Réunion OPERA

15/04/11 - Florian Brunet

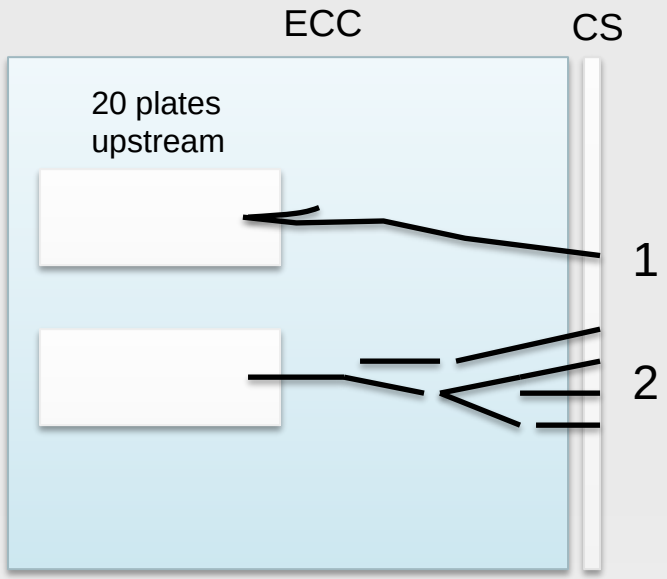
Outline

- News from EWG meeting
- Debugging session with Frank
- Implementation of shower algo into OpRelease
- Test on “1000 $\tau \rightarrow e$ DIS & QE” samples
- Outlook

Algorithm description

- The goal is to study how to recognize shower-like pattern from scanback data.
- This information can be used to increase the total scan volume in the upstream direction
- The shower-like pattern is triggered by one of the following conditions:

1. e-pair
   an e-pair is confirmed by visual inspection at the stopping plate
2. converging tracks
   some SB tracks (with similar angle) are converging in one or a few tracks (not so trivial)



Debugging session with Frank

- Debug of many problems into Shower algo codes : wrong number of plates processed, output tree badly filled…
- Investigation about overestimating energy

MC : 4 GeV → Reco : 5.1 GeV (38%)

→ Reco Frank : 4.1 GeV (34%)

- Overestimation because of energy loss into the whole 1st plate instead of random thickness : 0.5GeV
- The remaining enhancement of Energy : MC differences ? → Frank shall process my MC samples

