EMReco test using Z→ee

- Introduction
- Detector Position & Fiducial regions
- EMReco results
- Conclusion

Introduction

- use a new way to compute object position
  - central fiducial regions : central track, central PS Cluster, central EM Cluster
  - forward fiducial regions : forward track, forward PS cluster, forward EM Cluster
- EMReco efficiencies
  - sample used :
    - 10000 Z $\rightarrow$ ee (PYTHIA) with 1.1 min bias events
    - reconstructed (EMparticle & GTrack) with preco04.00.01
    - compute 2 regions :
      - central+central with $|\Delta\phi| > 0.015$ from module edges
      - forward+forward all ϕ
    - compute 3 efficiencies :
      - after EM selections
      - after EM selections & PS cluster matching
      - after EM selections & PS cluster matching & TRK matching

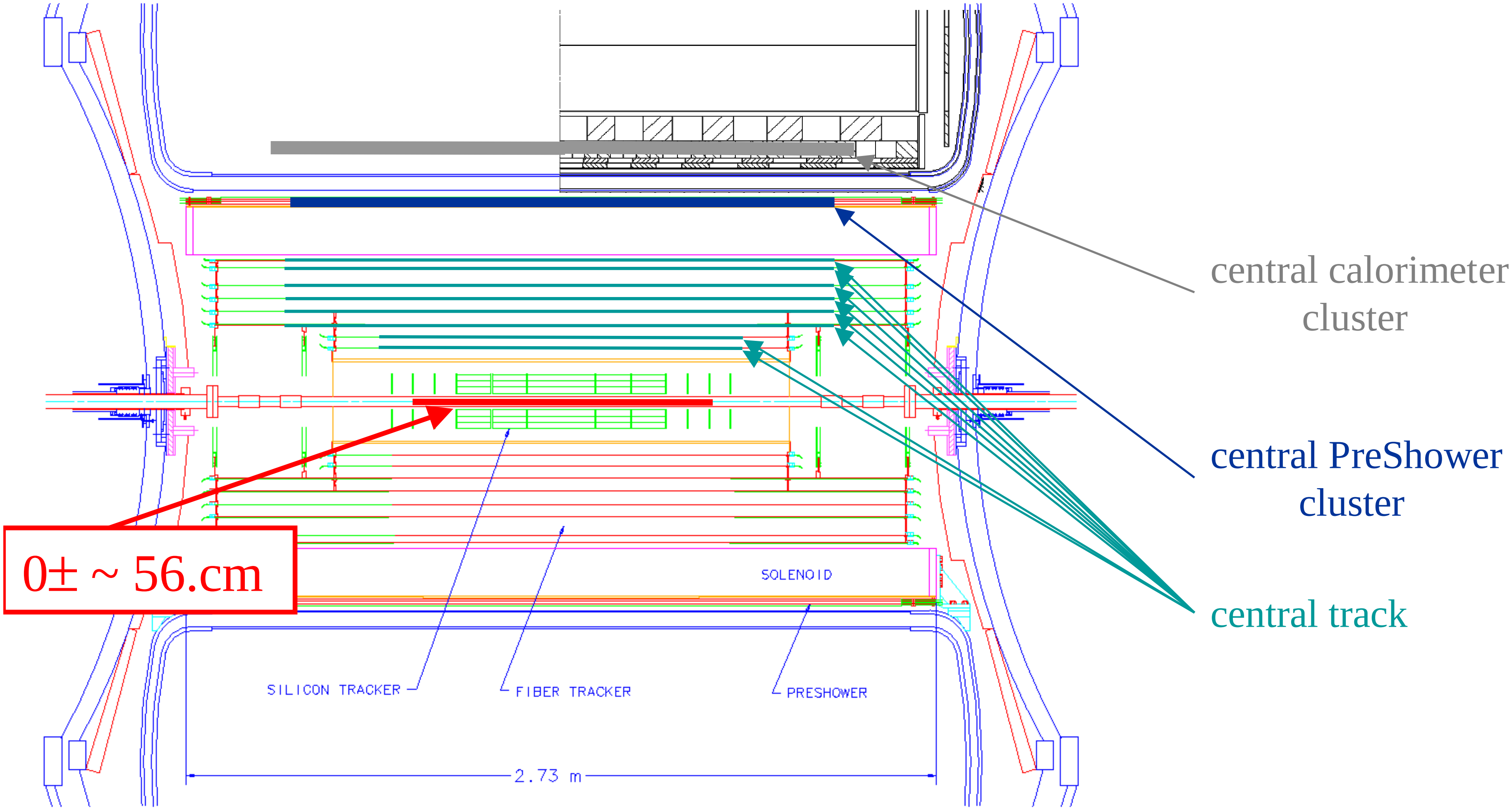
Detectors positions

- Central Detectors
  - Detector
    - Detector η = η at detector (R, Z_max) position
    - Z_fid ~ Z_max - 10%
    - η_fid = η at detector (R, Z_fid) position

