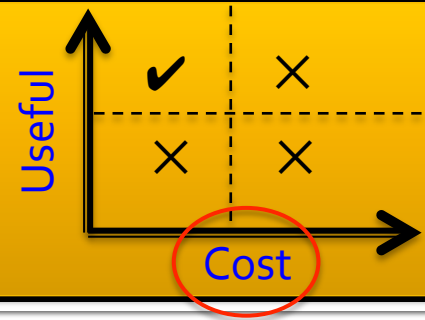


L3 trigger meeting

Mapping performances of algorithms

Intro



- For the L3 trigger we have to individuate possible inputs to a **Boosted Decision Tree**
- In this respect, we need to evaluate two criteria:
(1) How useful? (2) What **cost (timing)**?

- nominal (B,F)CAL reconstruction;
- some approximate (B,F)CAL reco;
- full charged-particle tracking;
- some approximate tracking.

In what follows:
a study of time
performances of
these algorithms

janadot

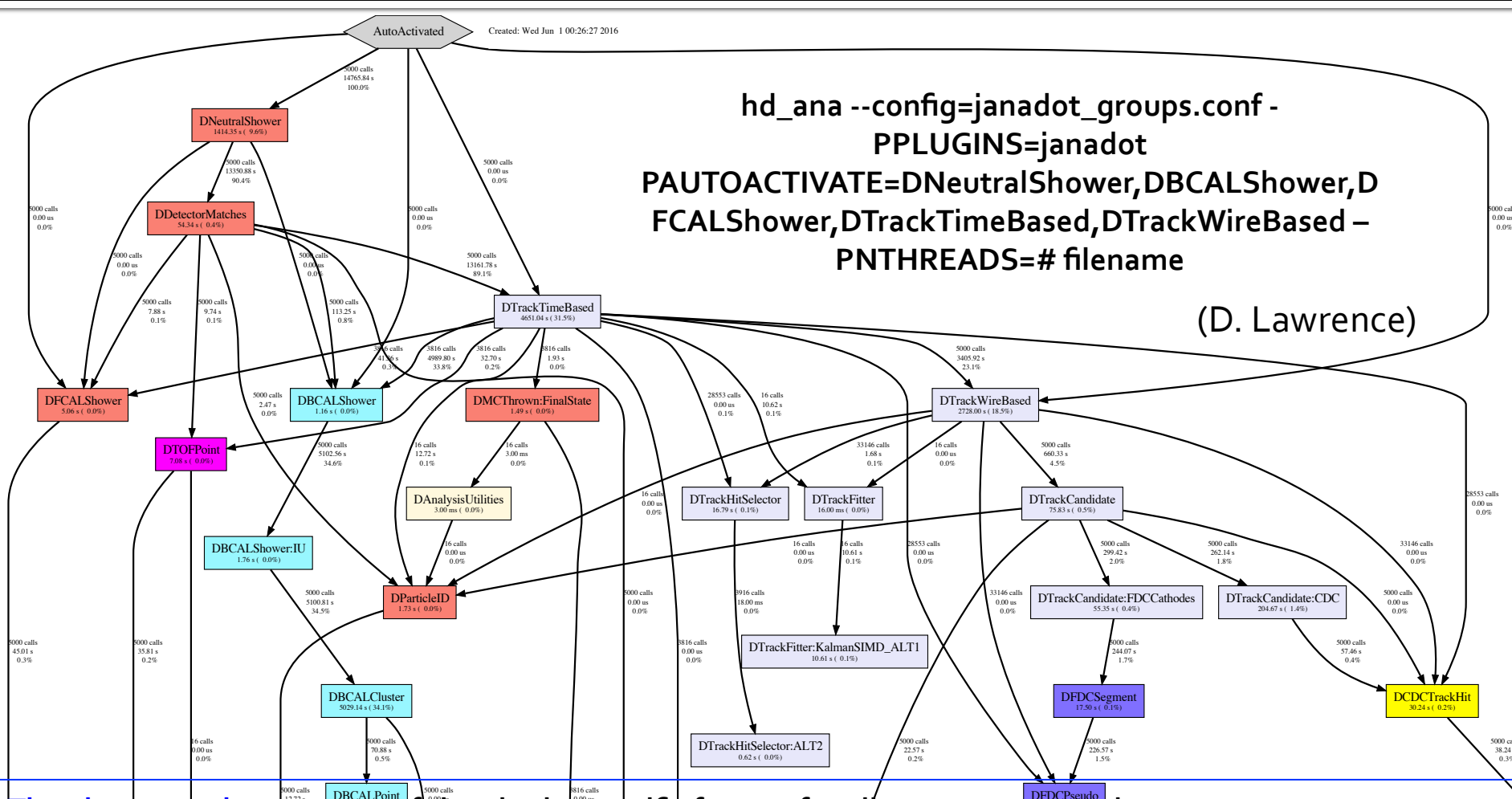
- We use **janadot** which provides the times spent in the specific factories

