DØ-CALIBRATION-WORKSHOP Sept 2000

RSO

SAMPLING WEIGHT IN EM ENERGY RECONSTRUCTION ETA DEPENDENCY

- Single e^- events

90 000 events generated

Cuts on η and P_T (mc_exam).

73295 events with KINE block

- 65649 (90%) with EM cluster
- 7646 (10%) no EM Cluster

No EM cluster (7646 events)

- CC 1569 (20%) : φ crack (75%)
  : end of CC (25%)
- EC 6077 (80%) : $R_{EC} > 90$ cm

⇒ lost events: in intermediate region (1.3 ≤ η ≤ 1.6) 85%
: in φ crack 15%

EM Cluster (65649 events).

- CC 38500 (59%).
  CPS 35805 (93%).
- EC 27149 (41%)
  FPS 15558 (57%).

⇒ lost of PS info in intermediate region
and V.F. region ($R < 22$

Single e^- files

/projects/775/emid_3/jaffre/pmc02/sim.electrons_pt15_150_1.c5
/projects/775/emid_3/jaffre/pmc02/sim.electrons_p15_200_3.c5
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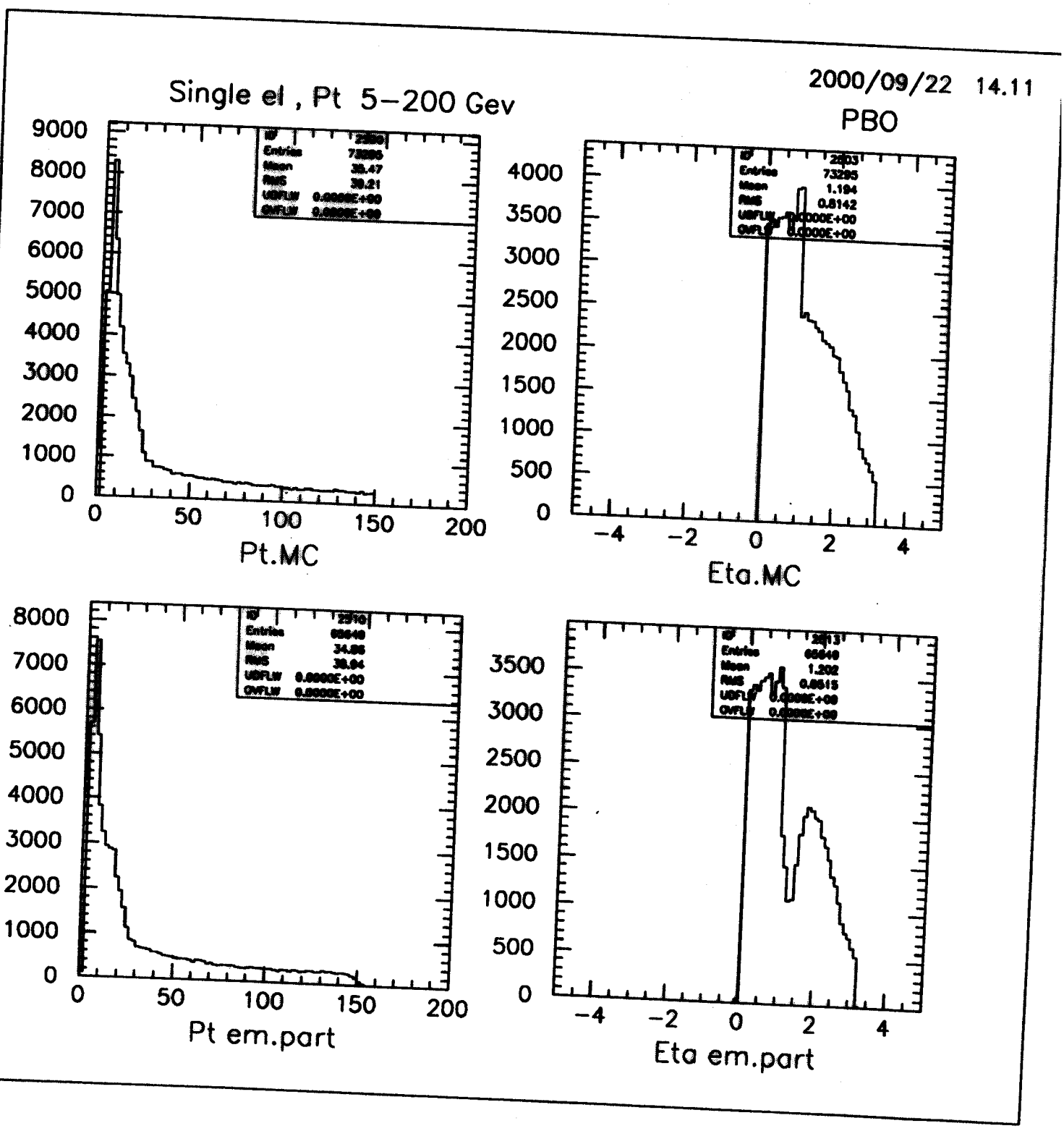
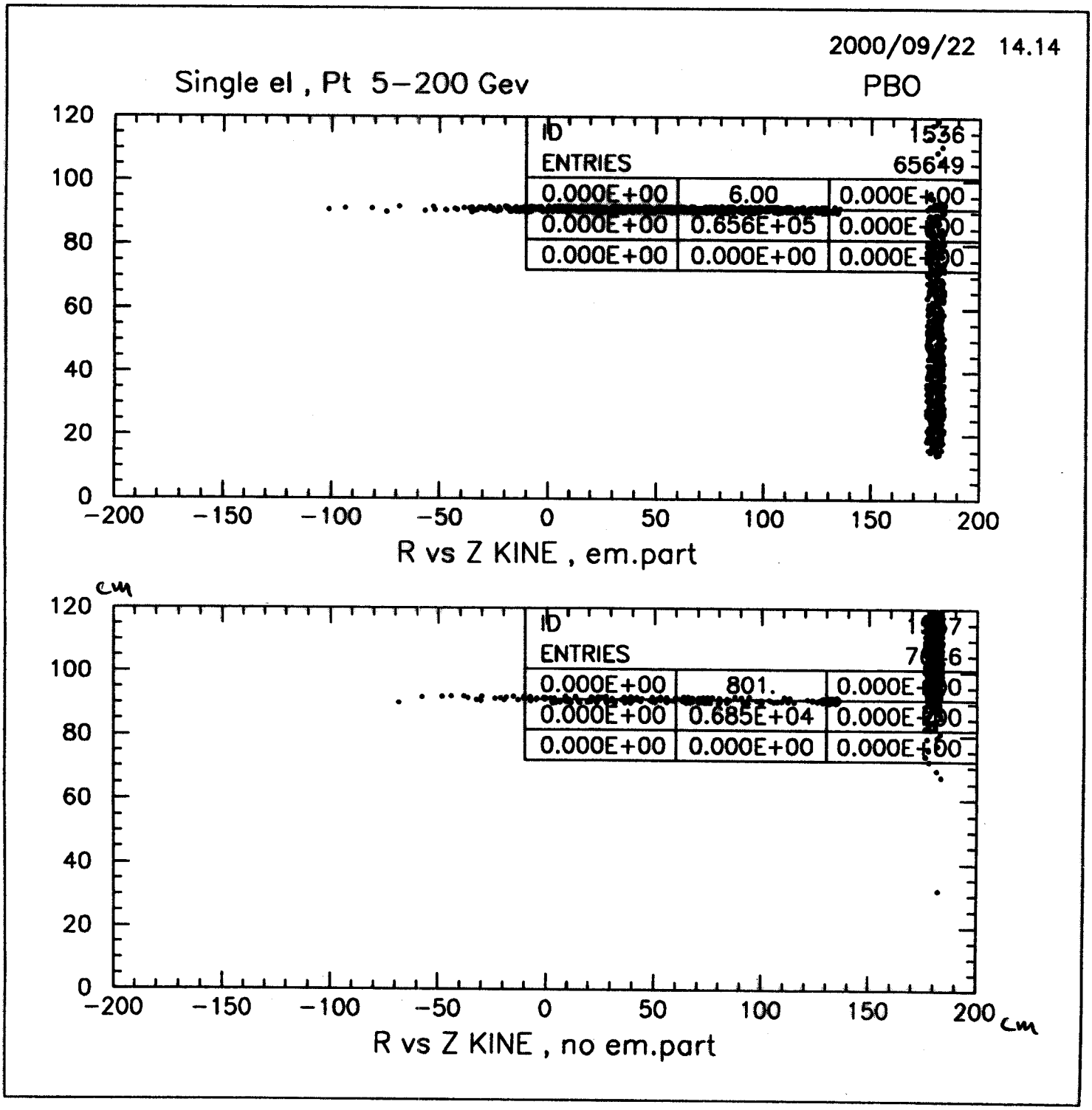
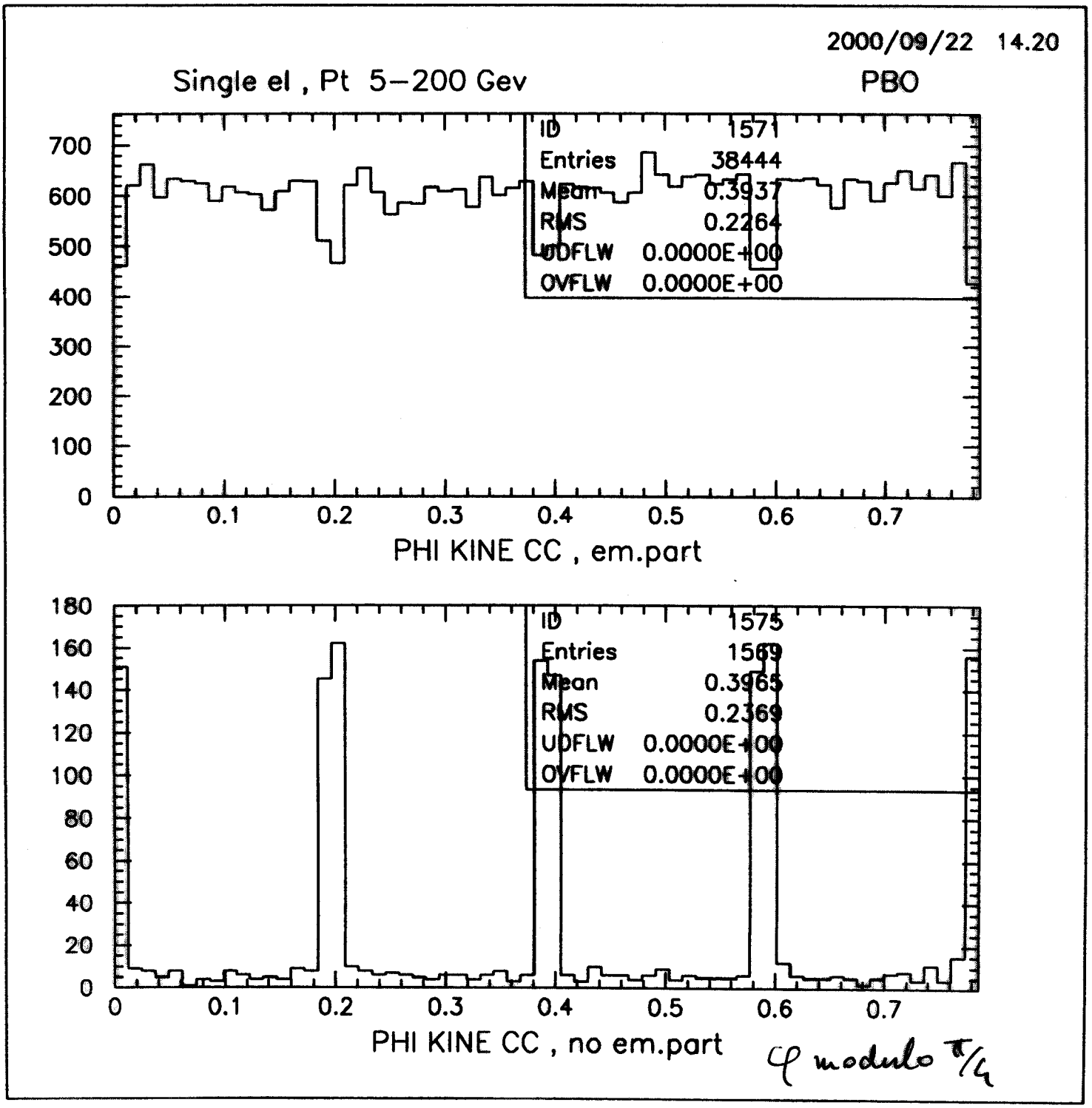
MS dø geant, dø sim pmc 02
A2 dø_reco, Analyze, mc_exam
t 01.11.00