Detector	*| Z max |*	*R*	*detector* $/\eta/$	*| Z fid |*	*| η fid |*
CFT1	83.1	20.0786 20.0392 20.1180 20.2483 20.2090 20.2877 20.2	2.12	**74.8**	**2.02**
CFT2	83.1	24.9886 24.9492 25.0280 25.1584 25.1190 25.1978 25.1	1.91	**74.8**	**1.81**
CFT3	126.0	29.8887 29.8492 29.9281 30.0585 30.0191 30.0978 30.0	2.14	**113.4**	**2.04**
CFT4	126.0	34.7987 34.7593 34.8381 34.9685 34.9291 35.0079 34.9	2.00	**113.4**	**1.89**
CFT5	126.0	39.7087 39.6693 39.7481 39.8785 39.8391 39.9179 39.8	1.87	**113.4**	**1.77**
CFT6	126.0	44.6187 44.5793 44.6581 44.7885 44.7491 44.8279 44.7	1.76	**113.4**	**1.66**
CFT7	126.0	49.5187 49.4793 49.5581 49.6885 49.6491 49.7280 49.6	1.66	**113.4**	**1.56**
CFT8	126.0	51.5189 51.4793 51.5586 51.6893 51.6496 51.7290 51.6	1.63	**113.4**	**1.53**
CPS	120.6	72.034 72.271 72.829 73.109 73.668 73.939 73.0	1.28	**108.5**	**1.19**
CC	129.9	92.1536 92.8179 92.5	1.14	**116.9**	**1.06**

- Object definition:
  - central track $\rightarrow$ cross the 8 CFT layers
  - central Pscluster $\rightarrow$ cross the CPS
  - central EM cluster $\rightarrow$ cross central EM3

