$\tau \rightarrow e$ analysis within OpEmuRec framework

Réunion groupe
10/06/11 - Florian Brunet

Outline

EWG talk

- Implementation of Shower algo within OpEmuRec
  Efficiency calculation
- Truncated events by scanback
- 2-Bricks analysis
- Outlook

New slide

Implementation of Shower Algo within OpEmuRec

Investigation about overestimating energy

MC : 4 GeV → **OpEmuRec** Reco : 4.7 GeV (38%)

→ **Frank** Reco : 4.8 GeV (34%)

Implementation into OpEmuRec is OK

Algorithm seems really sensitive to input variables

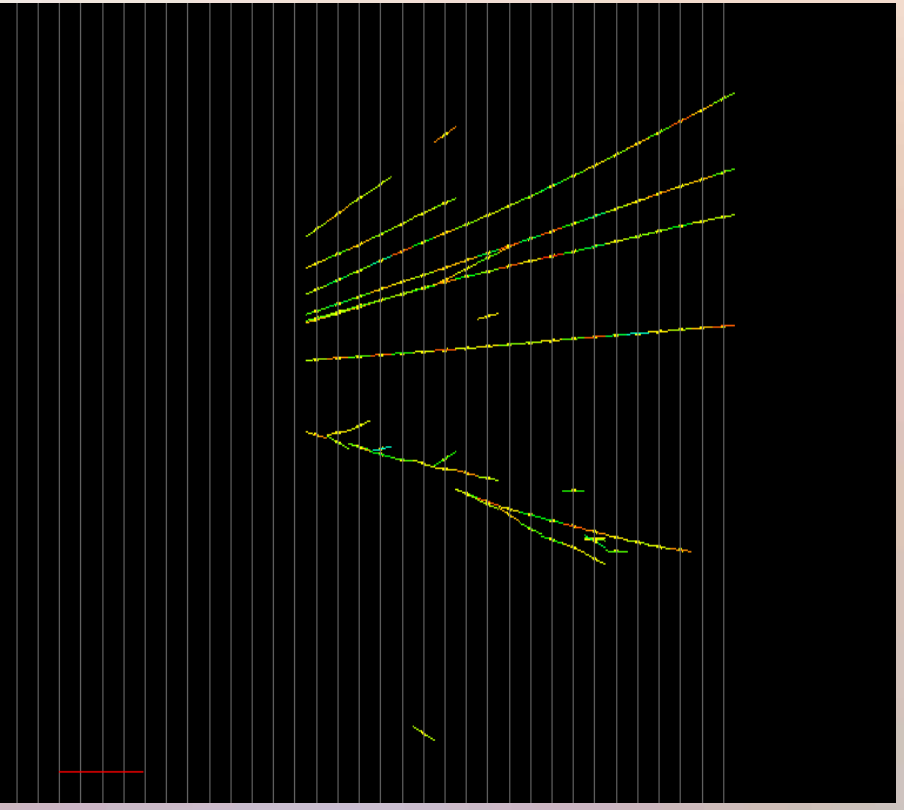
→ new ideas to improve this

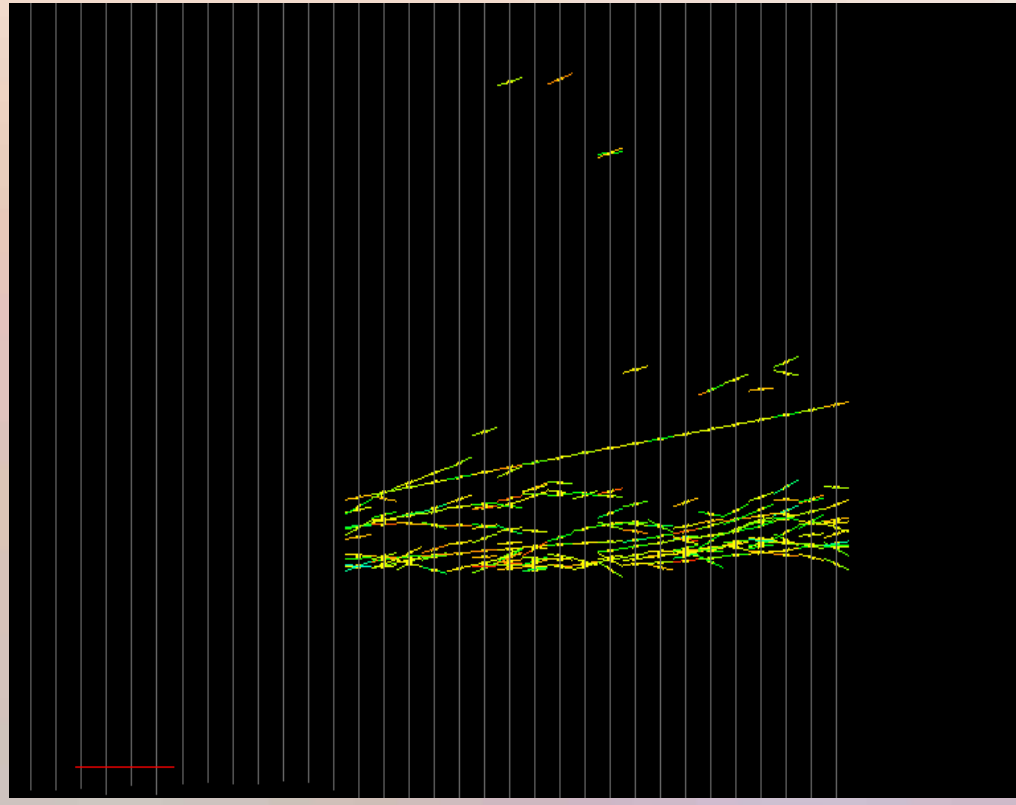
$\tau \rightarrow e$ efficiencies (confirmed by Umut & Budimir)

Florian	Right MC brick found by Brick Finding	*At least one BT found in CS*	*At least 1 BT as SB track & located in one plate < 55*	*At least one shower reconstructed* *eff±stat±sys* *Sys : selected showers are gamma*	*Reconstructed Vertex is in the same plate than the MC Vertex*
Tau-e DIS	0.677±0.015	0.638±0.016	0.530±0.016	0.508±0.016±0.004	coming
Tau-e QE	0.629±0.015	0.496±0.016	0.385±0.015	0.365±0.015	coming

Florian		No osc prob, no fake vertex		*Decay search at least one secondary vertex is reconstructed*
kink				80.7±1.9%
Short				78.7±1.9%

Truncated events by Scanback





On 10% of events in taue samples scanback stops quickly about the plate 57.

Since we open a volume from that point we cut off some events.

→ we need a new procedure to recover them

2-Bricks analysis

Andrea provides me a tool to run OpEmuRec – Fedra Linking and Alignment on 2 bricks

Shower algo has been modified in order to run over 2 bricks

→ **it has been tested on 2 events**

Outlook

Work with new 3000 events samples
Finish analysing 1000 events :