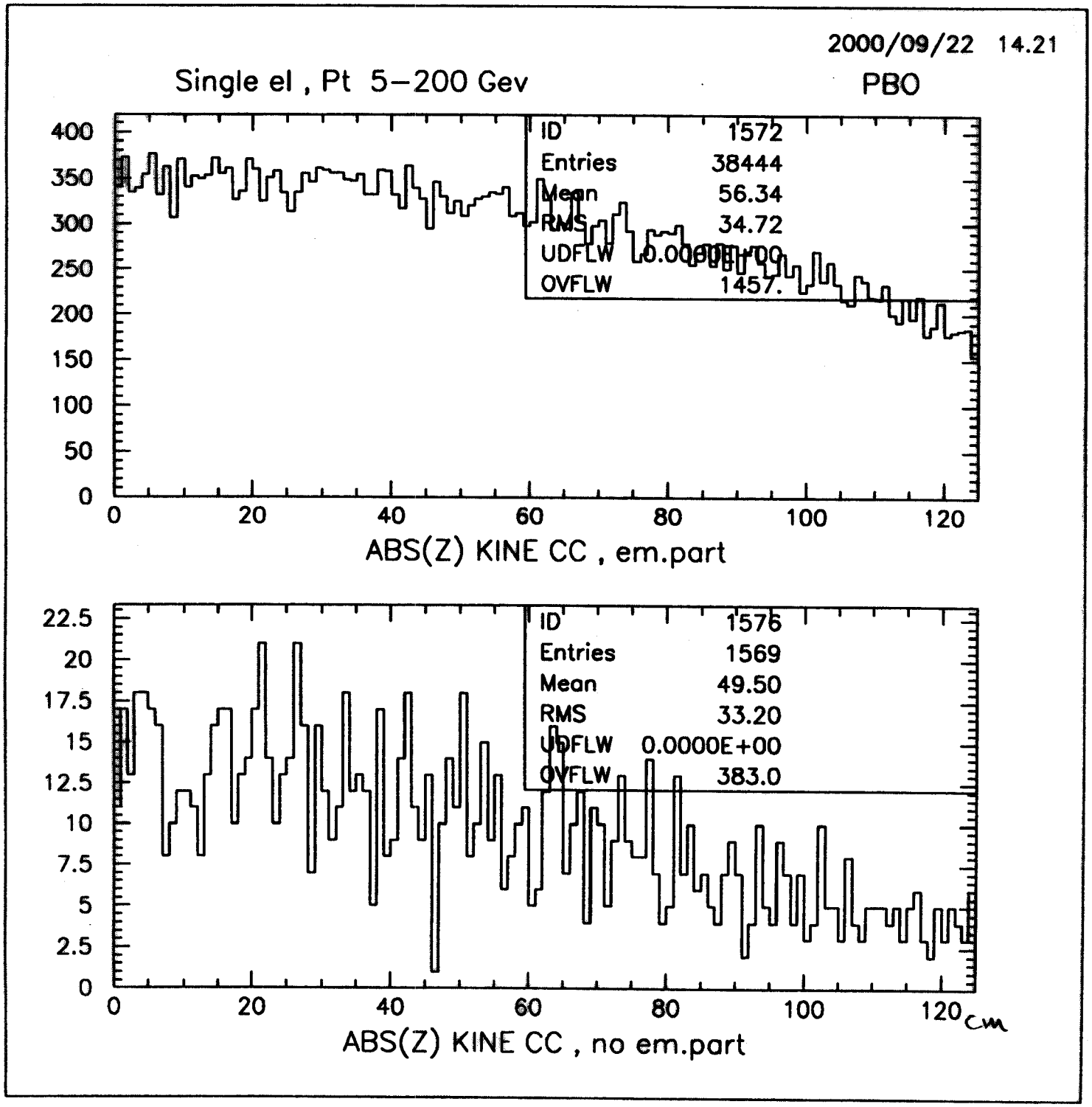

Single el , Pt 5–200 Gev
2000/09/22 14.11
PBO
Pt.MC
Eta.MC
Pt em.part
Eta em.part