Tested objects

- nominal (B,F)CAL reconstruction; ➔ **DNeutralShower**
- some approximate (B,F)CAL reco; ➔ **DB(F)CALShower**
- full charged-particle tracking; ➔ **DTrackTimeBased**
- some approximate tracking. ➔ **DTrackWireBased**

Alternatively to DB(F)CALShower can be also tested DB(F)CALCluster

Janadot: example



Time in rectangles: amount of time in the specific factory for all events processed
Time next to connectors: total time (includes the time in the factory it is pointing to as well as all other factories that factory points to, etc.)

Tested files

DATA

- **evio file** run 010913

Files have been skimmed:
required physics trigger, beam on

MC

- **hdgeant smeared (sim1)**

/volatile/halld/sim1/smeared/

- **hdgeant smeared (Adesh)**

/lustre/expphy/volatile/halld/home/adesh/l3trigmc/mcsmeared/

Reconstruction times survey

Time is divided by
#calls and #threads

J1A50 50 um radiator, PERP, 7 mode, 105 nA beam current, 27 kHz event rate, live time ~70% , LH2 fill, 5 mm collimator, 83 M total events

hd_rawdata_010913_060.

input file: phys_skim.evio

events	ALGORITHM	INPUT OBJECT	RECO TIME [s]	RECO TIME/event [ms]
10000	nominal reco	DNeutralShower	4.410	0.028
DATA	approx reco	DBCALShower	2.750	0.017
	approx reco	DFCALShower	8.010	0.050
	full tracking	DTrackTimeBased	18669.810	116.69
	approx tracking	DTrackWireBased	7397.300	46.23

hdgeant_smeared_14980

events	ALGORITHM	INPUT OBJECT	RECO TIME [s]	RECO TIME/event [ms]
10000	nominal reco	DNeutralShower	5.730	0.036
MC	approx reco	DBCALShower	3.430	0.021
	approx reco	DFCALShower	7.010	0.044
	full tracking	DTrackTimeBased	23878.840	149.243
	approx tracking	DTrackWireBased	12778.340	79.865

(new/old) MC comparison

hdgeant_smeared_14980 (sim1)

events	ALGORITHM	INPUT OBJECT	RECO TIME [s]	RECO TIME/event [ms]
10000	nominal reco	DNeutralShower	5.730	0.036
	approx reco	DBCALShower	3.430	0.021
	approx reco	DFCALShower	7.010	0.044
	full tracking	DTrackTimeBased	23878.840	149.243
	approx tracking	DTrackWireBased	12778.340	79.865

hdgeant_smeared_11367_2 (Adesh)

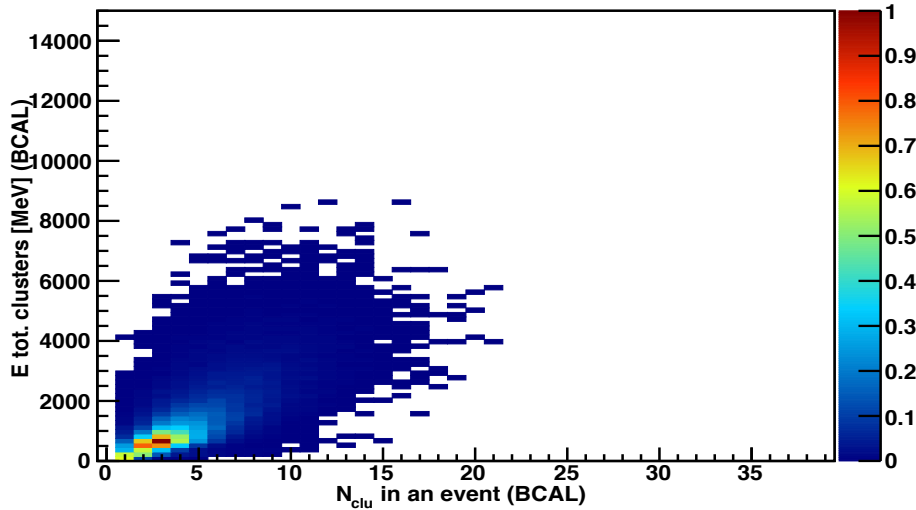
events	ALGORITHM	INPUT OBJECT	RECO TIME [s]	RECO TIME/event [ms]
24948	nominal reco	DNeutralShower	10.810	0.027
	approx reco	DBCALShower	6.250	0.016
	approx reco	DFCALShower	12.340	0.031
	full tracking	DTrackTimeBased	27072.140	67.821
	approx tracking	DTrackWireBased	13434.390	33.656