Central Fiducial Regions

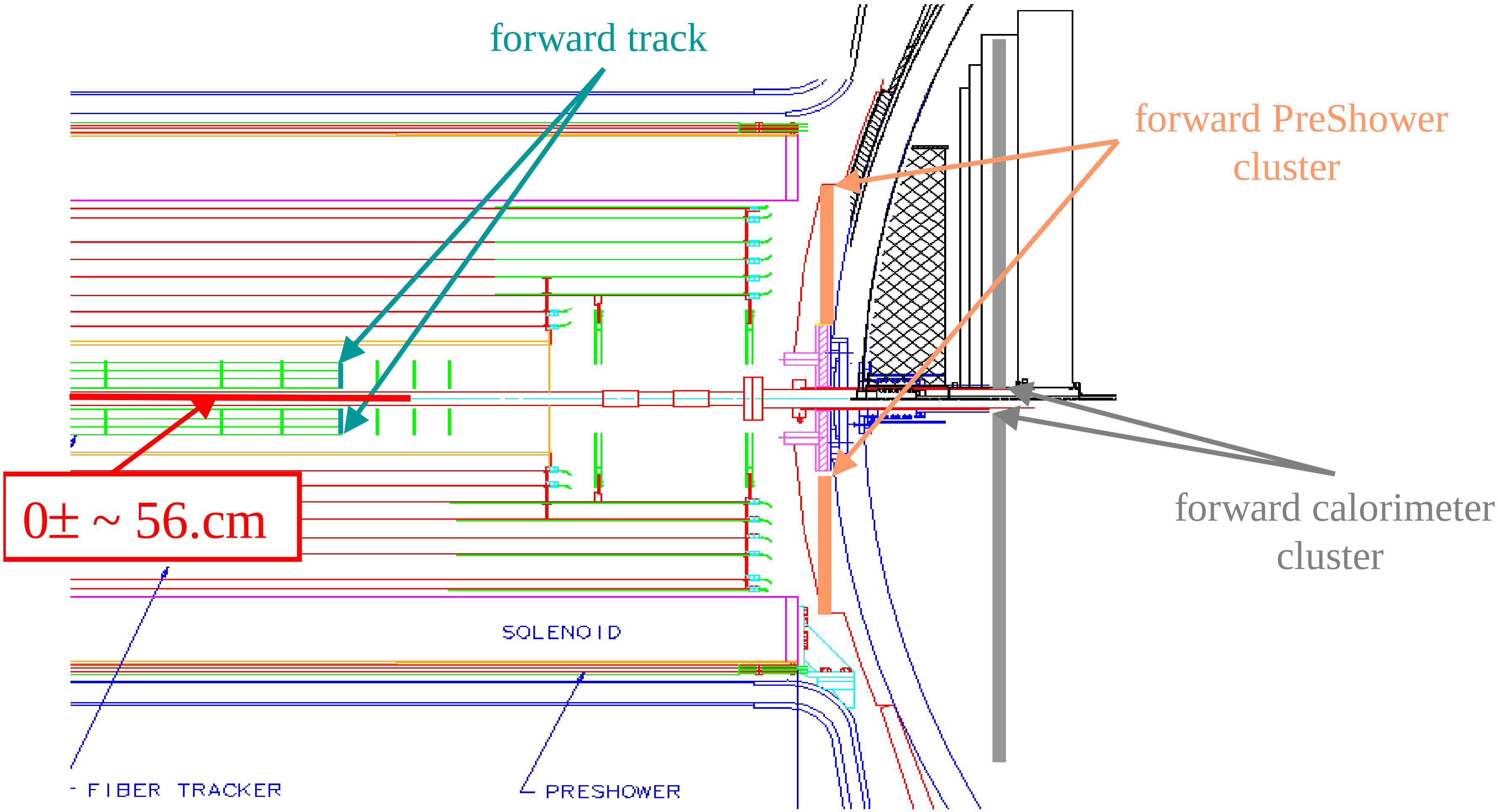


Detectors positions

- Forward Detectors
  - Detector
    - Detector η = η at detector (R_min/max, Z) position
    - Detector η_fid = η_fid at detector (R_fid_min/max, Z) position
  - Object definition
    - Forward track $\rightarrow$ cross F-disk4 or F-disk9
    - Forward PS cluster $\rightarrow$ cross FPS
    - forward calo cluster $\rightarrow$ cross forward EM3

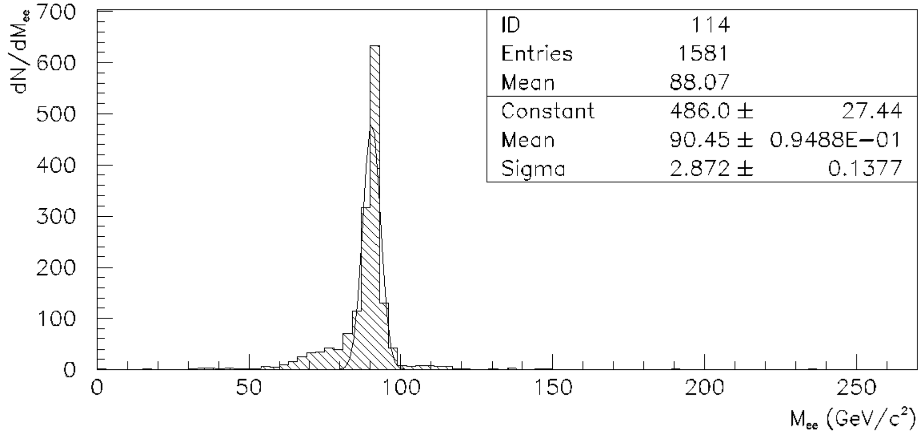
Detector	R min	R max	Z	η min	η max	R fid min	R fid max	η_fid min	η_fid max
SMT	2.7	10.2	38.1	2.03	3.34	2.95	9.95	2.05	3.25
FPS	24.0	44.4	145.0	1.9	2.5	24.0	44.4	1.9	2.5
EC	6.3	97.2	178.9	1.37	4.04	29.3	87.2	1.53	2.51