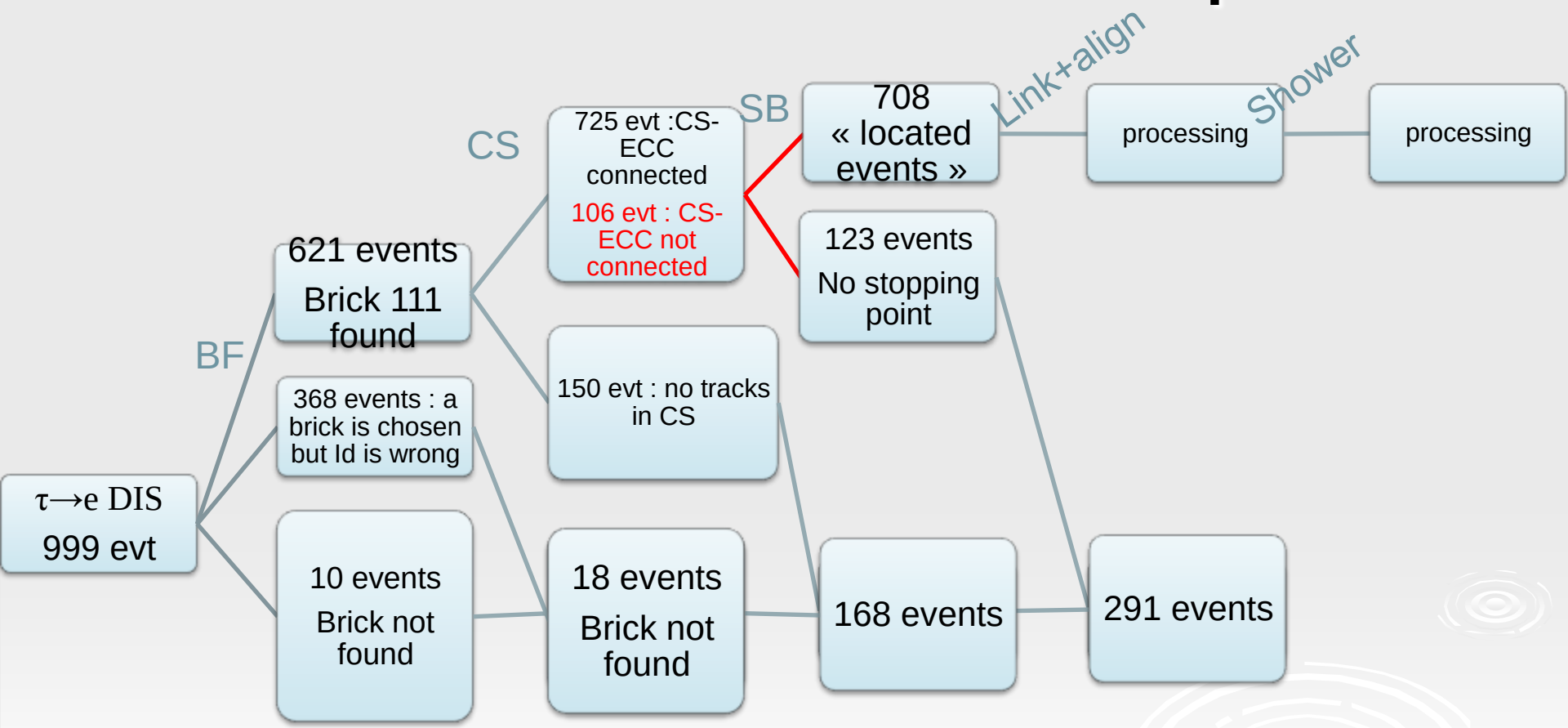
OpRelease 4.0

- Implementation of electromagnetic shower reconstruction algorithm in OpRelease 4.0 : DONE