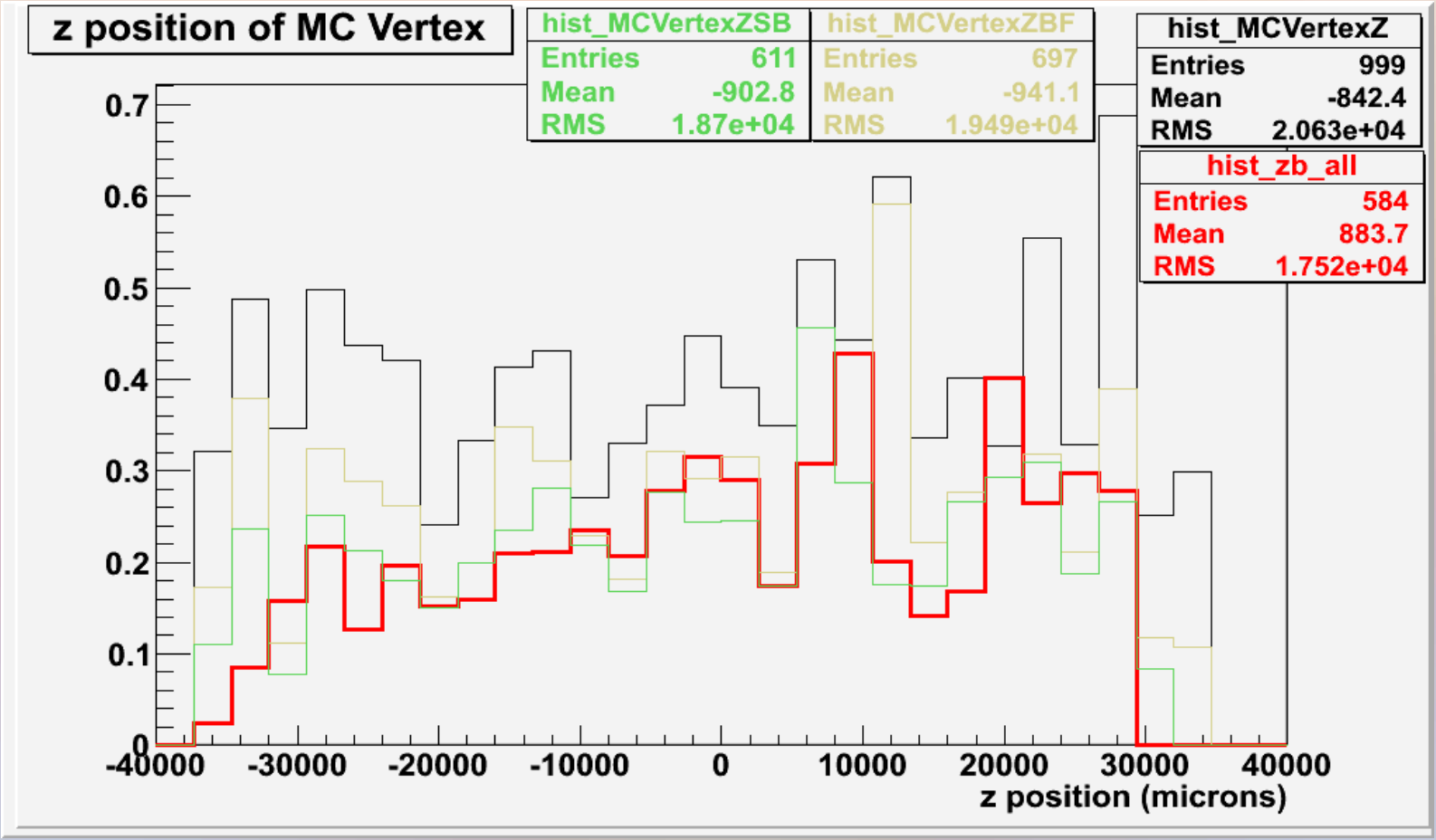
➔ Final efficiency : with **Decay Search** & kinematical selection