Forward Fiducial Regions

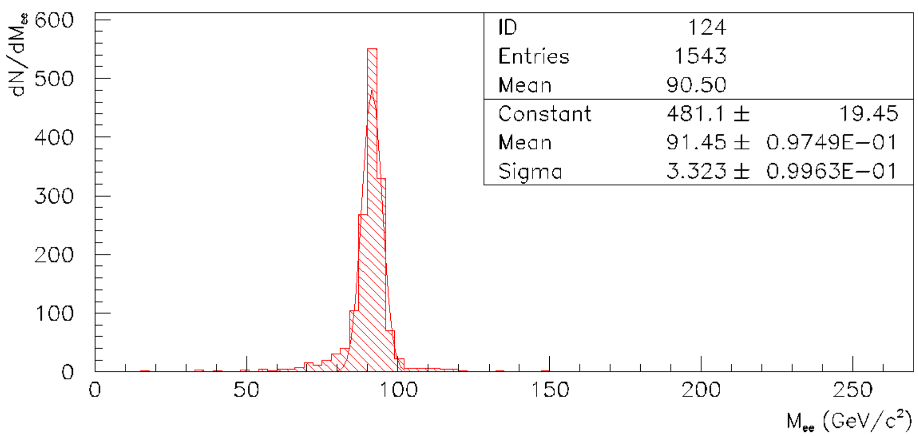


EMReco Efficiencies

- CC+CC events (CC fiducial region)
  - MC events



  - after EM selection

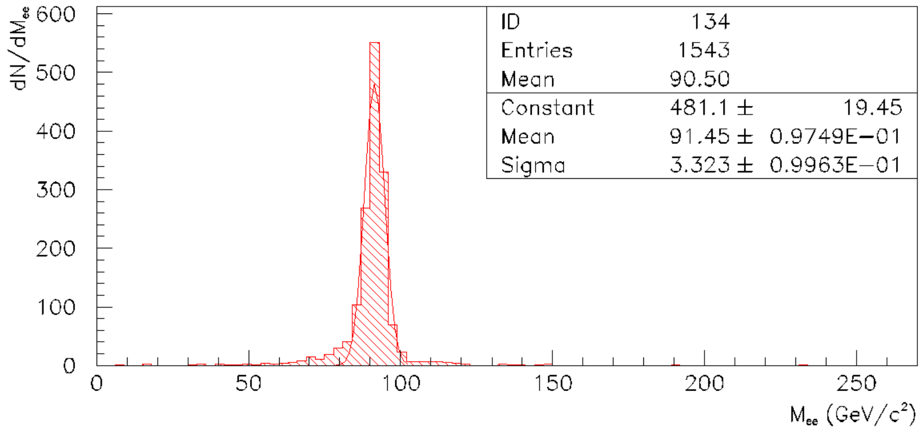


EM selections

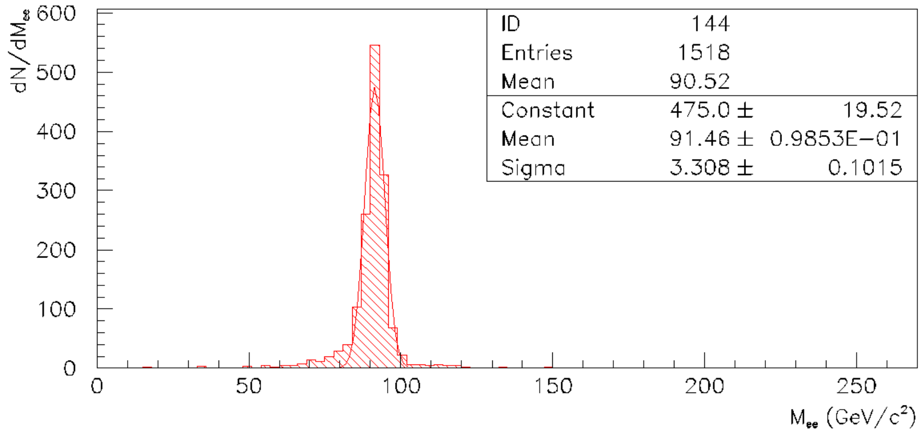
98% (99% per e)