- Here you can find :

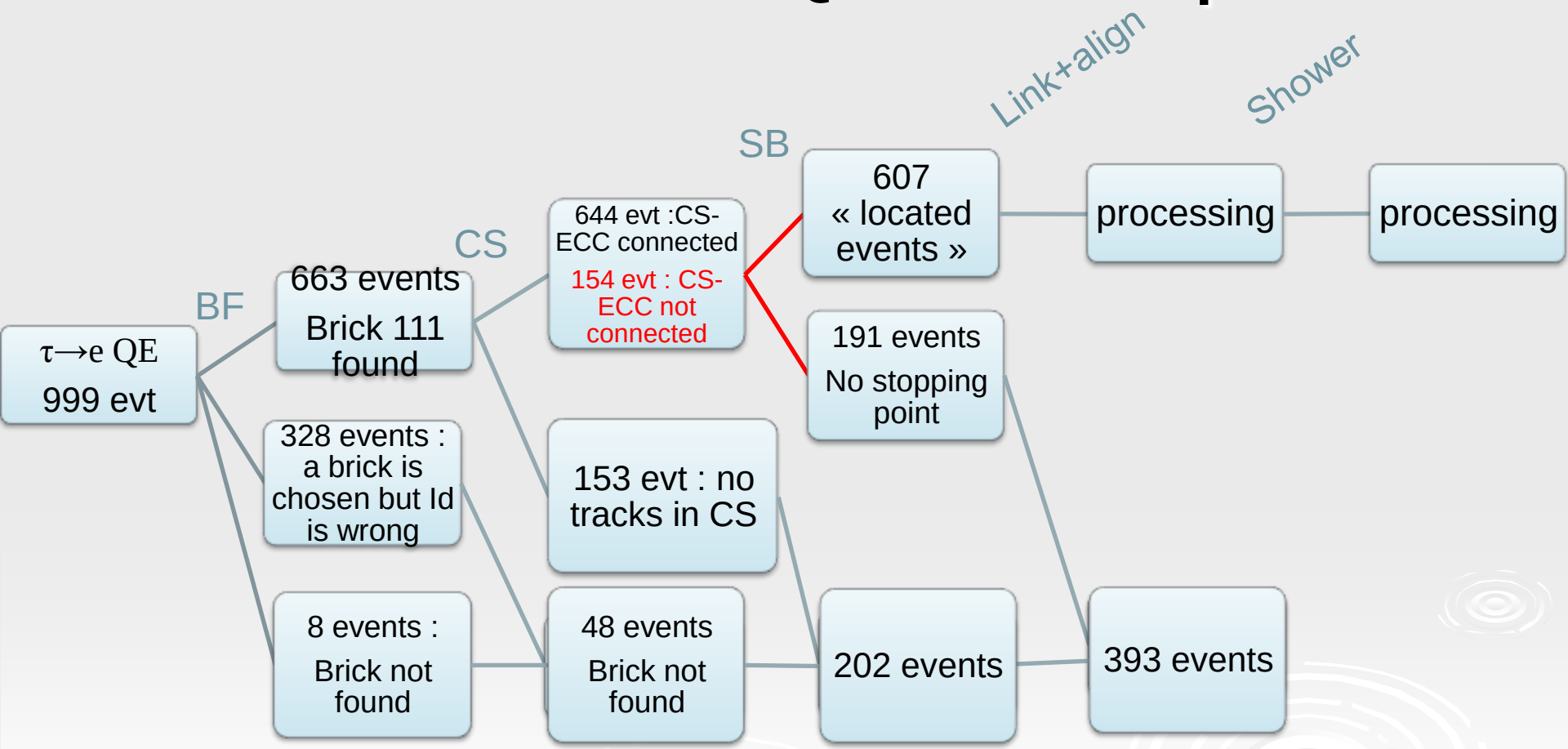
/sps/opera/scratch/flbrunet/analysis/OpRelease_2011-04-04_OKwithShower