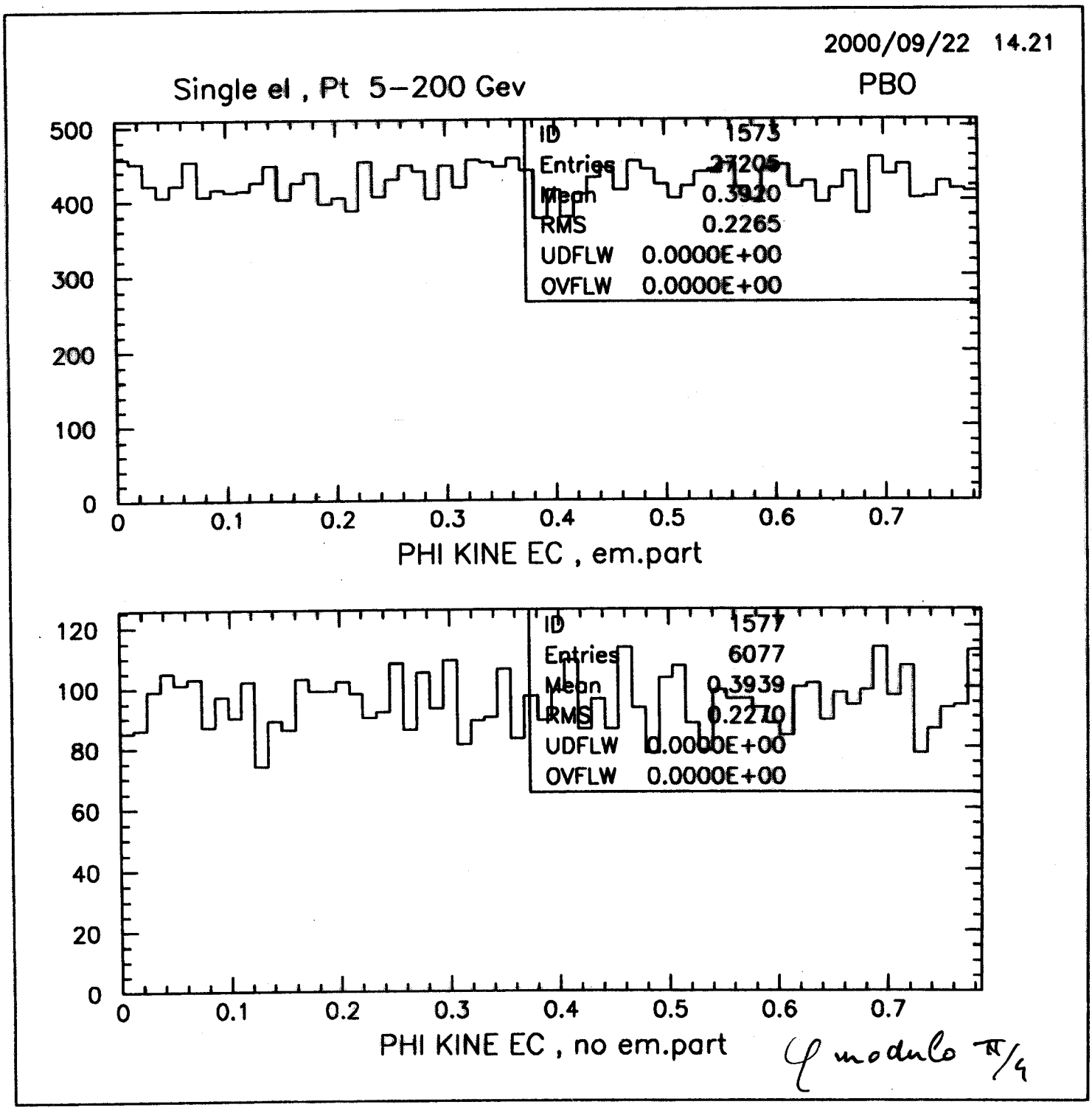
R, Z calo layer 3 level



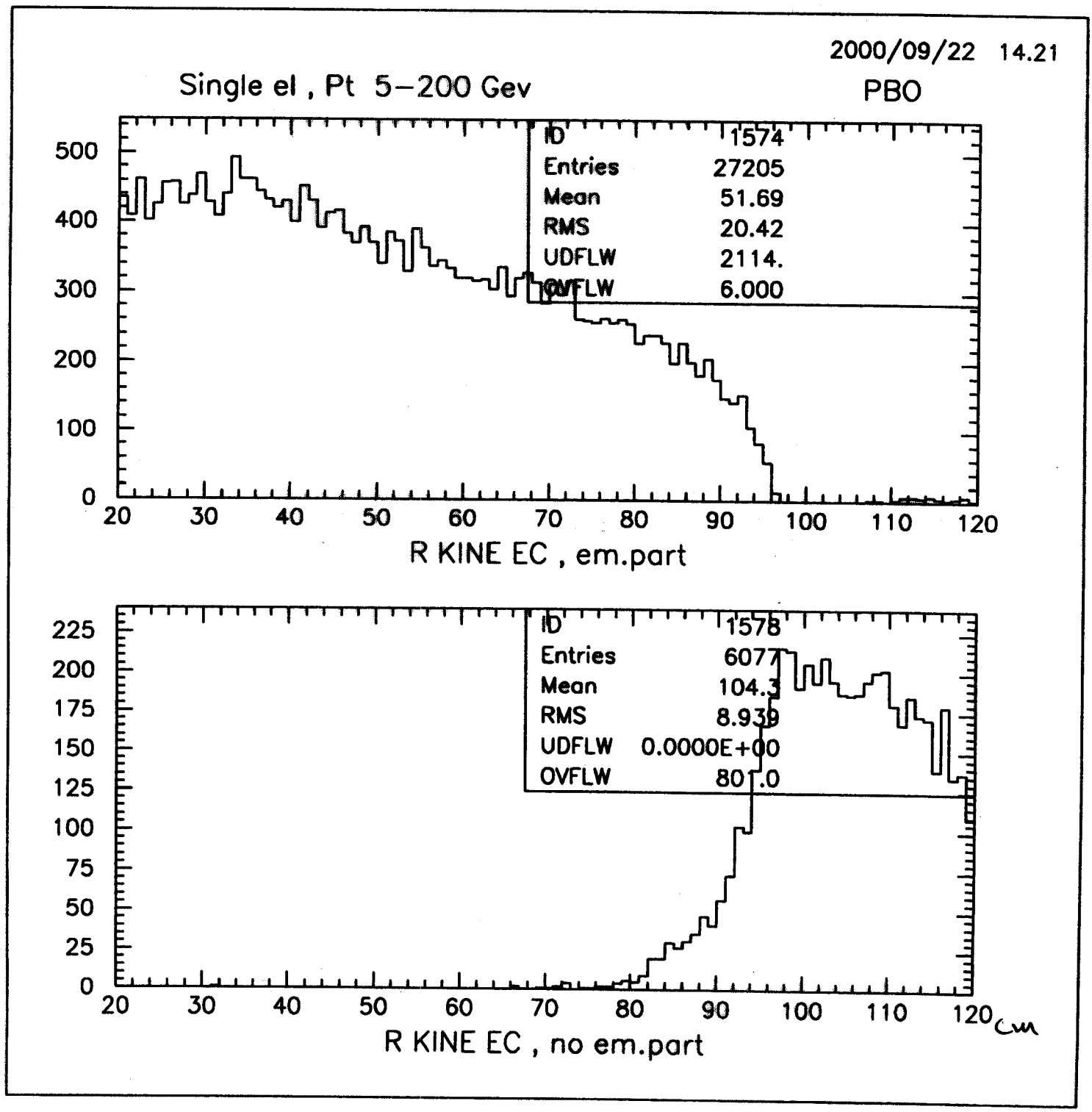
φ Calo layer 3 level
R ≃ 92 cm



Z Calo layer 3 level



φ, calo layer 3 level
$Z \simeq 179$ cm



R, calo layer 3 level
$Z \simeq 179$ cm

Selection Criteria

- EMfra > 0.97, EMiso < 0.03
- Preshower signal.
- out of φ crack.

Use standard calibration weight (constant)

- to look at $E_{em.reco} - E_{mc}$ distribution
  - as function of energy
  - as function of η
  - as function of position in calo
    (Z for CC, R for EC)

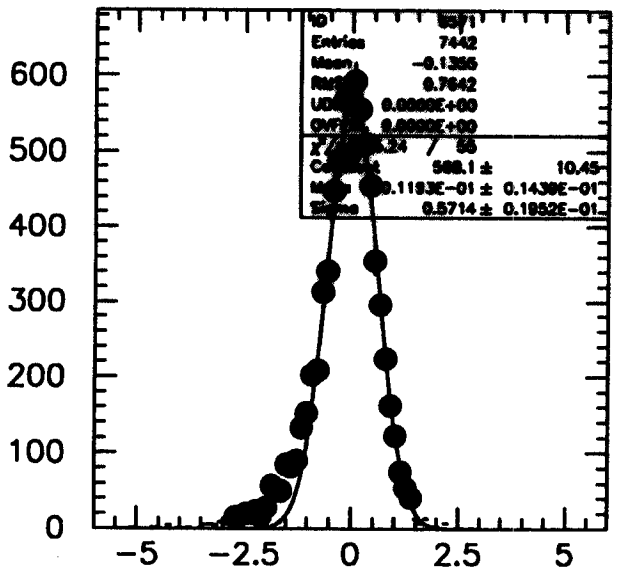
(E and η dependency correlated : P_T flat generation)

- fit gaussian on distribution
  - mean $\Rightarrow$ energy normalisation
  - sigma $\Rightarrow$ energy resolution