EMReco Efficiencies

- CC+CC events (CPS fiducial region)
  - after EM selection



  - after EM selection & PS matching

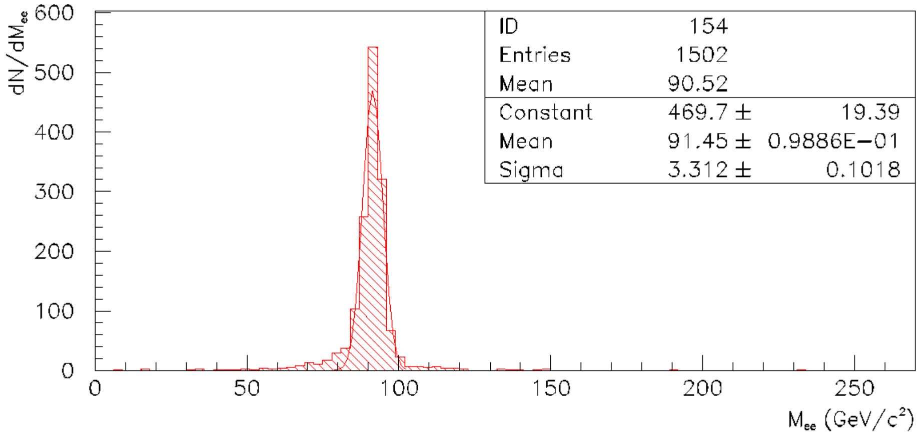


PS matching

98% (99% per e)

EMReco Efficiencies

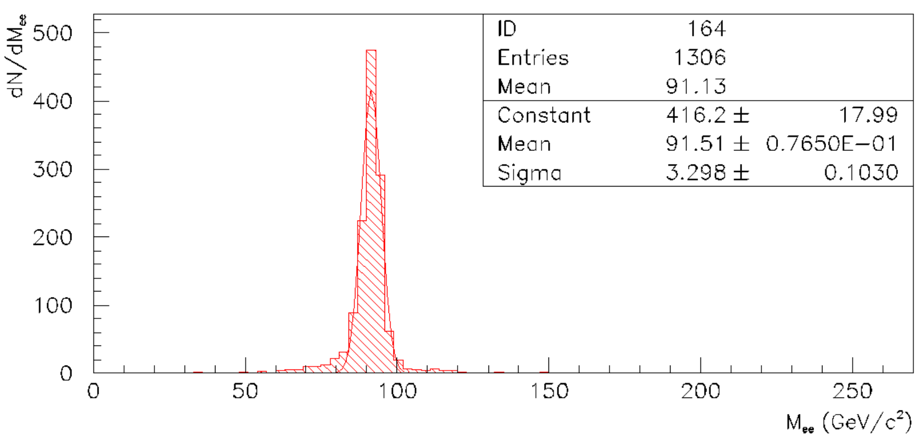
- CC+CC events (CFT fiducial region)
  - ◆ after EM selection & PS matching



TRK matching

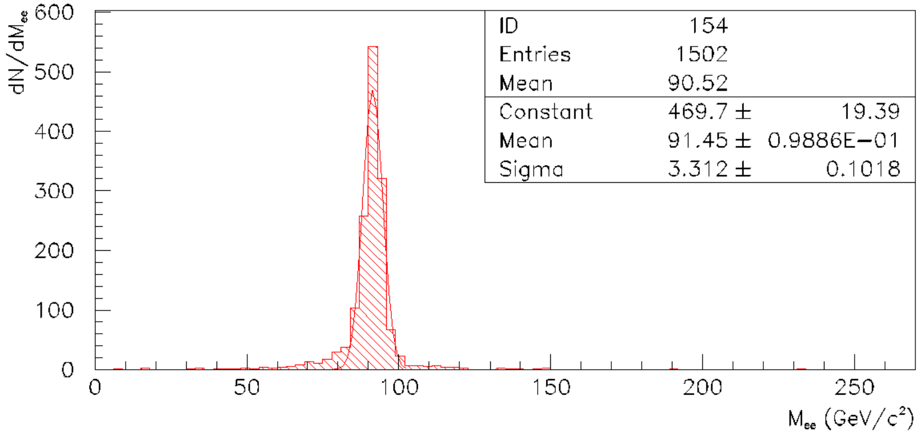
87% (93% per e)

