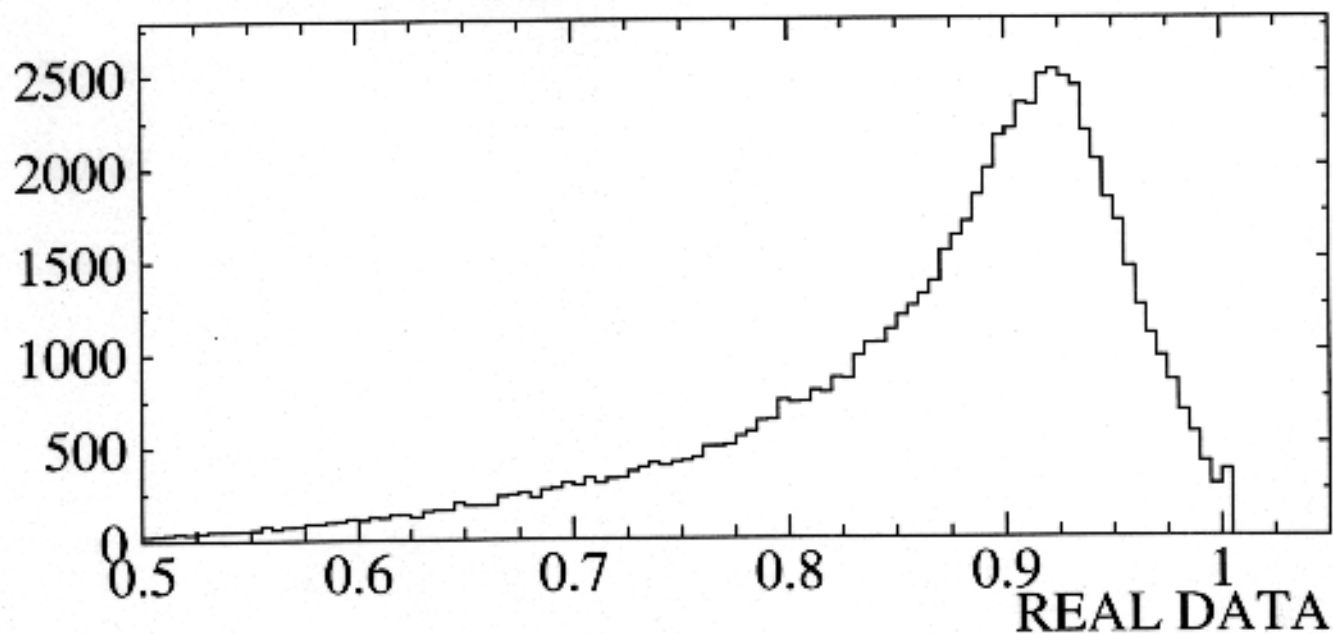
asym 0.8 1, R 20 150, no pi0



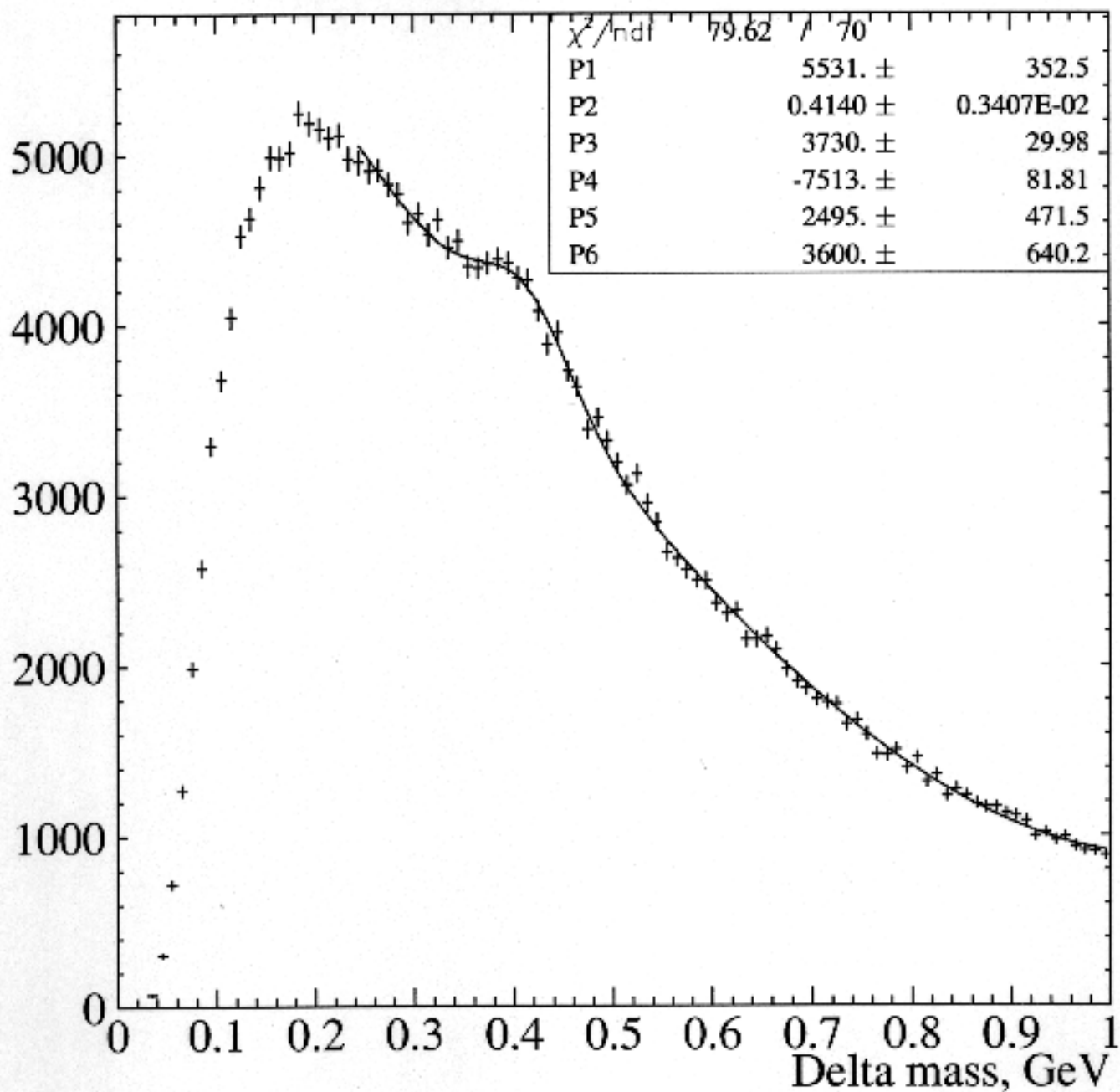
0.8 < asym < 1

20 < R < 150 cm

ECAL cluster ASYM with cut R 20 150