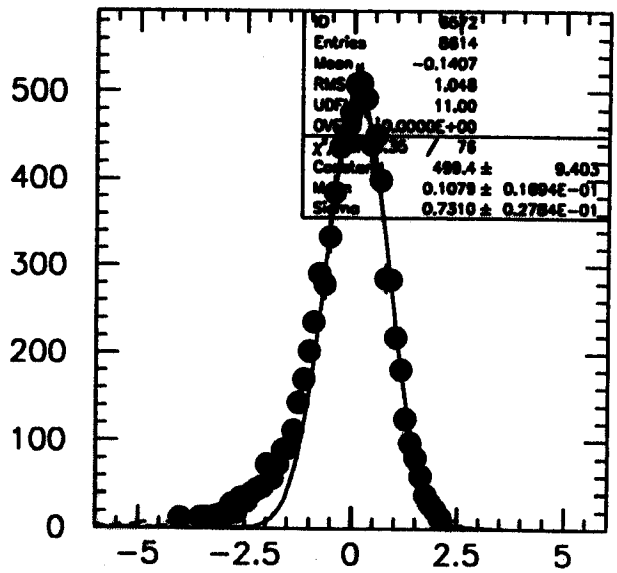
2000/09/22 16.41

Single el , Pt 5−150 Gev

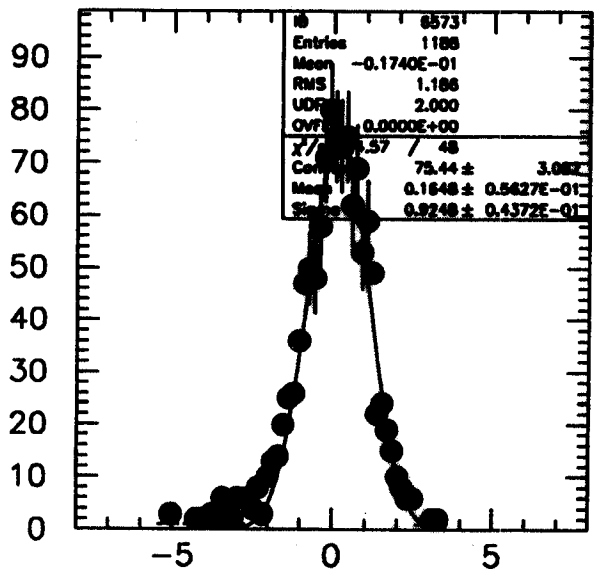
PBO



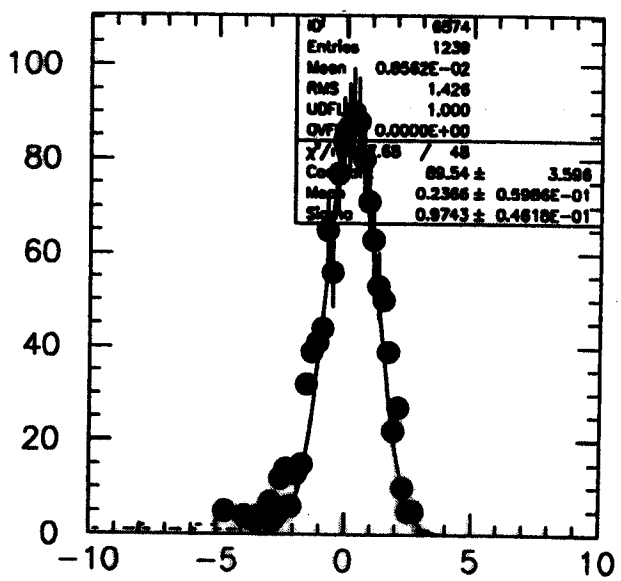
(E.Clu−E.MC), E 10Gev, CC



(E.Clu−E.MC), E 20Gev, CC



(E.Clu−E.MC), E 30Gev, CC



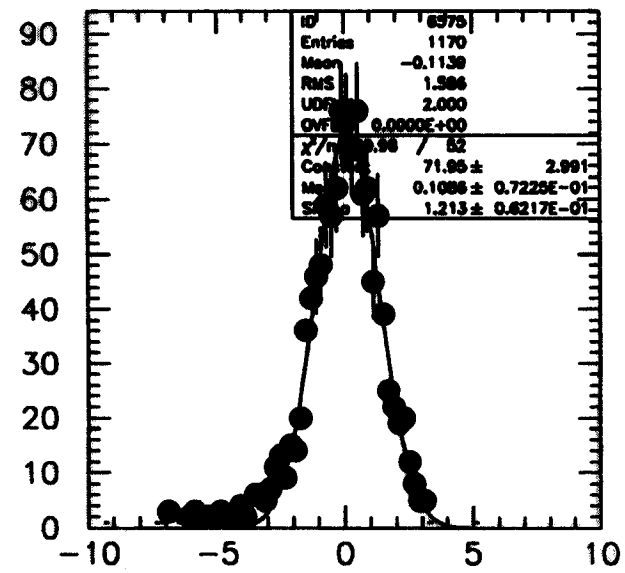
(E.Clu−E.MC), E 40Gev, CC

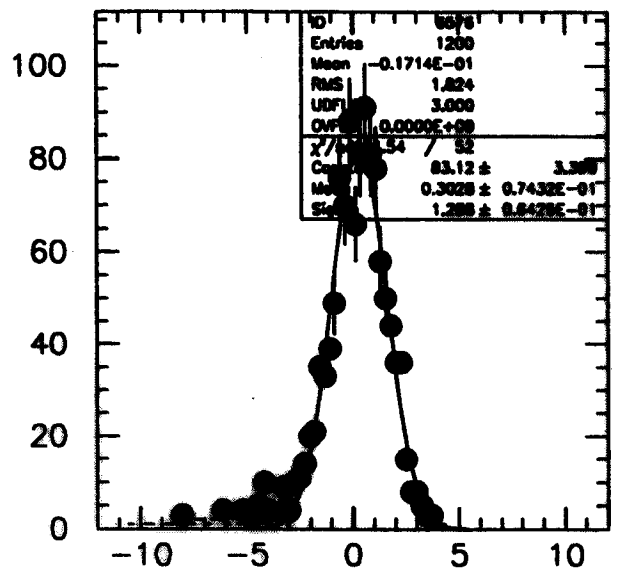
Standard Weight

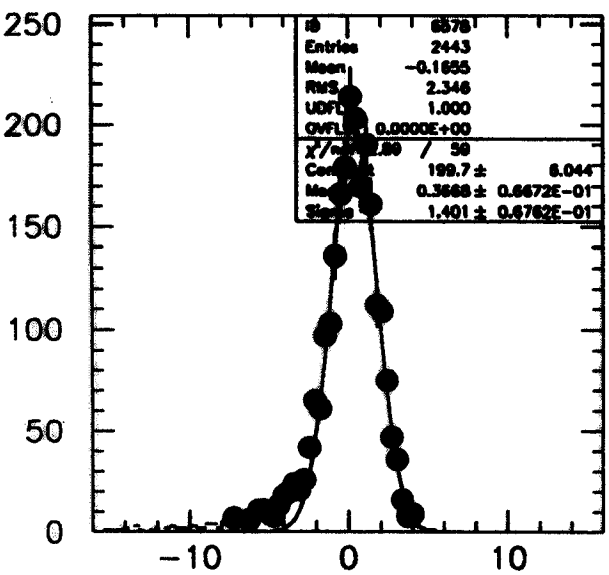
2000/09/22 16.41

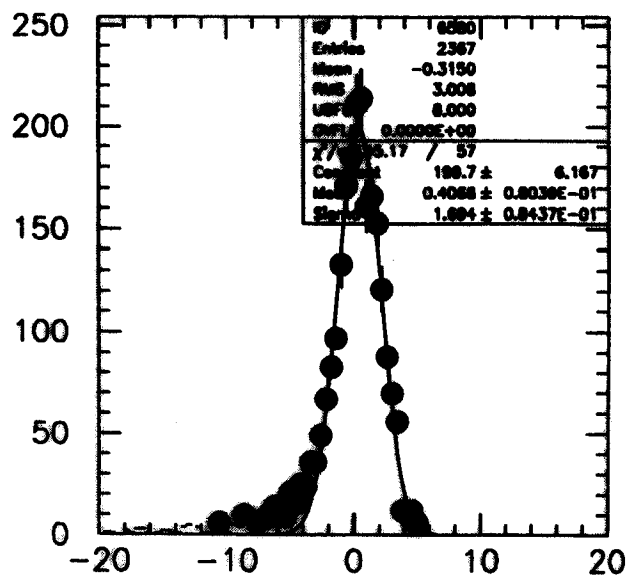
Single el , Pt 5−150 Gev

PBO







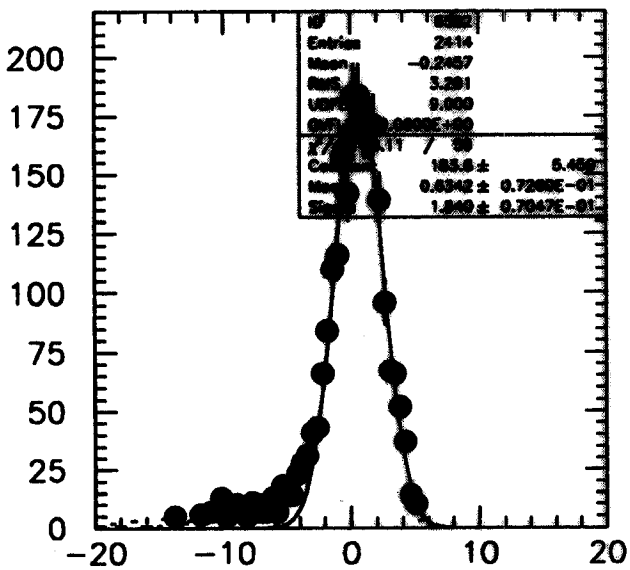


Standard Weight