  - ◆ after EM selection & PS matching & TRK matching



EMReco Efficiencies

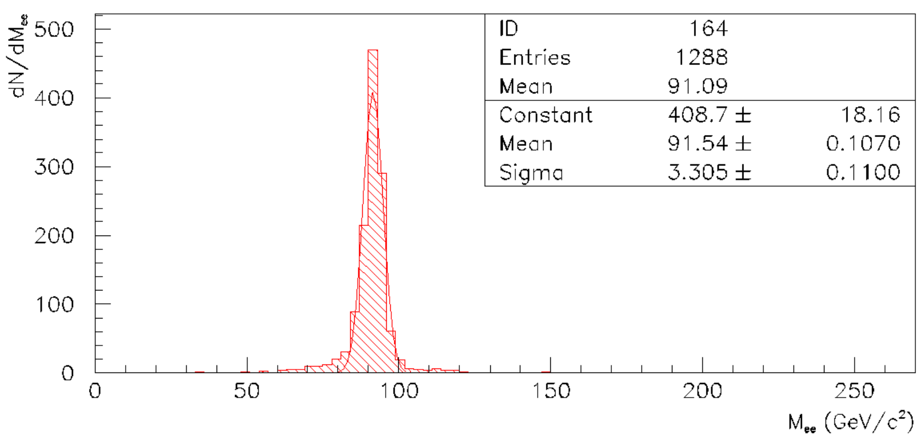
- CC+CC events (CFT fiducial region)
  - after EM selection & PS matching



TRK matching

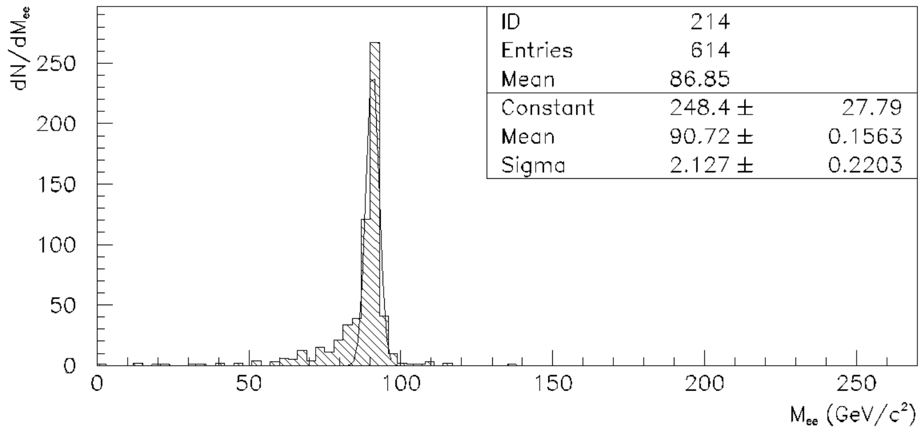
86% (93% per e)

  - after EM selection & PS matching & TRK matching (with opposite sign electrons)