2-bricks analysis

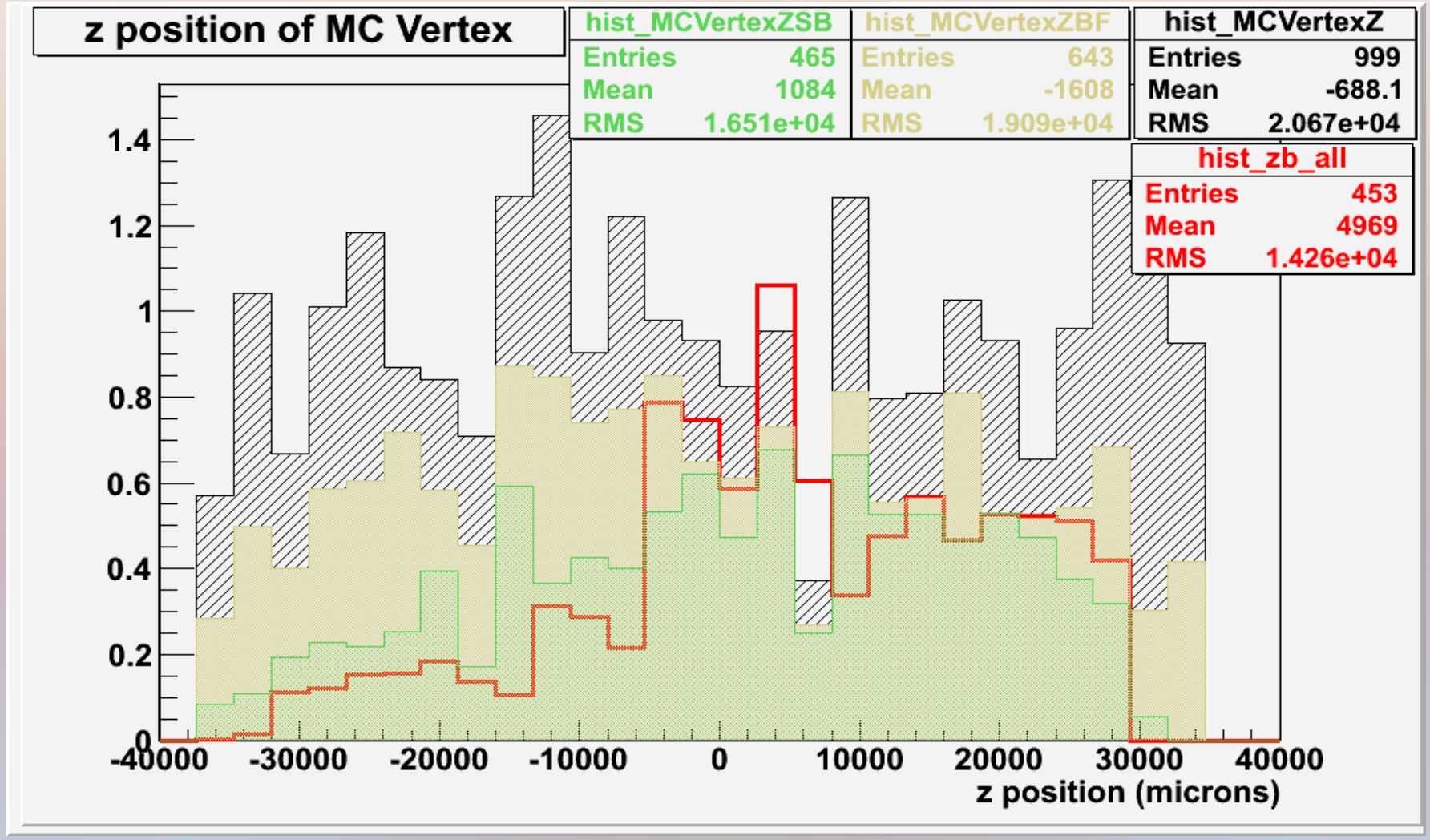
➔ first estimation of Energy of showers in the 2nd brick