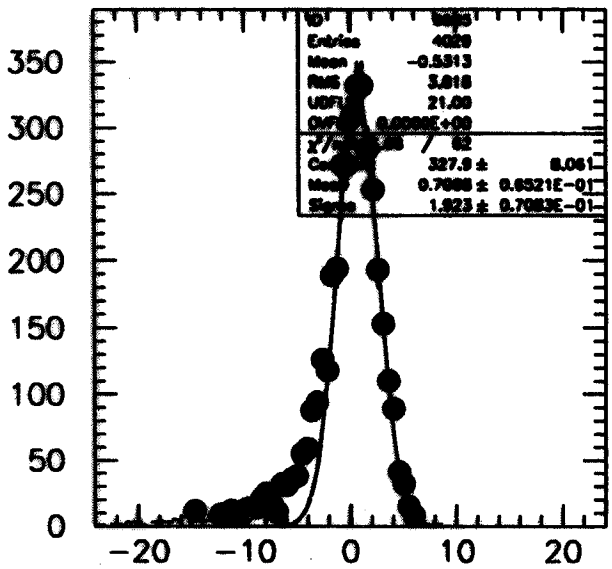
2000/09/22 16.41

Single el , Pt 5−150 Gev

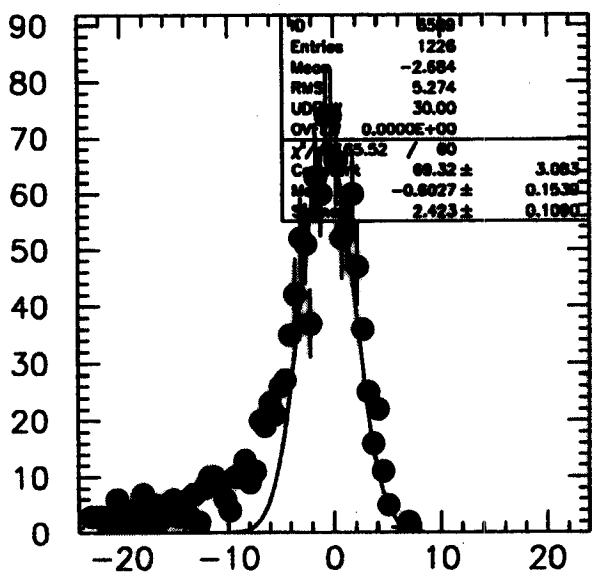
PBO



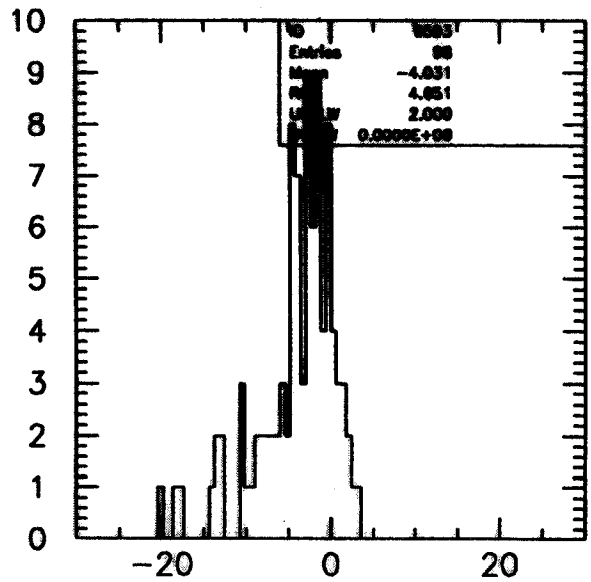
(E.Clu−E.MC), E 120Gev, CC



(E.Clu−E.MC), E 150Gev, CC

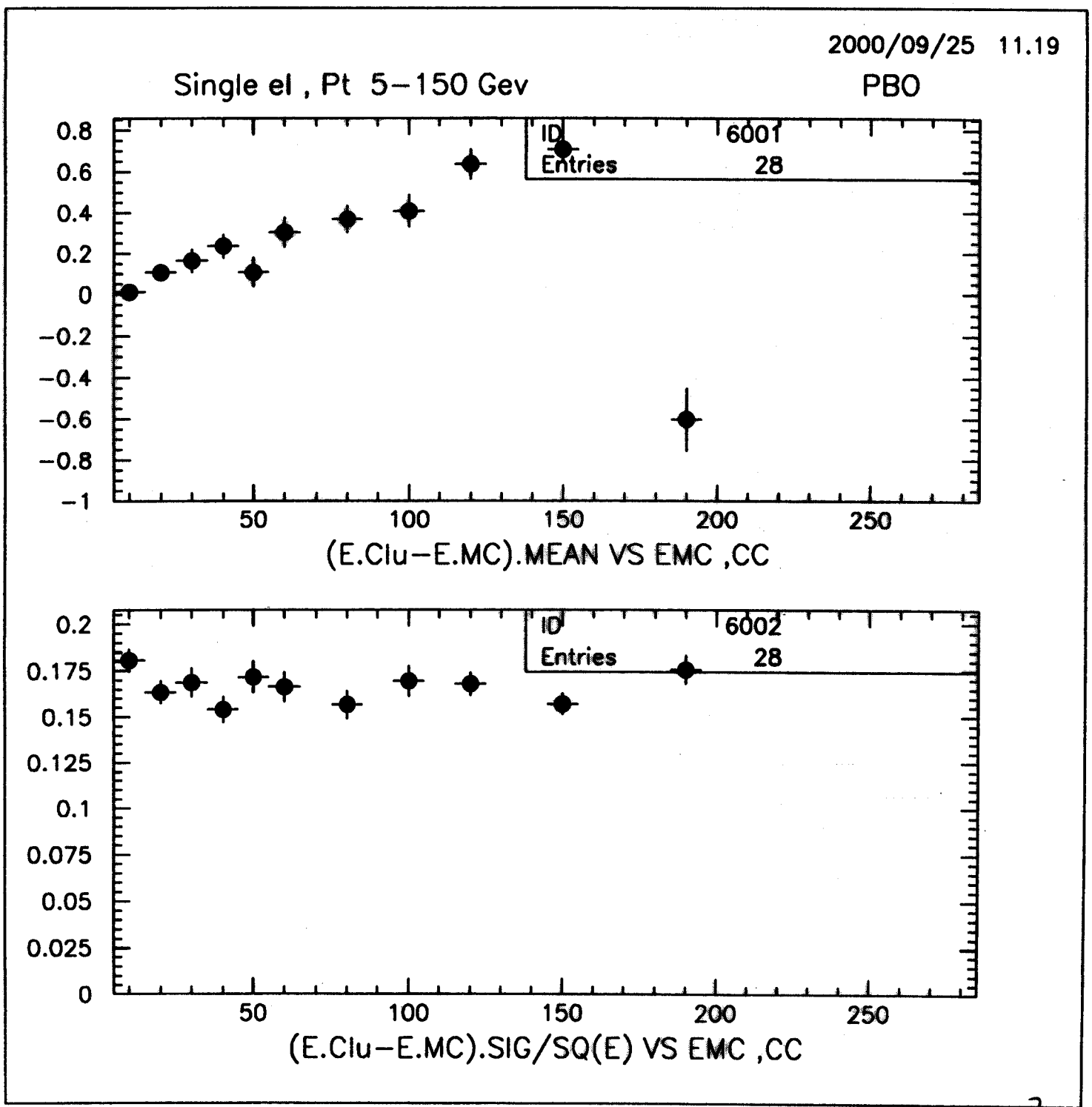


(E.Clu−E.MC), E 190Gev, CC

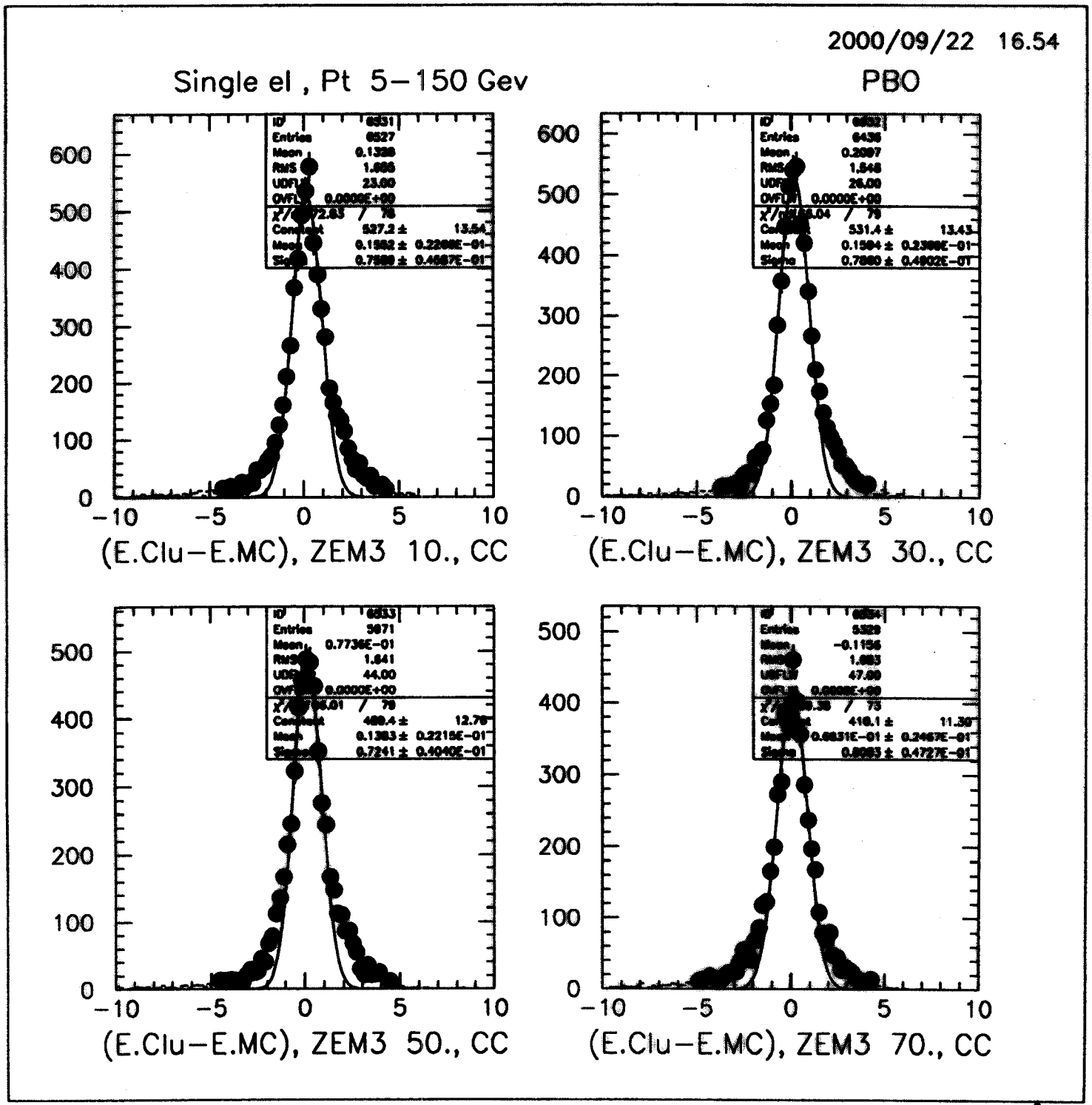


(E.Clu−E.MC), E 230Gev, CC

Standard Weight



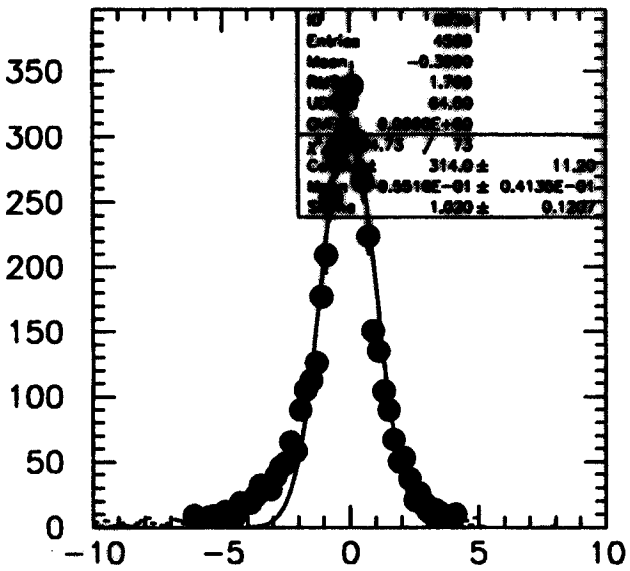
Standard Weight



2 Calo Layer 3 Level.
Standard Weight

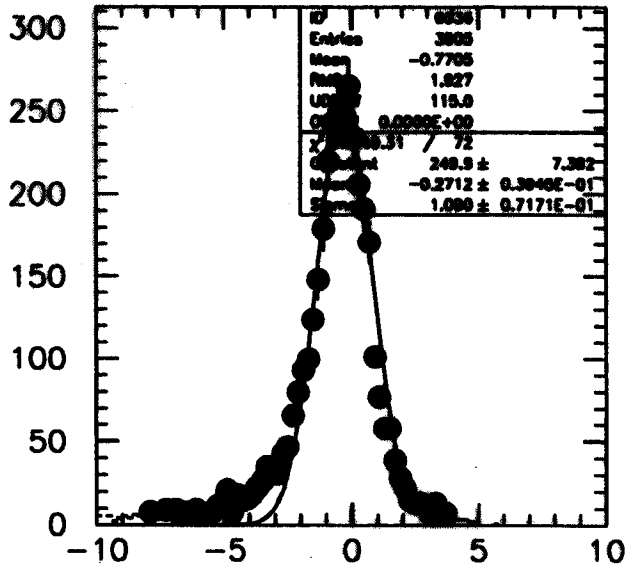
2000/09/22 16.54

Single el , Pt 5−150 Gev