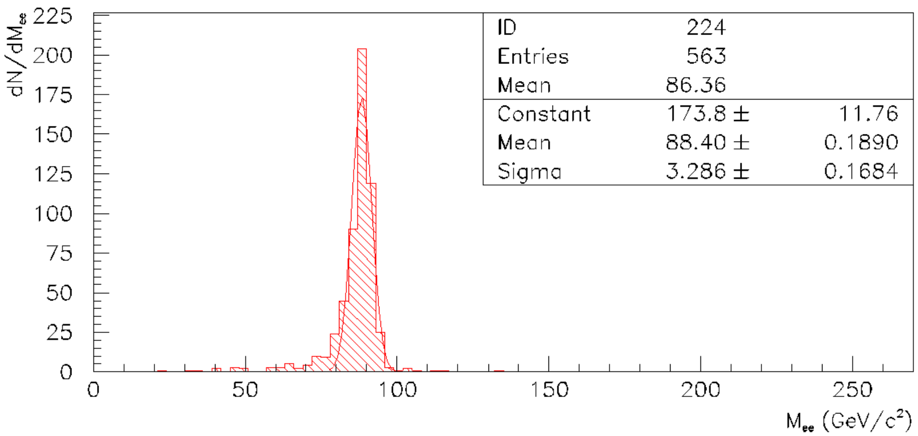


EMReco Efficiencies

- EC+EC events (CC fiducial region)
  - MC events



  - after EM selections

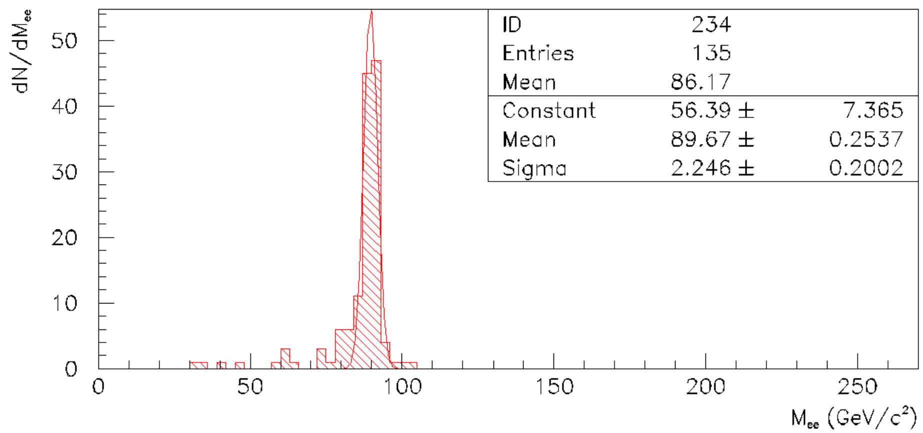


EM selections

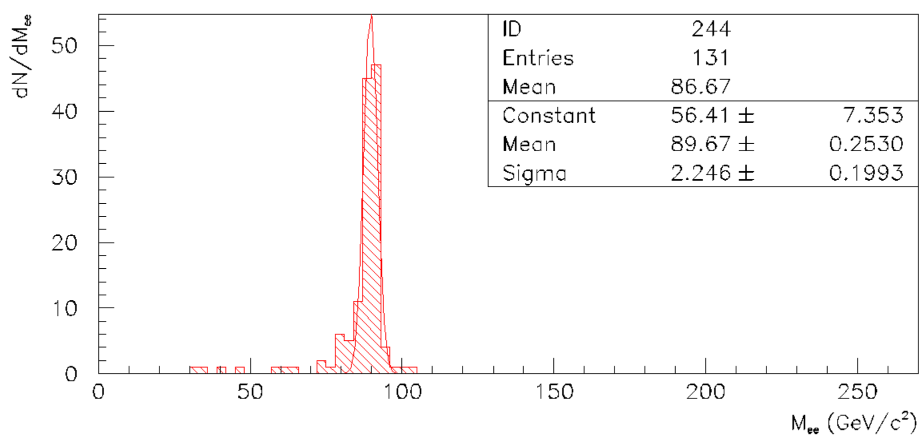
92% (96% per e)

EMReco Efficiencies

- EC+EC events (FPS fiducial region)
  - after EM selections



  - after EM selections & PS matching

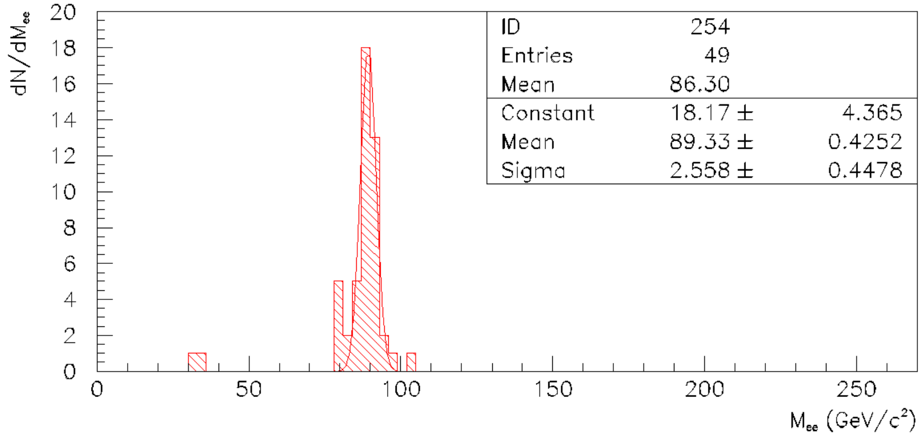


PS matching

97% (99% per e)

