Software Coordinators Report

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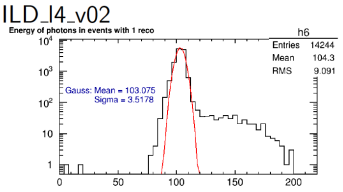
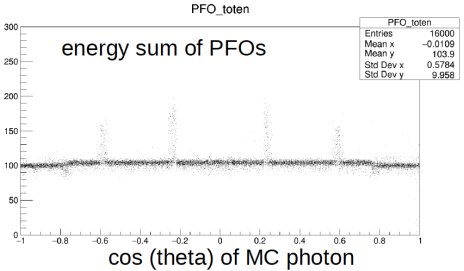
ILD SW&Ana Meeting, Sep 27, 2017

Outline

- Validation of Test Production
- Generator
- Simulation
- Reconstruction
- Monte Carlo Production

Validation: Photons M.Habermehl, D.Jeans



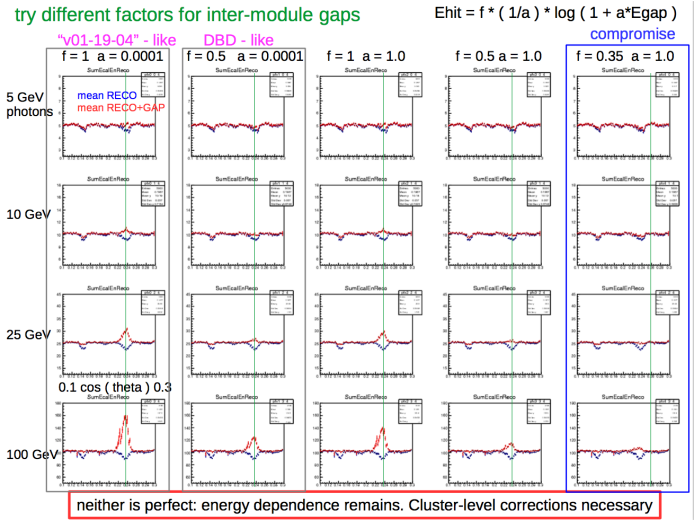


gap correction is now fixed and improved wrt. DBD (D.Jeans)

- introduced energy dependent correction factor:

$$E_{gap} = \frac{l_{gap}}{l_{cell}} \frac{E_1+E_2}{2} \text{ and } E_{hit} = \frac{f}{a}\, log(1 + a\, E_{gap})\, E_{gap}$$

Ecal gap correction D.Jeans



Generator M.Berggren, J.Tian

- latest HEAD version of Whizard seems to **have fixed the main problems**
  - 4 jet problem has a workable solution
    - still some technical issues to be sorted out w/ authors
  - ISR should also have been fixed
    - pending verification
  - pt-kick in gamma-gamma events improved
- some minor requests to authors about the correct generator record and status codes
  - e.g. ‘stable’ quark and missing generator event number in file header
- working on setting up the production scripts
- small issue with creating relevant diagrams if ‘resonance’ turned on

- fixed reading of stdhep and lcio files in ddsim/DDG4
- now can deal with new status codes 4 and 5 form Whizard2
  - preserves *any* generator status
- hybrid Ecal model: reduced the **thickness of the scintillator to 1.5 mm**
  - have realistic gap size for the current absorber structure
- will use *Geant4 10.03.p02* and *QGSP_BERT* physics list
  - as recommend by Calice and agreed by calorimeter conveners

need a new software release soon . . .

Reconstruction - Marlin

- have introduced two new features in Marlin (R.Ete):
  - **global constants** in xml-file
    - can be overwritten on the command line
  - **include mechanism** for xml-files