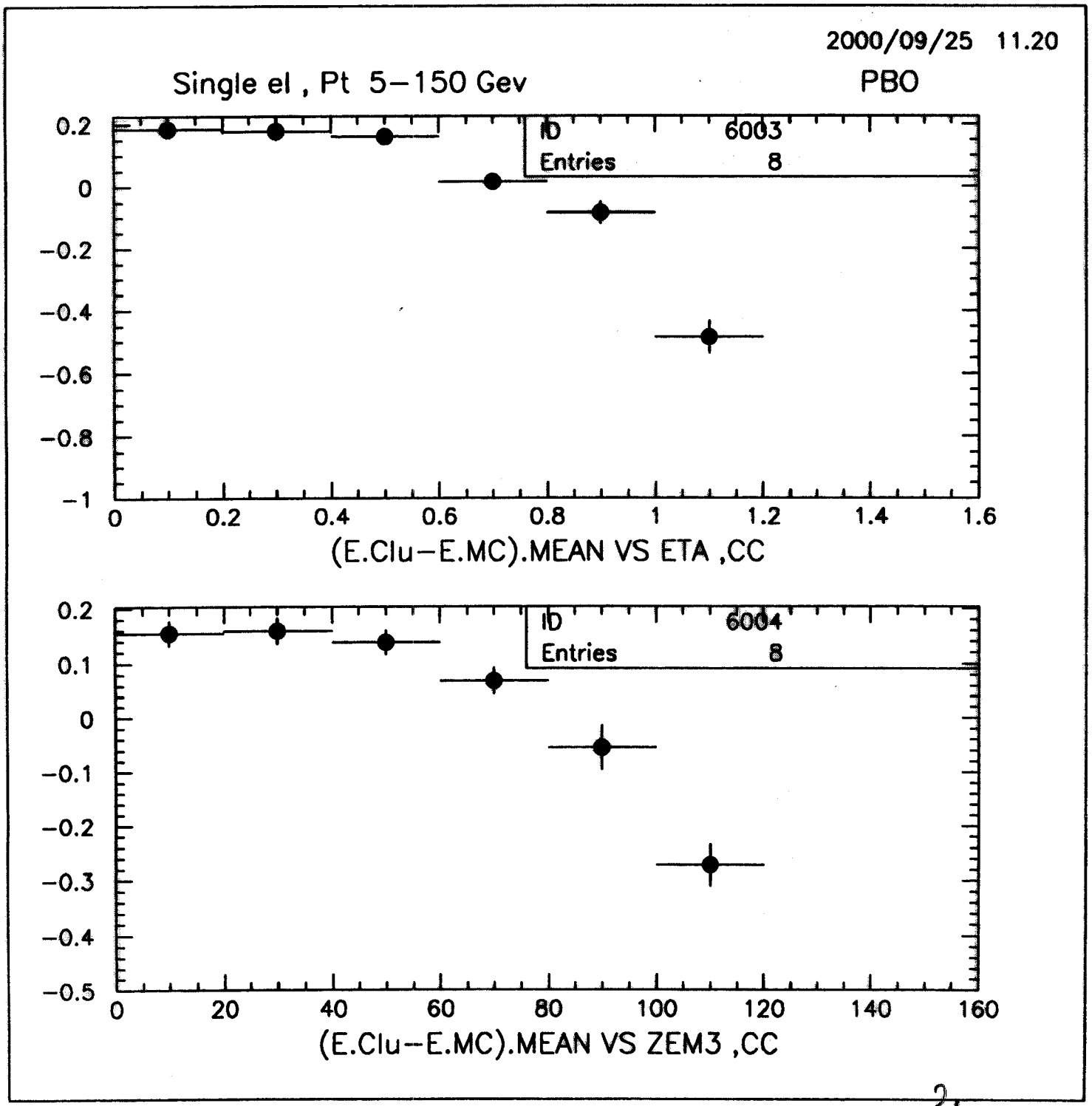
(E.Clu−E.MC), ZEM3 90., CC

PBO



(E.Clu−E.MC), ZEM3 110., CC

2 calo Layer 3, Barrel.
Standard weight



Standard Weight

Use standard procedure to determine new calibration weights function of position in calorimeter

χ^2 minimization

$$\chi^2 = \sum_{n=1}^{Nevts} \frac{\left(E_n^{mc} - \sum_{i=0}^{5} C_i E_i\right)^2}{E}$$

i	0	1	2	3	4	5
layer	PS	EM1	EM2	EM3	EM4	HAD1

- no constant term
- no ICD information

New weights are corrections of standard weights

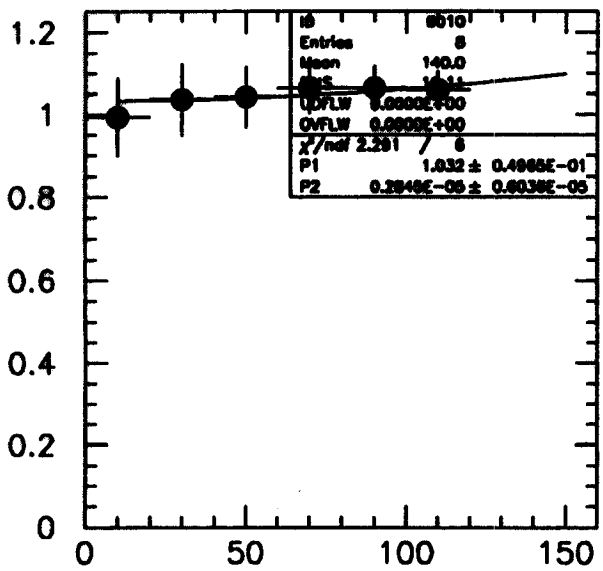
$$W_i = W_{0,i}\,(1. + W_{2,i}\,Z_i^2) \qquad CC$$