New slides

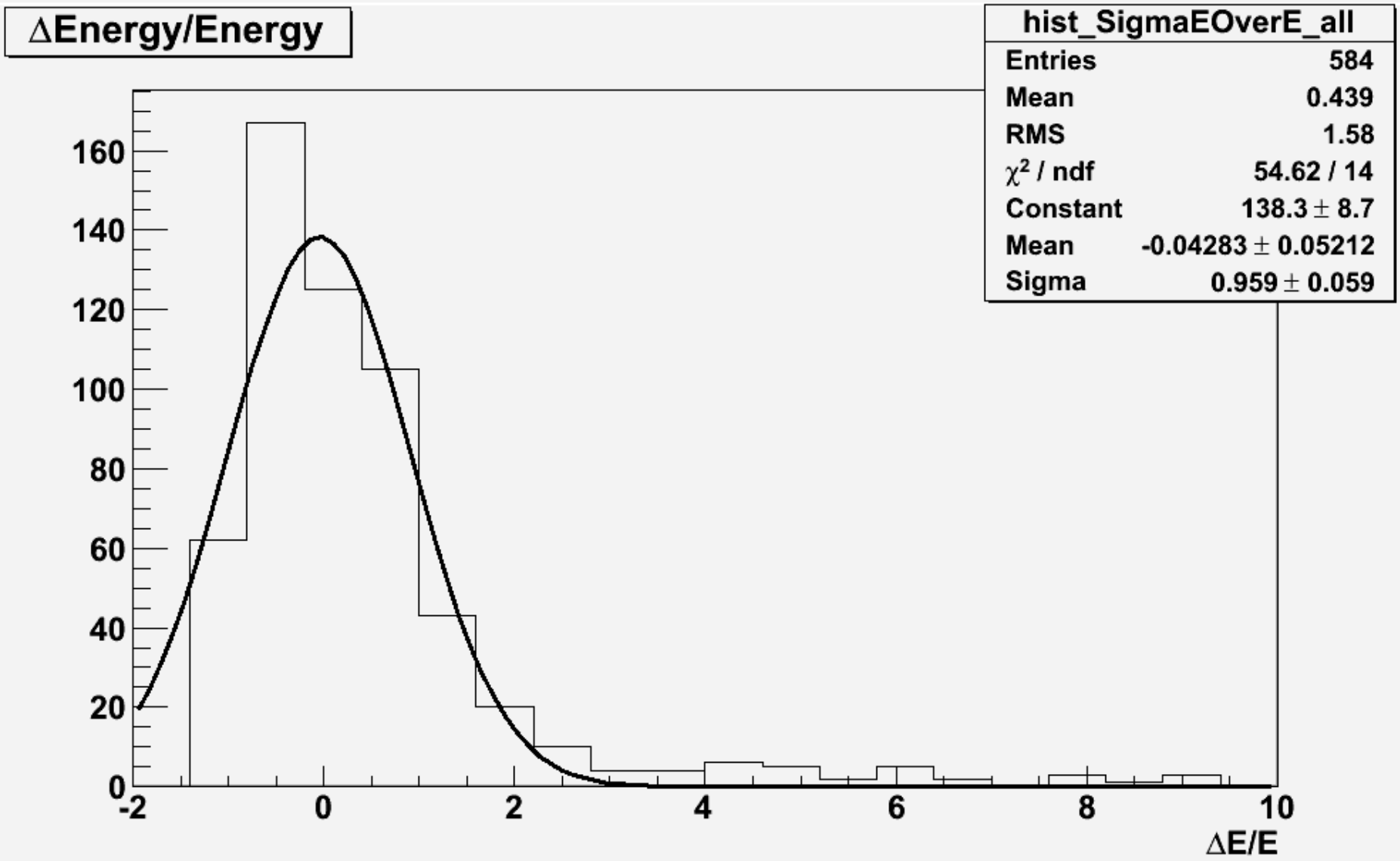
τ→e DIS : location bias



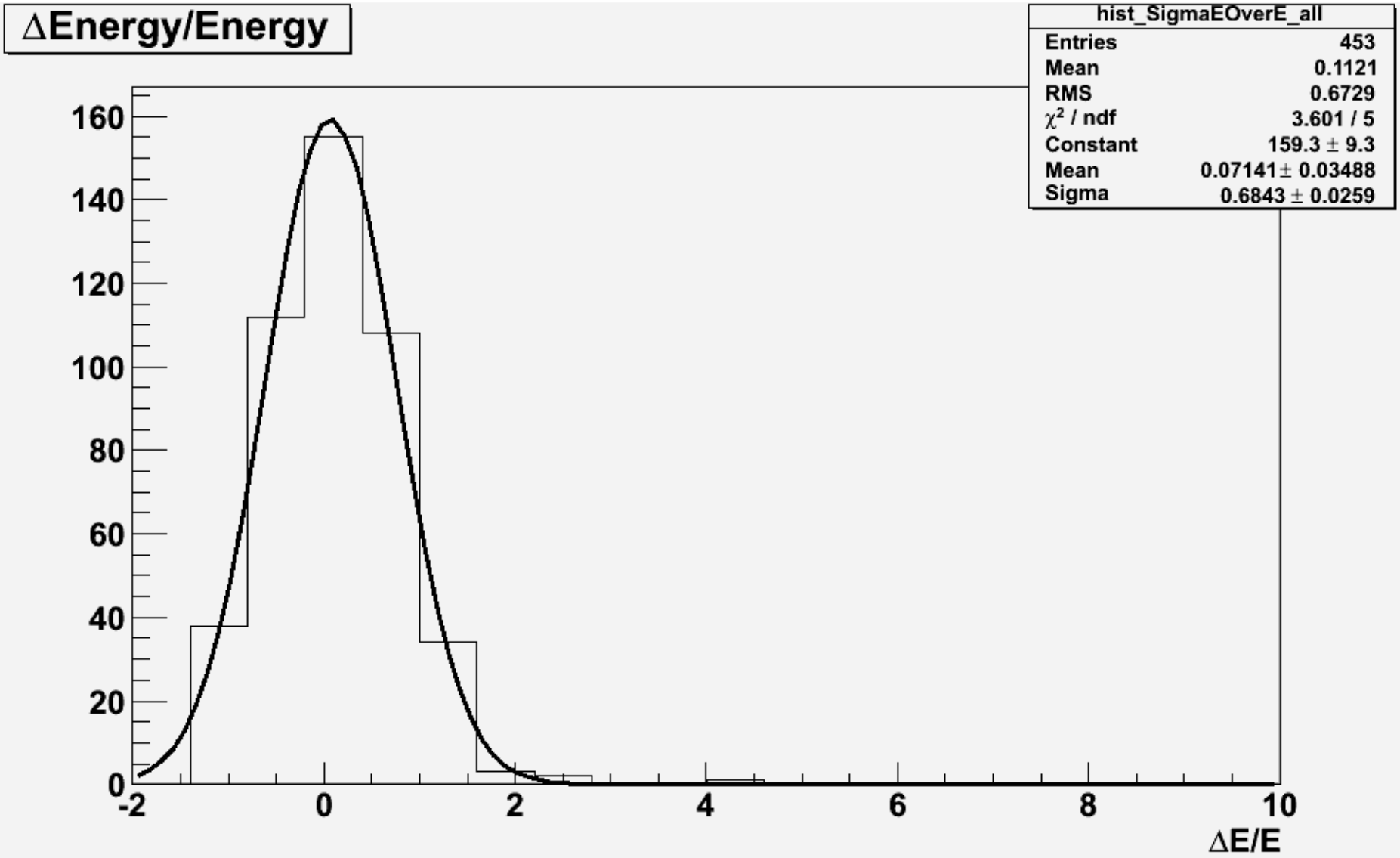
τ→e QE : location bias



τ→e DIS


ΔEnergy/Energy
hist_SigmaEOverE_all
Entries 584
Mean 0.439
RMS 1.58
χ² / ndf 54.62 / 14
Constant 138.3 ± 8.7
Mean -0.04283 ± 0.05212
Sigma 0.959 ± 0.059
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
ΔE/E

τ→e QE


ΔEnergy/Energy
hist_SigmaEOverE_all
Entries 453
Mean 0.1121
RMS 0.6729
χ² / ndf 3.601 / 5
Constant 159.3 ± 9.3
Mean 0.07141 ± 0.03488
Sigma 0.6843 ± 0.0259
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
ΔE/E

Outlook

EWG outlook

- Decay search : estimation of « real » efficiencies for long kink, short kink and *film kink*
- DS : recover low angle kinks by microtracks search