- Note that you need Fedra standard output from linking which are automatically produced by *OpRelease4.0_emulsion_march2011*
- Test of this last implementation with new production : 100 events $\tau \rightarrow e$ DIS & QE → check of energy systematic errors
- Test of this last implementation with new production : 1000 events $\tau \rightarrow e$ DIS & QE

Reconstruction chain : « 1000 τ→e DIS » sample



Reconstruction chain : « 1000 τ→e QE » sample



Outlook

- Finish work session with Frank about discrepancy between Fedra standalone algorithm/OpEmuRec implemented algorithm : 9-10/04/11

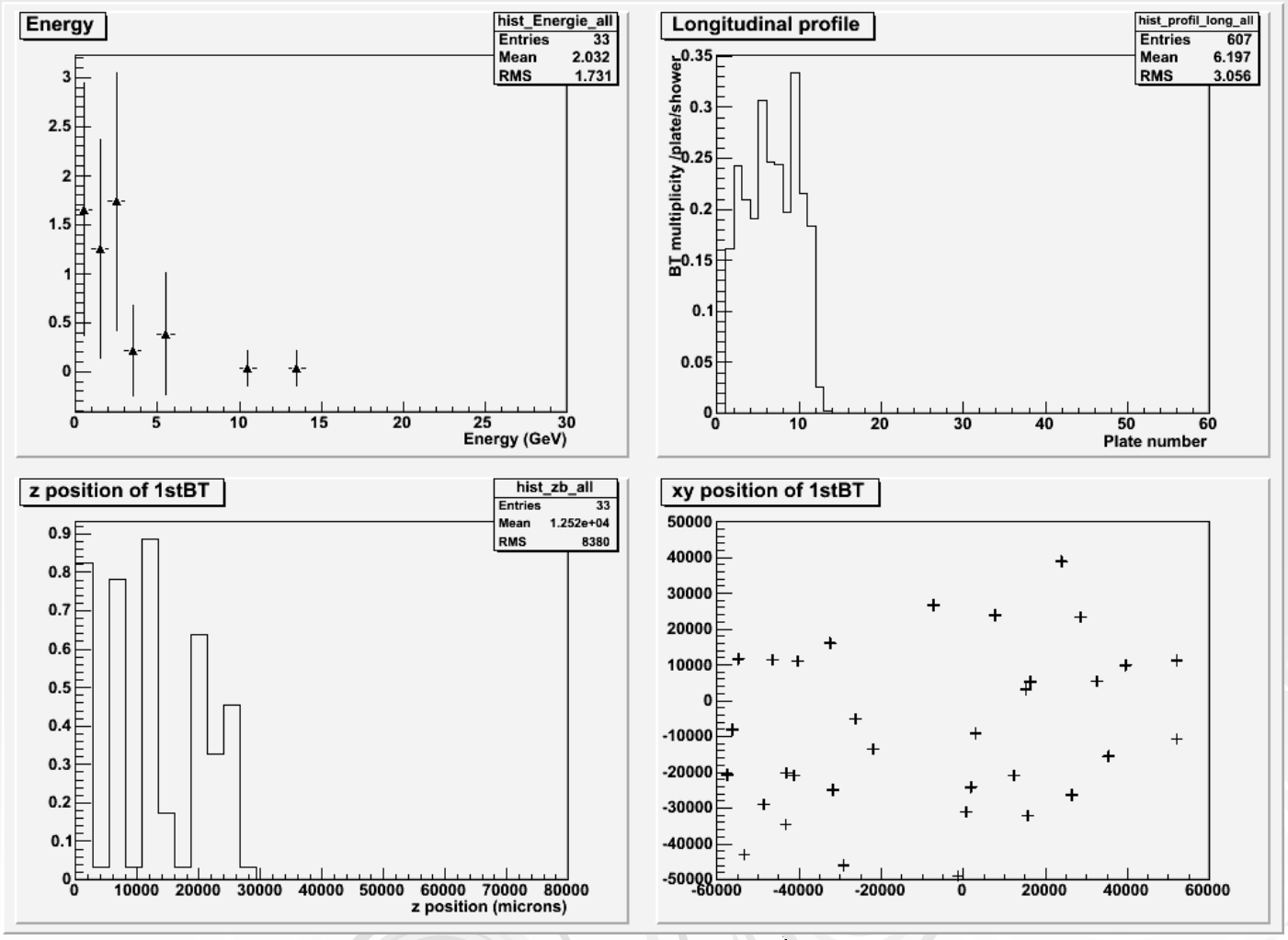
- Finish processing 1000 events through the whole reconstruction chain and check results
- Reconstruct showers of ν_e beam MC sample
  - Check energy range of reconstructed showers : comparison with low electron energies of 0mu data

  (see : Ariga's talk of Analysis meeting 23/03/2011)
- Detection efficiency for $\tau \rightarrow e$ channel

BACKUP SLIDES

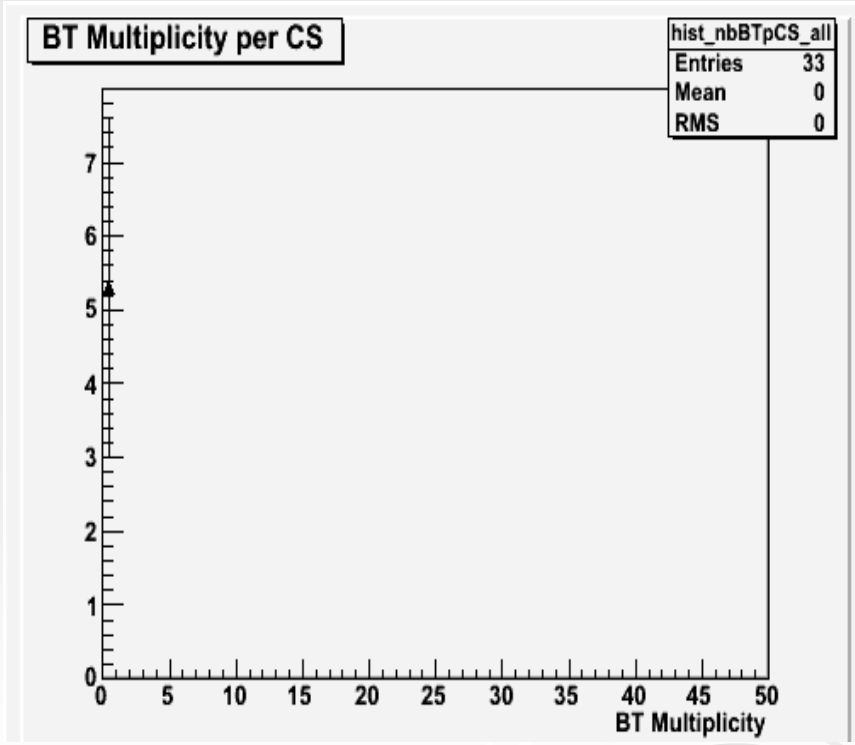
Test on “100 $\tau \rightarrow e$ DIS” sample