asym 0.8 1, no pi0, no Outer calorimeter



Reconstruction of χ_c
using the most energetic photons
in event

1. There is not more than one χ_c in event.

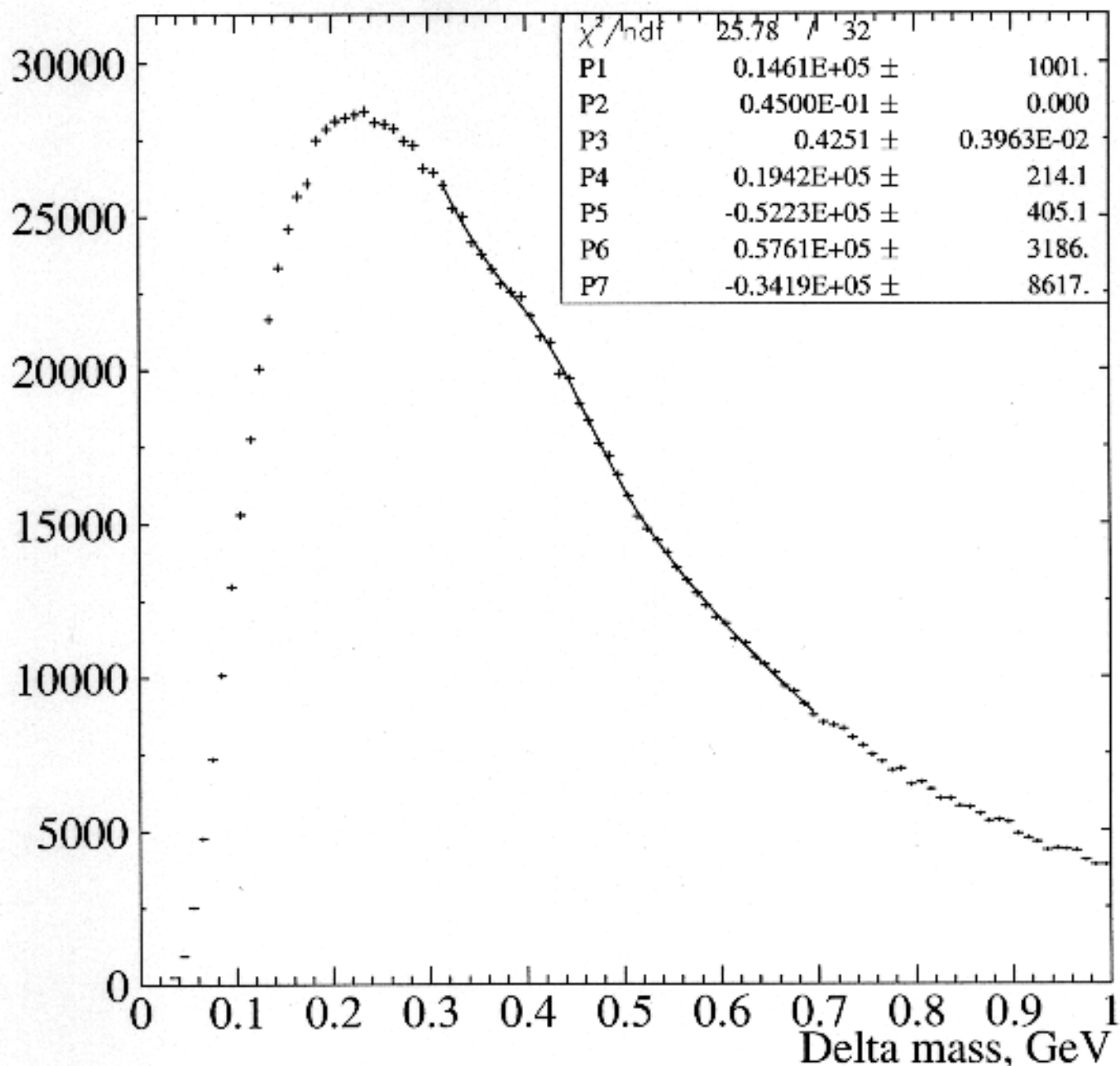
For $E_\gamma >$ something cut:

the events with 10γ and with 50γ
enter with the same weight, but
in the 1st case the $S/\sqrt{B} \approx \frac{1}{\sqrt{10}}$,
in the 2nd case the $S/\sqrt{B} \approx \frac{1}{\sqrt{50}}$.