Thrown particle energy range of 120 MeV to 12 GeV

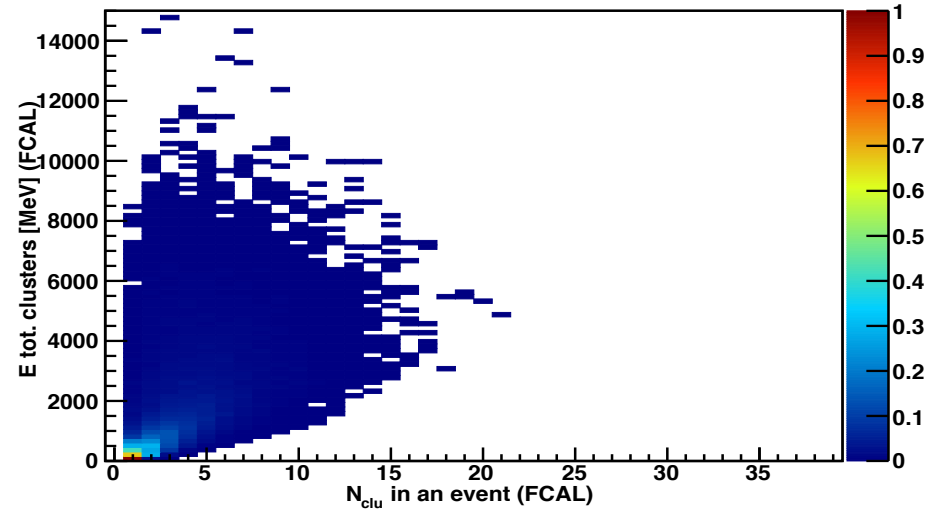
Sum of energy of all clusters vs #clusters for all events in BCAL and FCAL.
Plots normalized to point of maximum to compare to MC

Input variables: tot energy in B(F)CAL

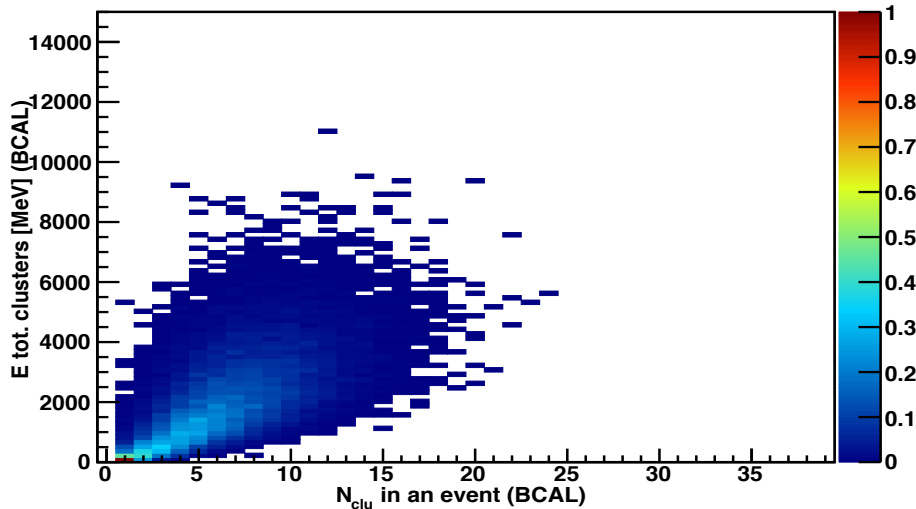
real data (010913_060_phys_skim)



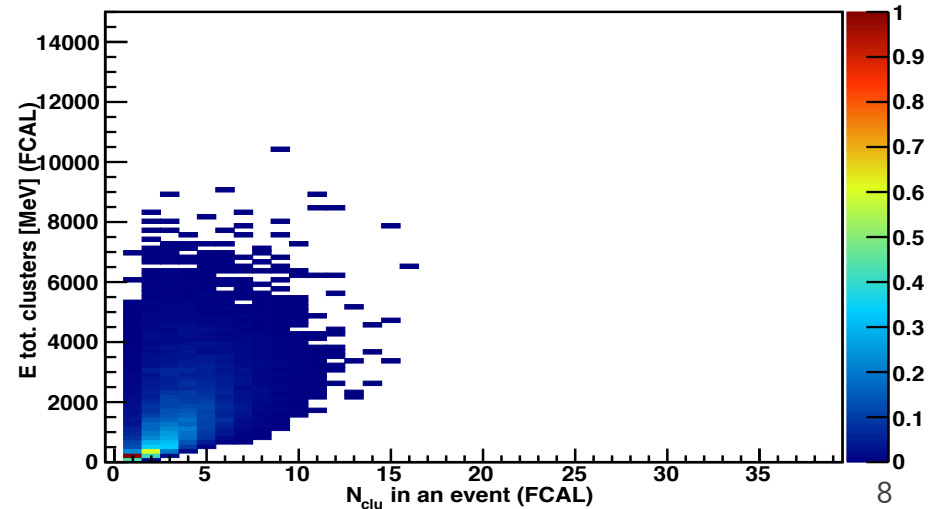
real data (010913_060_phys_skim)