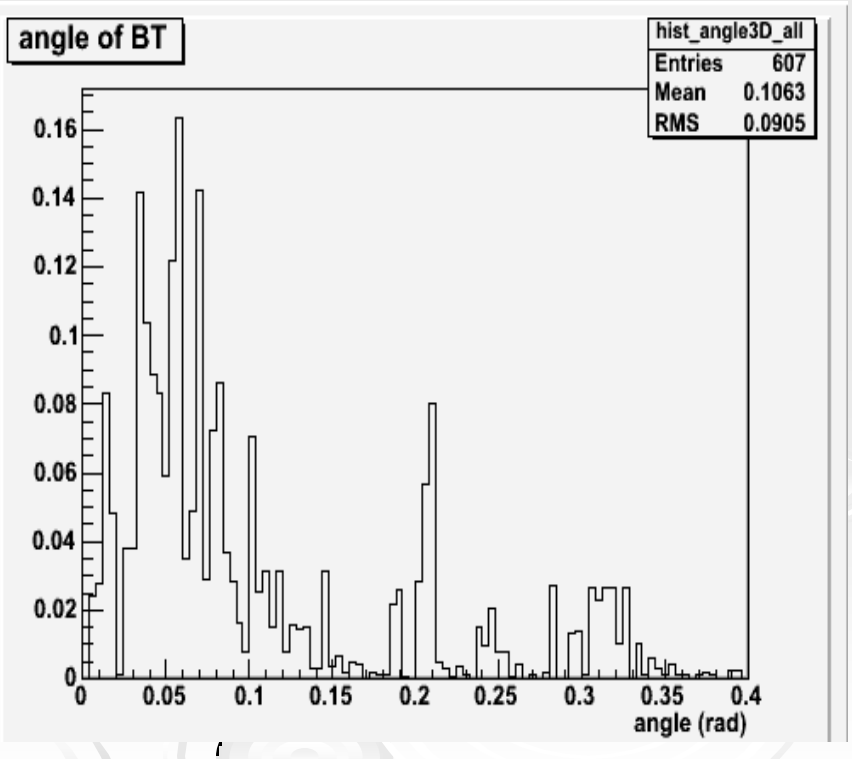
Weighted with oscillation probability



Test on “100 $\tau \rightarrow e$ DIS” sample

Weighted with oscillation probability





Summary of event location efficiencies

Sample	Efficiency of reconstructing a shower	Effciency to see one shower in CS : 1 BT	Effciency to see one shower in CS : 3 BT (Fabio)	Effciency to see one shower in CS : 5 BT (Tiem)
313 $\tau \rightarrow e$ DIS	87.4±2.0%	41.4±4.6%	18.0±5.4%	14.4±5.5%
1000 $\tau \rightarrow e$ QE	85.8±1.2%	51.1±2.4%	41.8±2.6%	35.5±2.8%

Outlook

- Use of the 4.0 OpRelease
  - Improve statistics : 5000 events
  - Improve location efficiency in CS for $\tau \rightarrow e$ events QE
    - Compute basetrack density
    - Associate BT in CS with respect to criteria : BT multiplicity and BT density & compare at the shower algorithm results to evaluate « misidentification »
    - Add background and tune criteria
  - Same efficiency study for ν_e & charm$\rightarrow$e samples
- Still investigating discrepancy between Fedra standalone algorithm/OpEmuRec implemented algorithm
- Detection efficiency for $\tau \rightarrow e$ channel