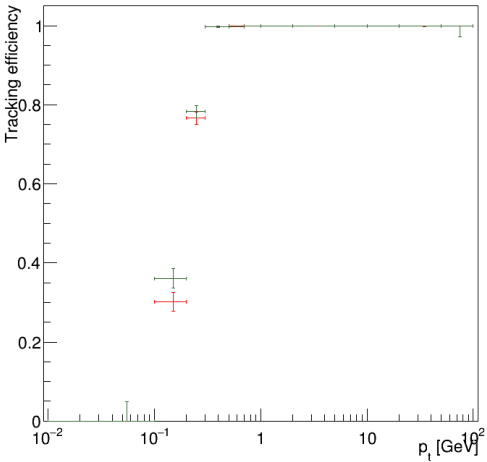
```
<constants>
    <constant name="DetectorModel" value="ILD_l5_v02"/>
    <constant name="FilePath" value="../../test/testmarlin"/>
    <constant name="InputFile" value="${FilePath}/${DetectorModel}_simjob.slcio"/>
    <include ref="./${DetectorModel}_calibration.xml" />
</constants>

Marlin --constant.DetectorModel=ILD_s4_v02  marlin-steer.xml
```

- will allow to more transparently organize the *steering files* for our different detector variants and collision energies

Reconstruction - Tracking S.Lu

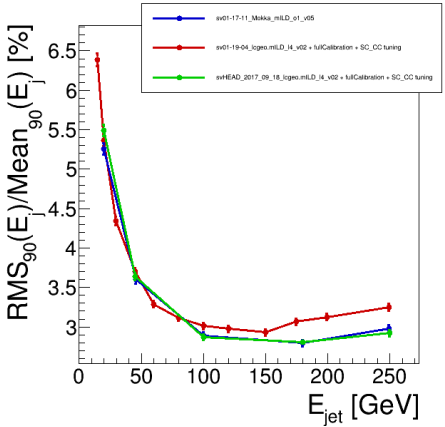
- have activated *MiniVectorCA* tracking for new software chain
- observe the expected improvement at low p_t
- *small issue* at *theta* $= 90^\circ$ under investigation



Reconstruction - PFA S.Lu, R.Ete

- developed automated calibration procedure for ILD models
  - including *re-tuning of SW-compensation parameters*
  - correct re-tuning of SW-compensation parameters improves *linearity* significantly
- with *full calibration* and *reccent bug fixes* we no reach the JER performance of the Mokka based sim/reco !!

major milestone reached !



Preliminary results of the estimation of resource needs

- Method
  - ILCSoft: head version on Sep. 19.
  - DDSim and Marlin, 50 events each for all 500 GeV DBD samples.
  - Overlay aa_lowpt and selected_pair events (produced by Mikael)
  - Run on KEKCC batch and study CPU time and produced data size.
  - Detector mode: ILD_l4_v02
  - CPU time and total data size to produce 500 fb^-1 samples were estimated
  - For a comparison, 4f processes were simulated by Mokka of v01-16-02
- v01-16-02(dbd) and head version(opt) comparison : typical case
  - CPU time comparison
    - pr_ID, pr_name, opt-sim(hour), dbd-sim(hour), opt/dbd ratio
    - l250008, P4f_ww_h, 274.92, 306.32, 0.89
    - l250028, P4f_ww_l, 3.93, 2.20, 1.78
  - Data size comparison
    - pr_ID, pr_name, opt-sim(GB), dbd-sim, opt/dbd ratio
    - l250008, P4f_ww_h, 23.36, 23.20, 1.00
    - l250028, P4f_ww_l, 2.90, 0.15, 19.36

need to understand difference for *leptonic* sample

Preliminary results of the estimation of resource needs - 2

- Total number for 500 fb^-1

pr_type	sim_cpu_days	rec_cpu_days	sim_size_GB	rec_size_GB
1f	785732	180587	2438730	3554864
2f	21450	10996	71450	120181
3f	103650	31972	364432	526572
4f	21999	9552	65918	121651
4f_lowmee	5	2	52	34
5f	64	36	183	420
6f	718	724	2322	6370
aa_2f	133903	64345	1531916	1053861
aa_4f	39	21	143	264
higgs	286	242	767	2197
total	1067849	298481	4475918	5386418

sim+rec cpu = 1366331 days
sim+rec data = 9862337 GB

- The validation of the estimation is not done. There may be bugs in scripts …
- Need to check breakdown of CPU time and data size in more detail.
- Need to optimize sample statistics, such as to reduce statistics of 1f, 3f and aa_2f

need to reduce sample similar to DBD (1f and 3f, . . .)