EMReco Efficiencies

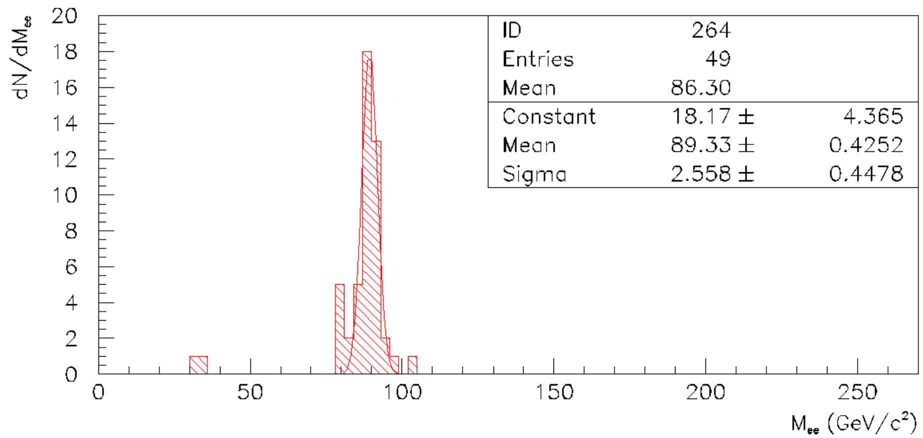
- EC+EC events (SMT fiducial region)
  - after EM selections & PS matching



TRK matching

100% (100% per e)

  - after EM selections & PS matching & TRK matching

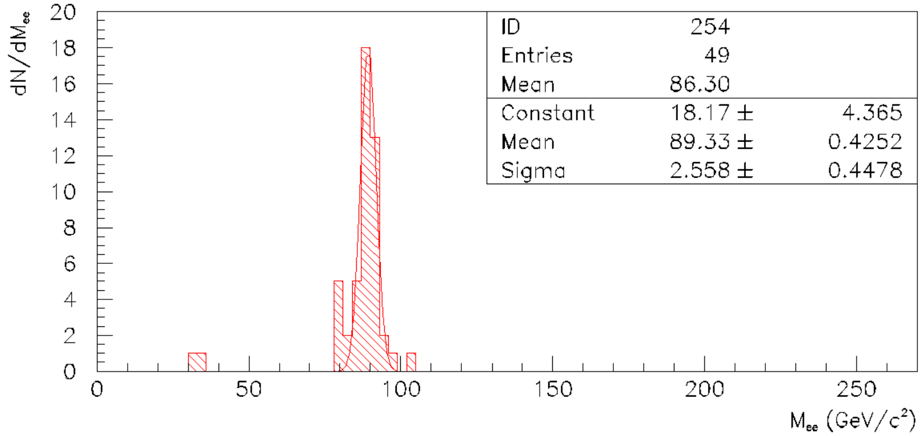


EMReco Efficiencies

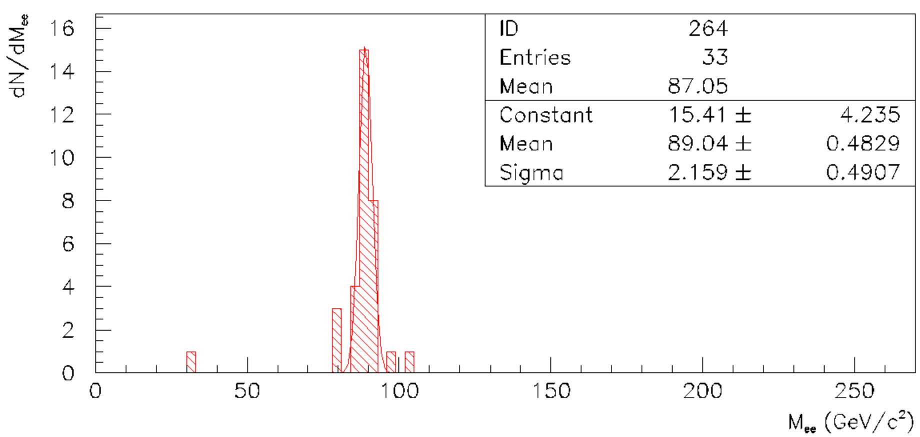
- EC+EC events (SMT fiducial region)
  - after EM selections & PS matching

TRK matching

67% (82% per e)



  - after EM selections & PS matching & TRK matching (with opposite sign electrons)



Conclusion

- $Z \to ee$ (EMReco) :
  - Central + Central electrons
    - EM selections $\to$ 98% (99% per e)
    - PS matching $\to$ 98% (99% per e)
    - TRK matching $\to$ 87% (93% per e)
    - TRK matching (with opp. Sign e) $\to$ 86% (93% per e)
  - Forward + Forward electrons
    - EM selections $\to$ 92% (96% per e)
    - PS matching $\to$ 97% (99% per e)
    - TRK matching $\to$ 100% (100% per e)
    - TRK matching (with opp. Sign e) $\to$ 67% (82% per e)