Taue → energy estimation without background

BACKUP SLIDES

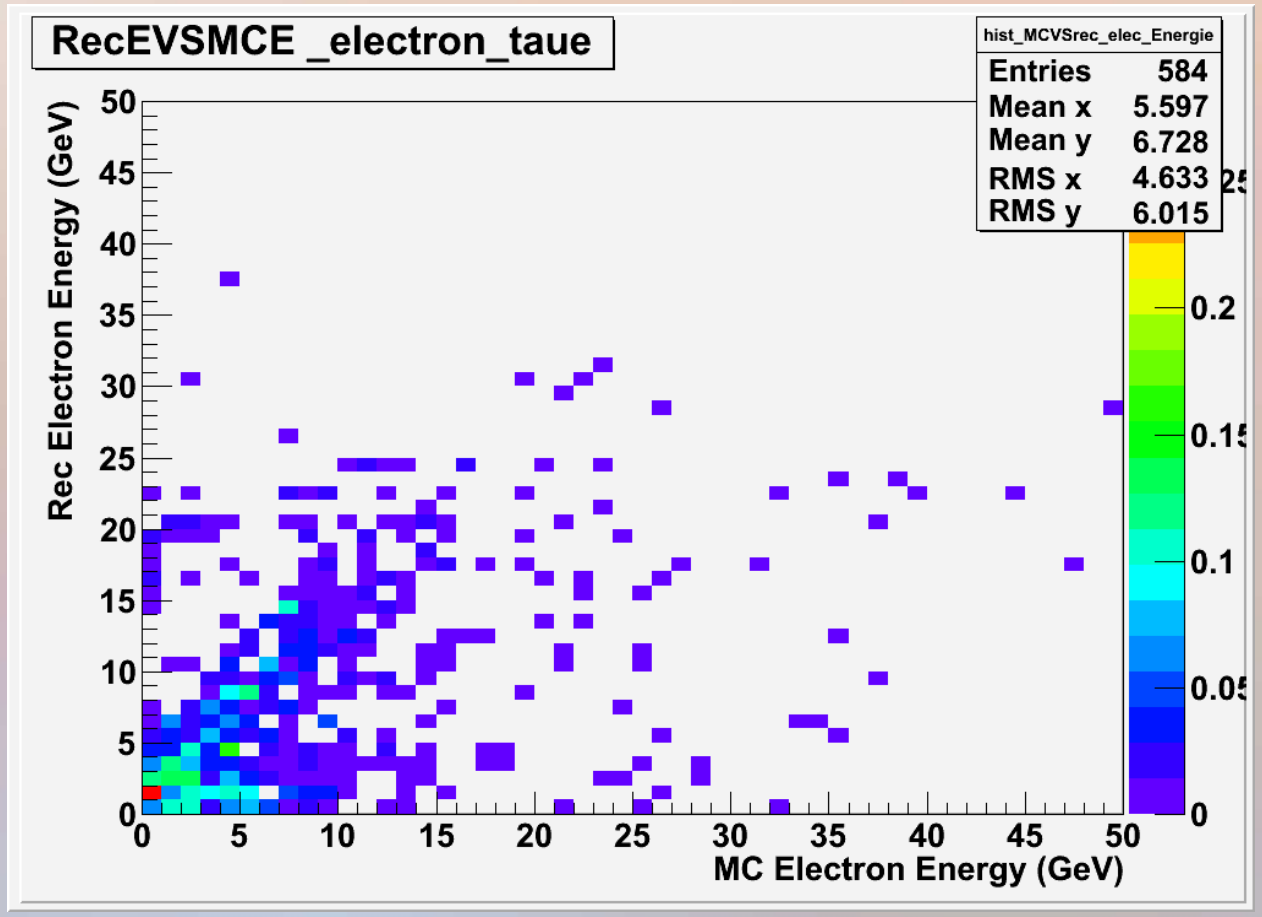
MC Sample - OpRelease 4.0

Samples of $\tau \rightarrow e$ DIS & QE produced by Elisabetta
/sps/opera/operap/production/OpEmuIO/march2011/TAUE/DATA/taueforemu_tgt1000_OpR4.0_rec_11.root

- Processed through OpEmuIO
- Processed through OpEmuRec packages : CS, Scanback, Link, Alignment, Track & Shower by using all plates available in the brick