$$W_i = W_{0,i}\,(1. + W_{2,i}\,R_i^2) \qquad EC$$

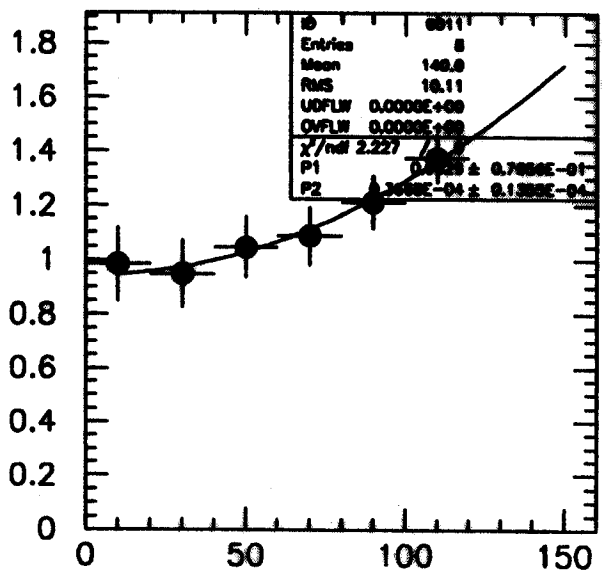
2000/09/22 16.41

Single el , Pt 5−150 Gev

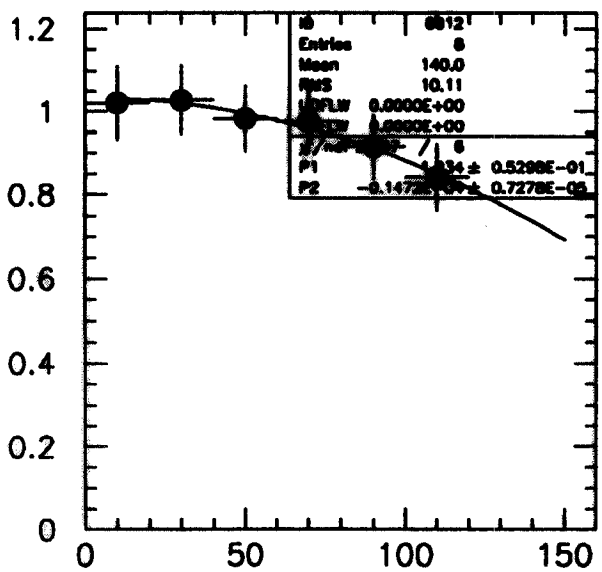
PBO



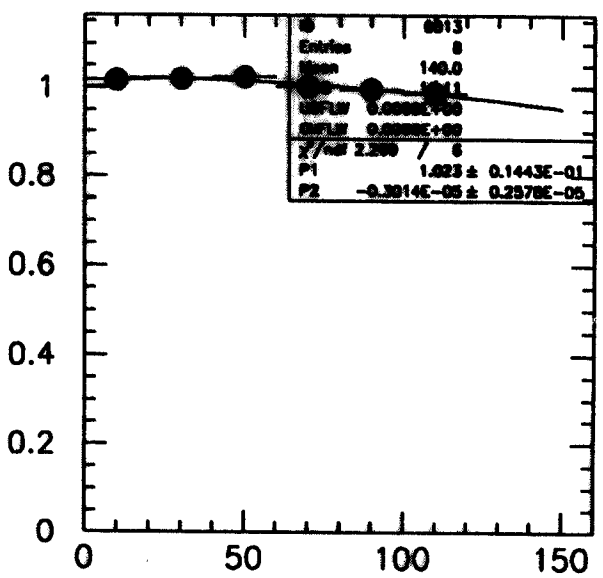
CPS COEF VS ZEM3, CC



EM1 COEF VS ZEM3, CC



EM2 COEF VS ZEM3, CC

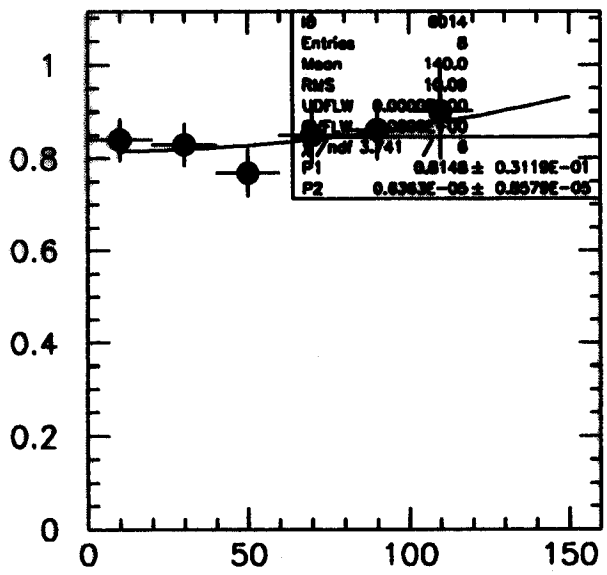


EM3 COEF VS ZEM3, CC

Fit Weight

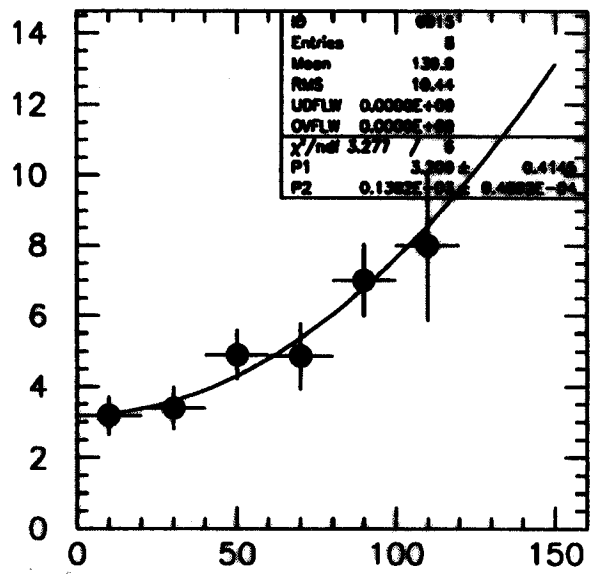
2000/09/22 16.41

Single el , Pt 5−150 Gev



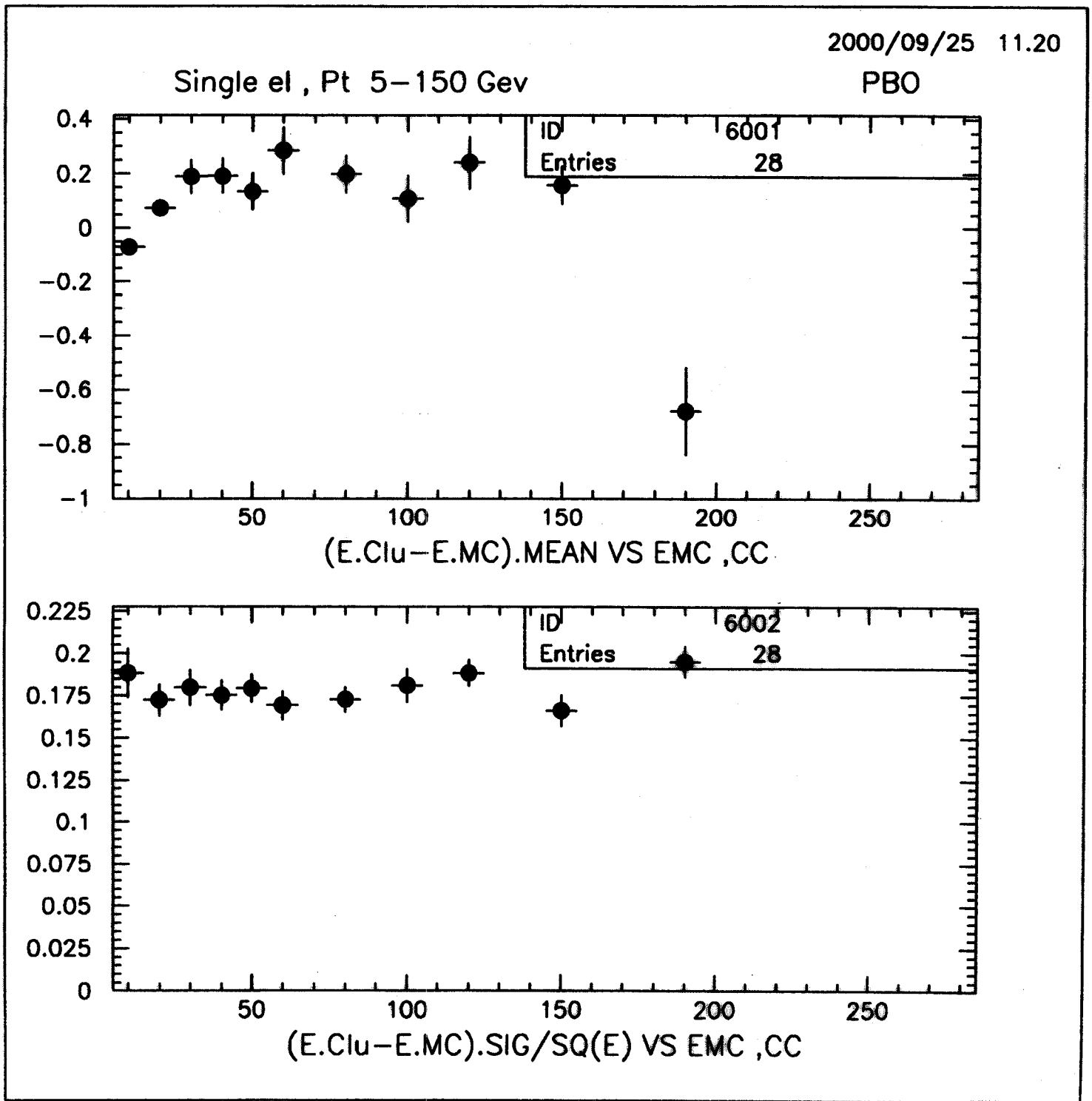
EM4 COEF VS ZEM3, CC

PBO

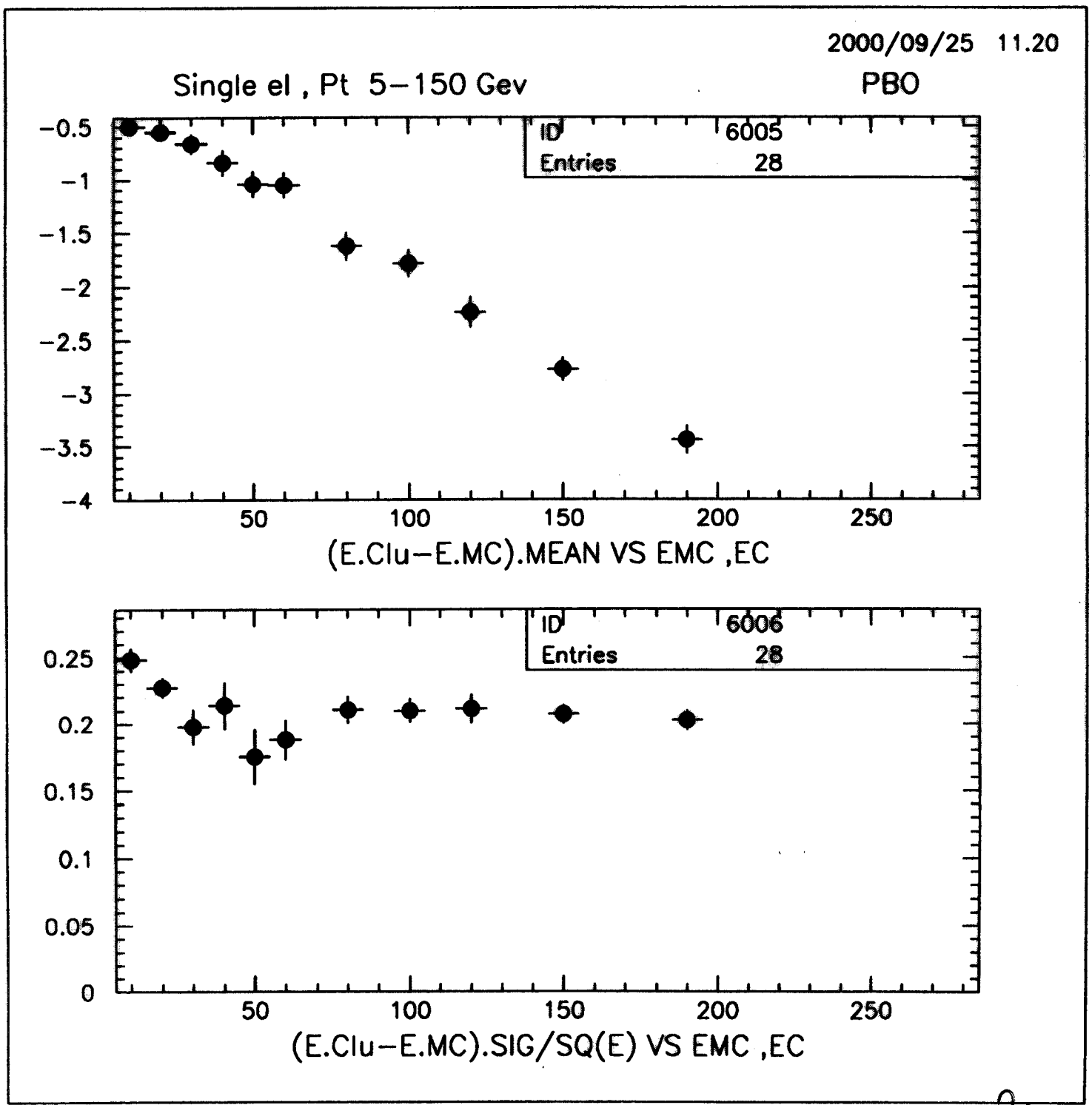


HAD COEF VS ZEM3, CC

Fit weight



Fit Weight Used

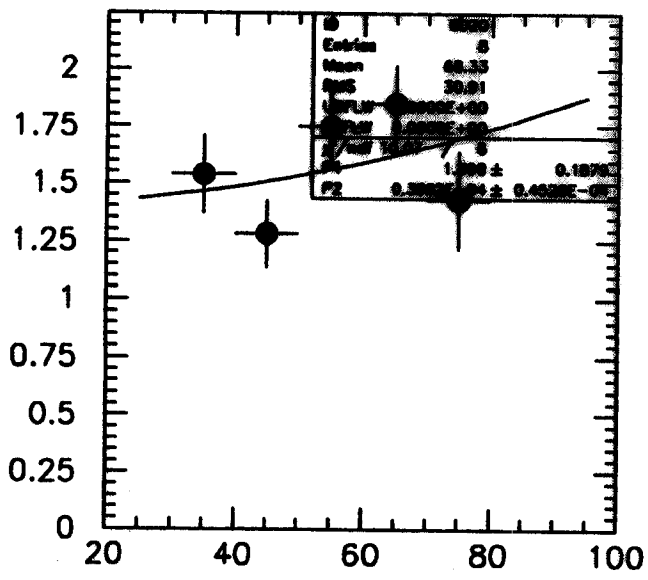


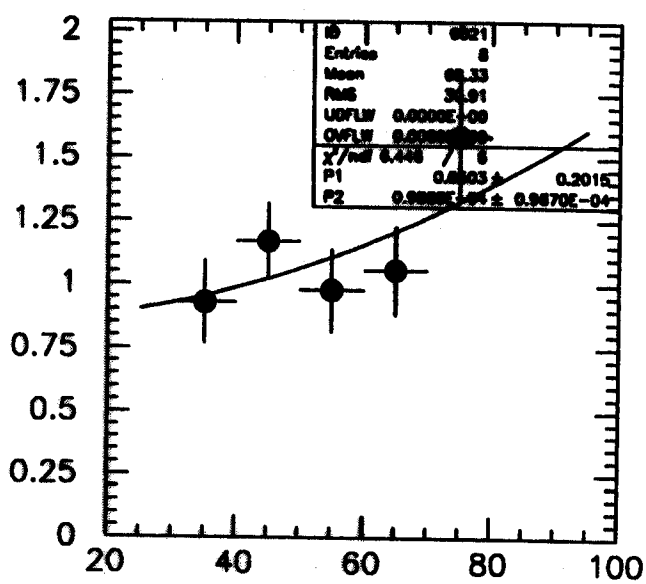
Standard Weight User

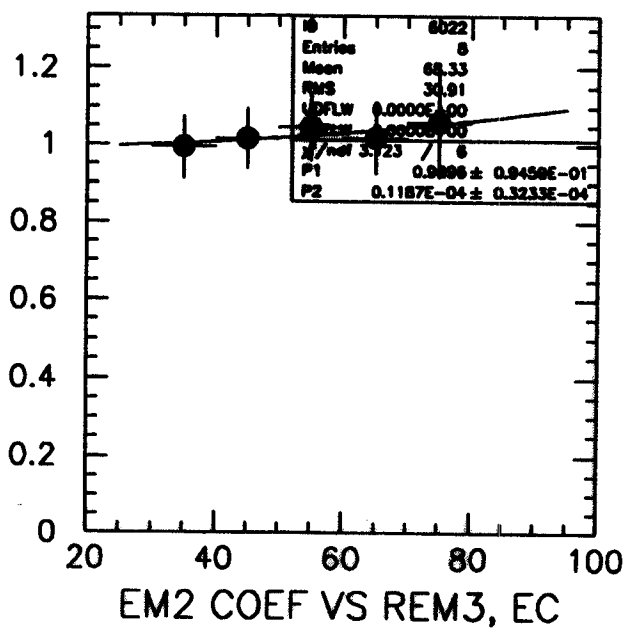