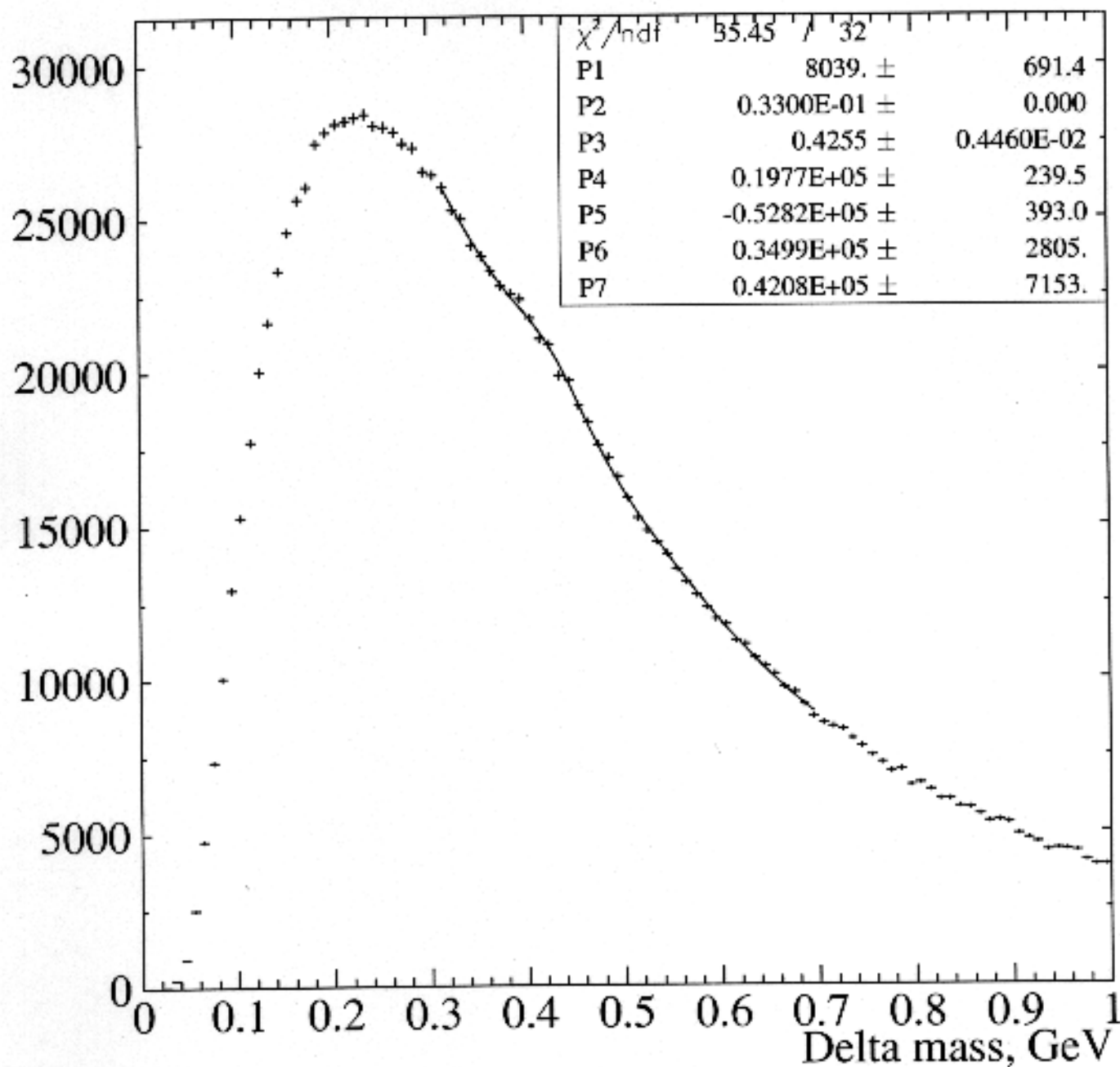
2. The γ from χ_c are more
energetic than others, but with
($E_\gamma >$ something) cut all photons
with energy greater threshold are
accepted on equal footing.

Idea: consider only N the most
energetic photons in the event.