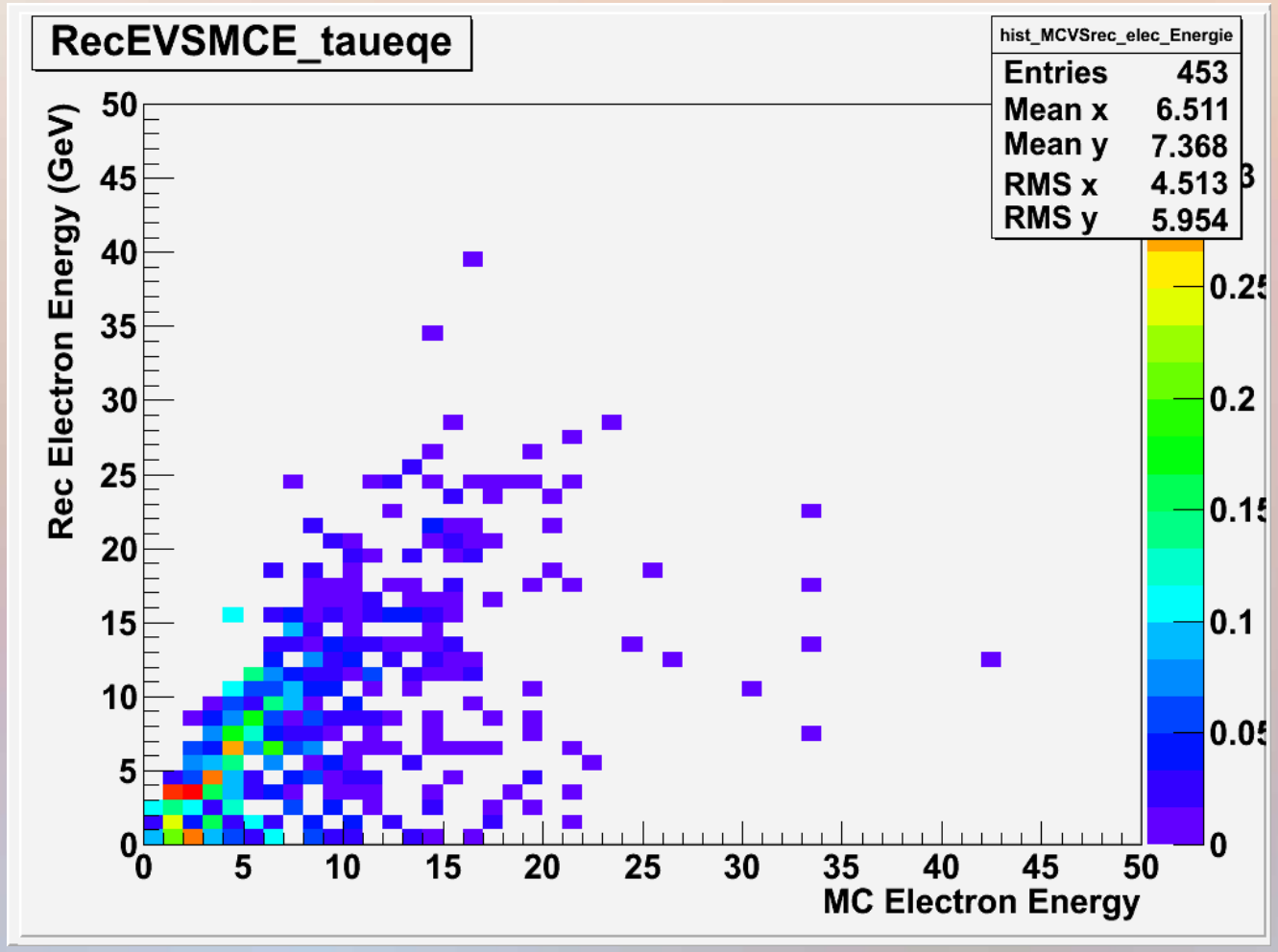
- All packages up to OpEmuRec Track are taken from the release $GROUP_DIR/soft/OpRelease4.0_emulsion_march2011/
- OpEmuRec Shower is released here : /sps/opera/scratch/flbrunet/analysis/OpRelease_2011-04-04_OKwithShower/4.0/OpEmuRec/

τ→e DIS : Reconstructed electron energy VS MC electron energy



Good agreement between Reconstructed & MC Electron Energy

τ→e QE : Reconstructed electron energy VS MC electron energy



Good agreement between Reconstructed & MC Electron Energy → slight underestimation