2000/09/22 16.42

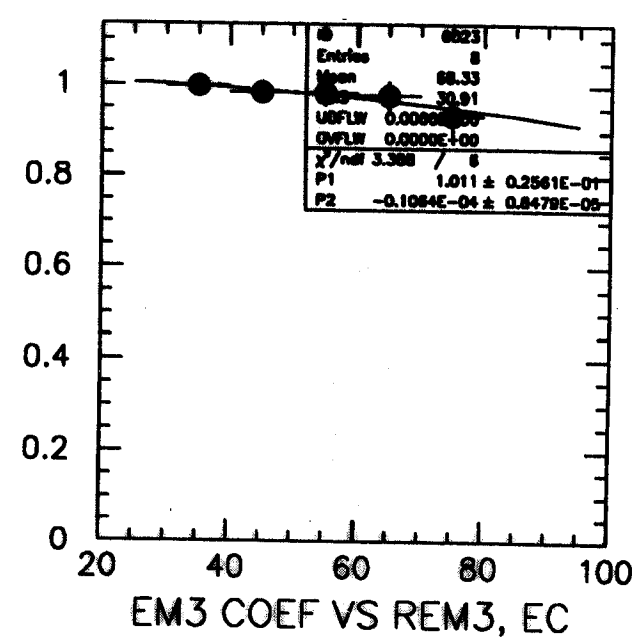
Single el , Pt 5−150 Gev

PBO





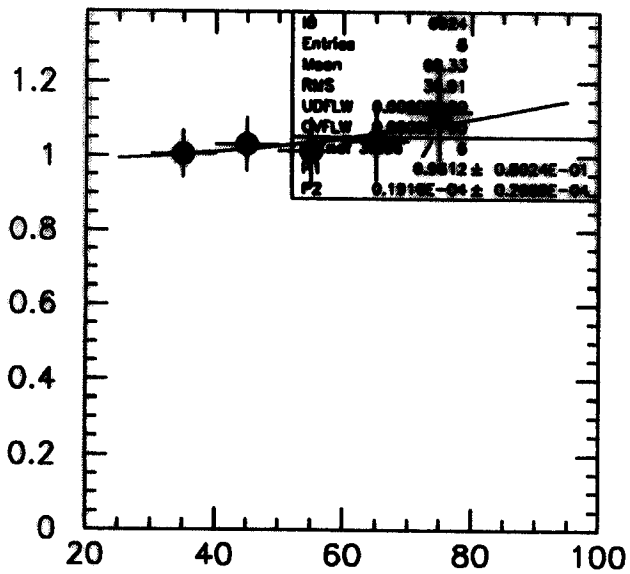




Fit Weight

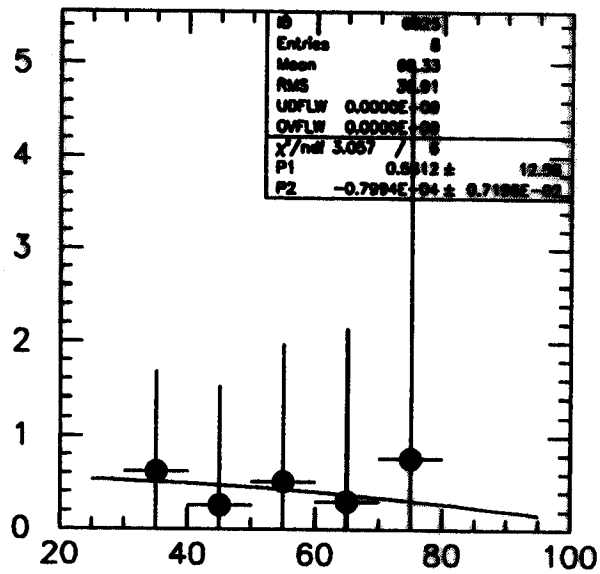
2000/09/22 16.42

Single el , Pt 5–150 Gev



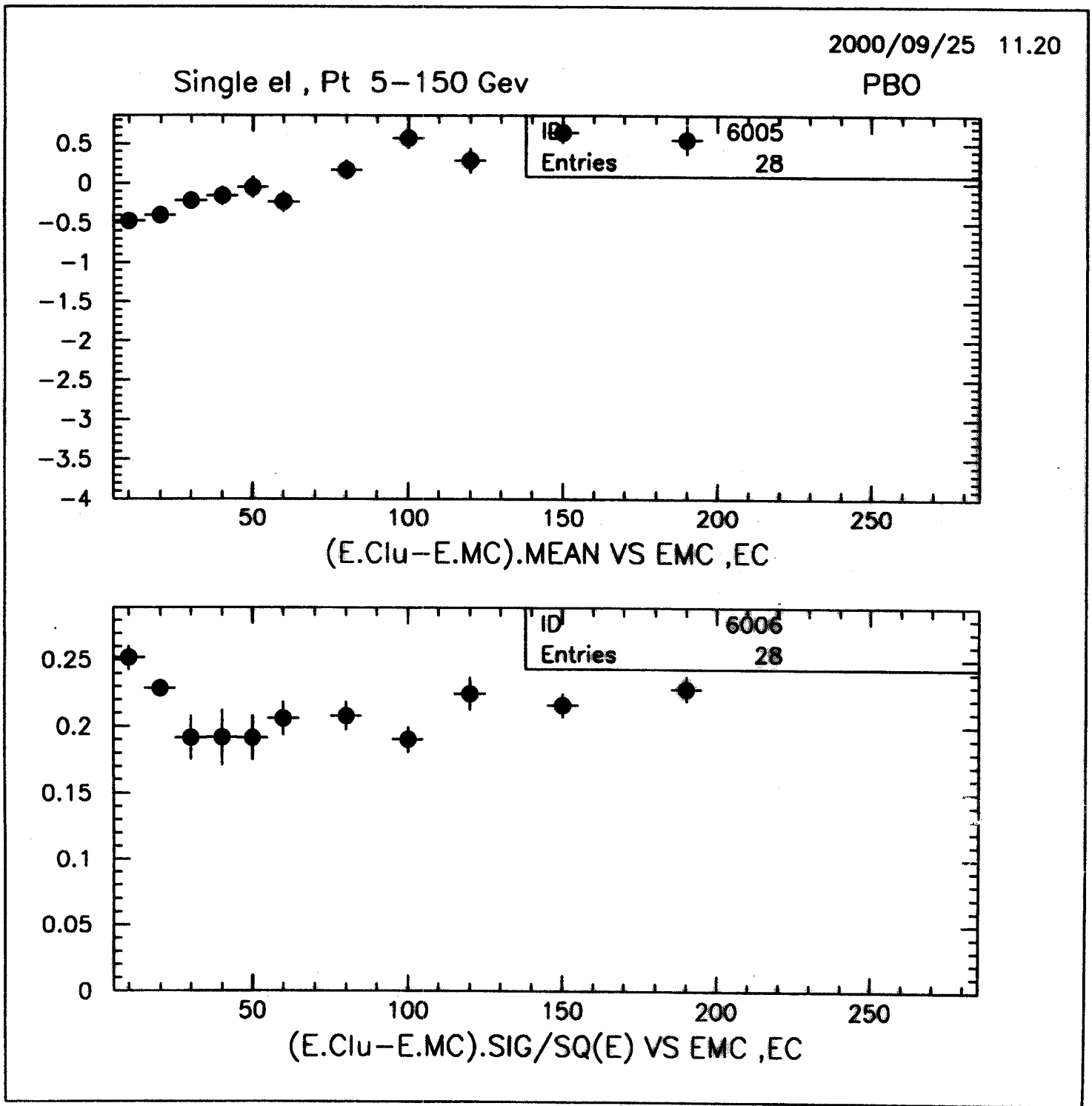
EM4 COEF VS REM3, EC

PBO



HAD COEF VS REM3, EC

Fit weight



Fit Weight Used

PBO

Conclusion

- weights function of cluster position give
  better energy normalization
  no improvement in energy resolution
- problems in the intermediate region ($\eta \simeq 1.3$)
  lost of EM cluster
  no PS information
  need ICD information (this is missing in the EM.PART block : Analyze package)
- reproduce events flat in p
- do same work with global track energy instead of Emc
- W, Z ... production