sim 1 hdgeant smeared (14980_0)

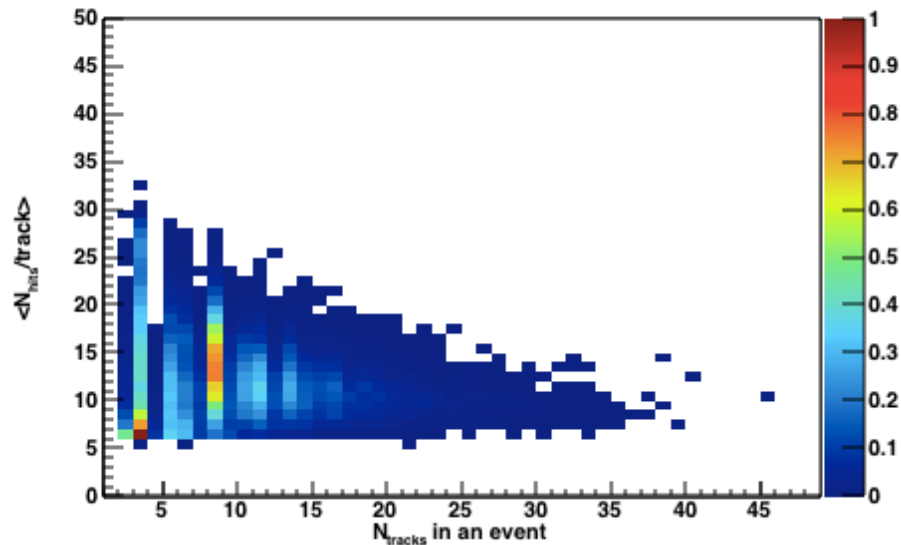


sim 1 hdgeant smeared (14980_0)

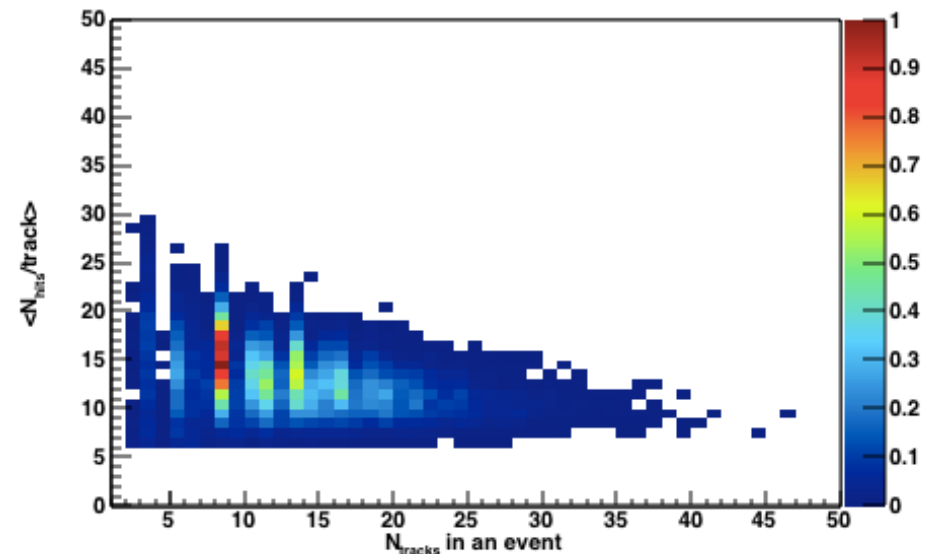


Input variables: #hits/track

real data (010913_060_phys_skim)



sim 1 hdgeant smeared (14980_0)



to get # of physical tracks from DTrackTimeBased
one should scale with the # mass hypotheses

To do list

- Study “input” variables as a function of E_γ :
e.g. num. of clusters and energy in B(F)CAL and
num. of hits/tracks in the events, etc.
- Issues with janadot (i.e. tot times).

Spare

Janadot: total times

Apparently in few cases a connector time was less than the time in the factory...

That should not happen by definition.