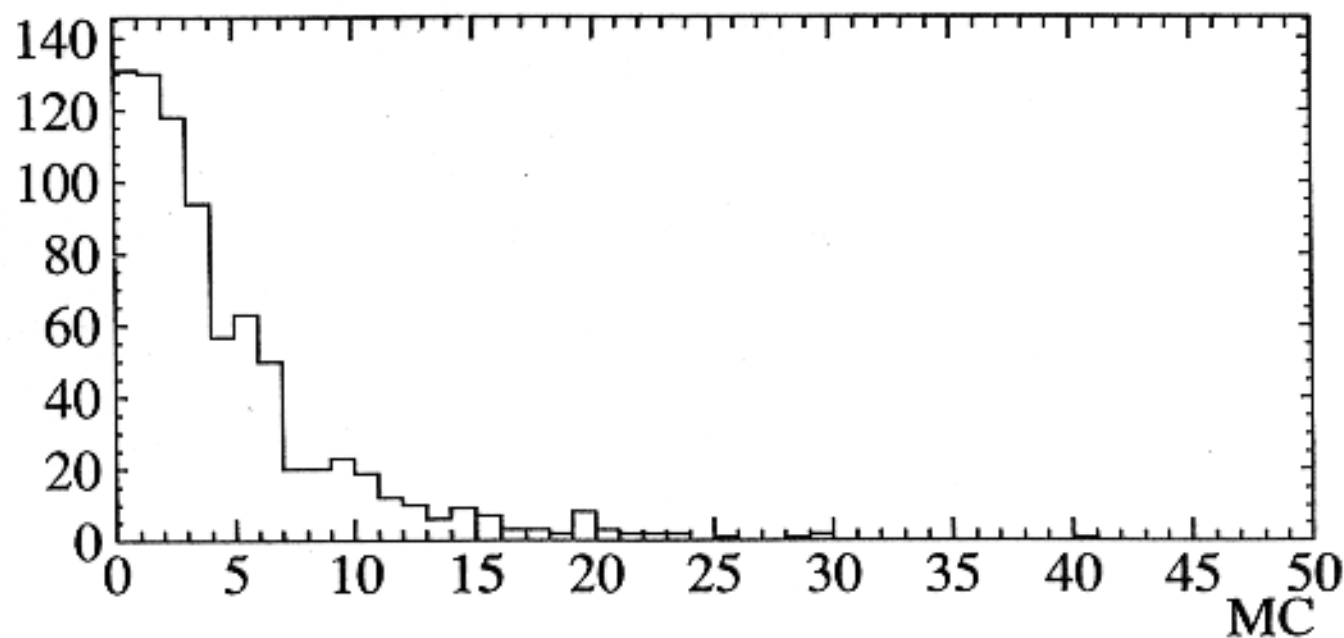
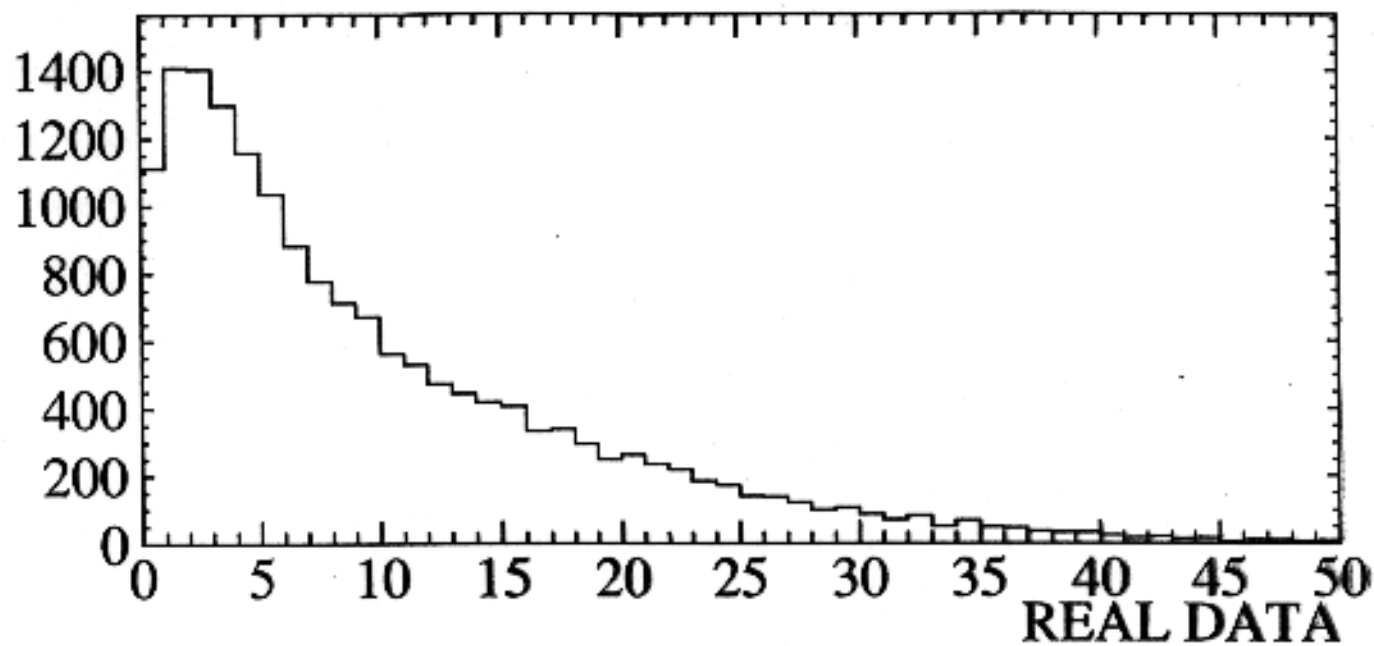
8 most energetic gammas in ev



8 most energetic gammas in ev



number n of photon in the array
 $E_{\gamma_1} > E_{\gamma_2} > E_{\gamma_3} > \dots > E_{\gamma_n} > \dots$
sorted according to energy



Conclusion

- Both methods have similar significance.
- Next one can use event mixing for background description