CALICE Meeting

RAL 31.08.2007
M. Stanitzki

Marcel Stanitzki

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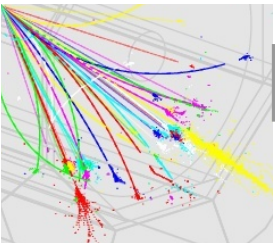Rutherford Appleton Laboratory

What is on today ?
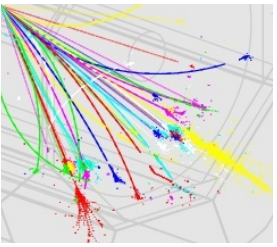
- Laser <-> DAQ communication

- Tungsten purchases (cont'd)

- Particle Flow

- News from SiD

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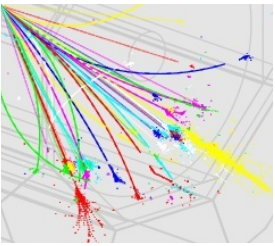Rutherford Appleton Laboratory

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Laser-DAQ communication

- Two pieces of Labview Code

  - Network Interface (Marcel)

  - Laser Control (Giulio)

- Each of them works nicely ... but not together

- Fixed some small issues with Konstantin's input

  - Main issue is to handle multiple events right

    - Network commands
    - Stage moving
    - Laser polling

- Non-trivial, but i think I have some ideas how to fix this
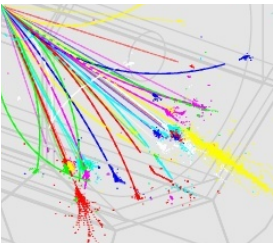
  - I'll try it next week

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Tungsten

- Got several quotes
  - 1 kg ~ 160-200 US-$
  - Delivery time 30-50 days
- Minimum quantity ~ 5-10 plates
- How many of each do we want ?

  - 100 x 100 x 5 mm **10**

  - 100 x 100 x 10 mm **5**

- Tungsten alloy a lot cheaper (£ 80 per kg)

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Tungsten Alloys

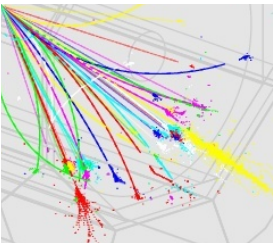| ALLOY DESIGNATION		K1700	K1701	K1750	K1800	K1801	K1850
Tungsten	(%)	90	90	92.5	95	95	97
Density	(g/cm3)	17	17	17.5	18	18	18.5
	(lb/in3)	0.61	0.61	0.63	0.65	0.65	0.67
Hardness	(Rc)	23	22	24	25	24	26
Ultimate Tensile Str.	(psi)	125,000	110,000	125,000	125,000	110,000	120,000
	(N/mm2)	860	760	860	860	760	830
Yield Strength	(psi)	80,000	90,000	90,000	90,000	85,000	95,000
	(N/mm2)	590	550	620	620	590	660
Elongation	(% in1in.)	12	4	10	8	2	6
Modulus of Elasticity	(psi x 10)	45	40	46	48	45	50
	(kN/mm2)	310	280	320	330	310	345
ALLOY DESIGNATION		K1700	K1701	K1750	K1800	K1801	K1850
Magnetic Properties		slight	none	slight	slight	none	slight

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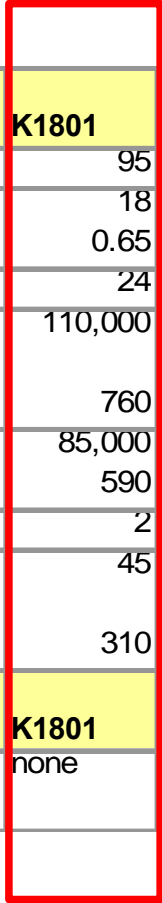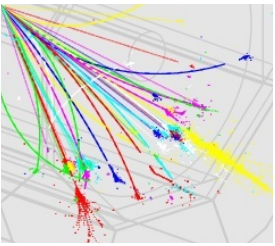
PFA work

- Long discussions with Jim Brau about Pandora
  - We like to reproduce his numbers
  - So went ahead and produced a lot of samples
- Primary questions
  - What is a best radius
  - What is the best B field
- Boils down to Sid-ish versus LDC'ish detector
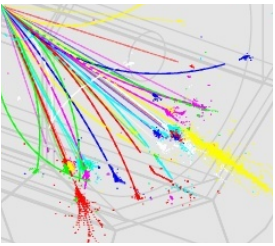- But it is not easy to reproduce Marks numbers at all

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Scaling Detectors

- Can be done in steering files

  - /Mokka/init/globalModelParameter TPC_outer_radius 1270 mm
    /Mokka/init/globalModelParameter TPC_Ecal_Hcal_barrel_halfZ 1680 mm
    /Mokka/init/globalModelParameter Field_nominal_value 5.0 T

- Means regenerating photons, neutrons and Z's at each point ...

- playing with LDC00Sc and LDC01Sc

  - LDC00 is Mark's favorite , as it is large and has deep ECAL/HCAL

  - LDC01(Sc) is the one we are always using

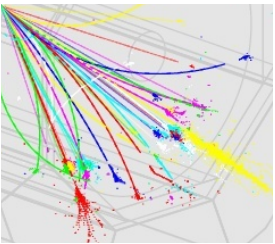- Lot of input from David Ward

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GEAR

- Having the appropriate GEAR files for each detector is very important for PFA

- Not central repository to my knowledge

- LDC is very poorly documented

- MOKKAGEAR is a rudimentary at best

- Are we comparing apples and apples here ?

- Making GEAR files and getting them right without documentation is painful

- The source for a lot of problems and confusions

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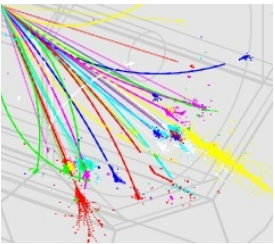
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Some oddities

- Mark uses a different step size
  - `/Mokka/init/rangeCut 0.05 mm`

- uses 45, 100 180 GeV Jets
  - But always LDC00Sc ..

- Weird B-Field dependence
  - My resolution decreases with higher B-Field
  - Mark : Too many curly tracks at the Z, maybe ...

- Made a run with default LDC00Sc and LDC01Sc at the Z
  - LDC00Sc : 30.4 % (Mark 29.8 %)
  - LDC01Sc : 39.5 %
  - LDC01Sc with MAPS 33.8 %

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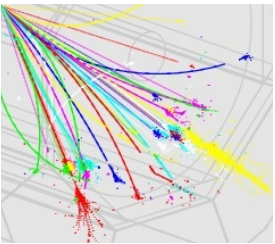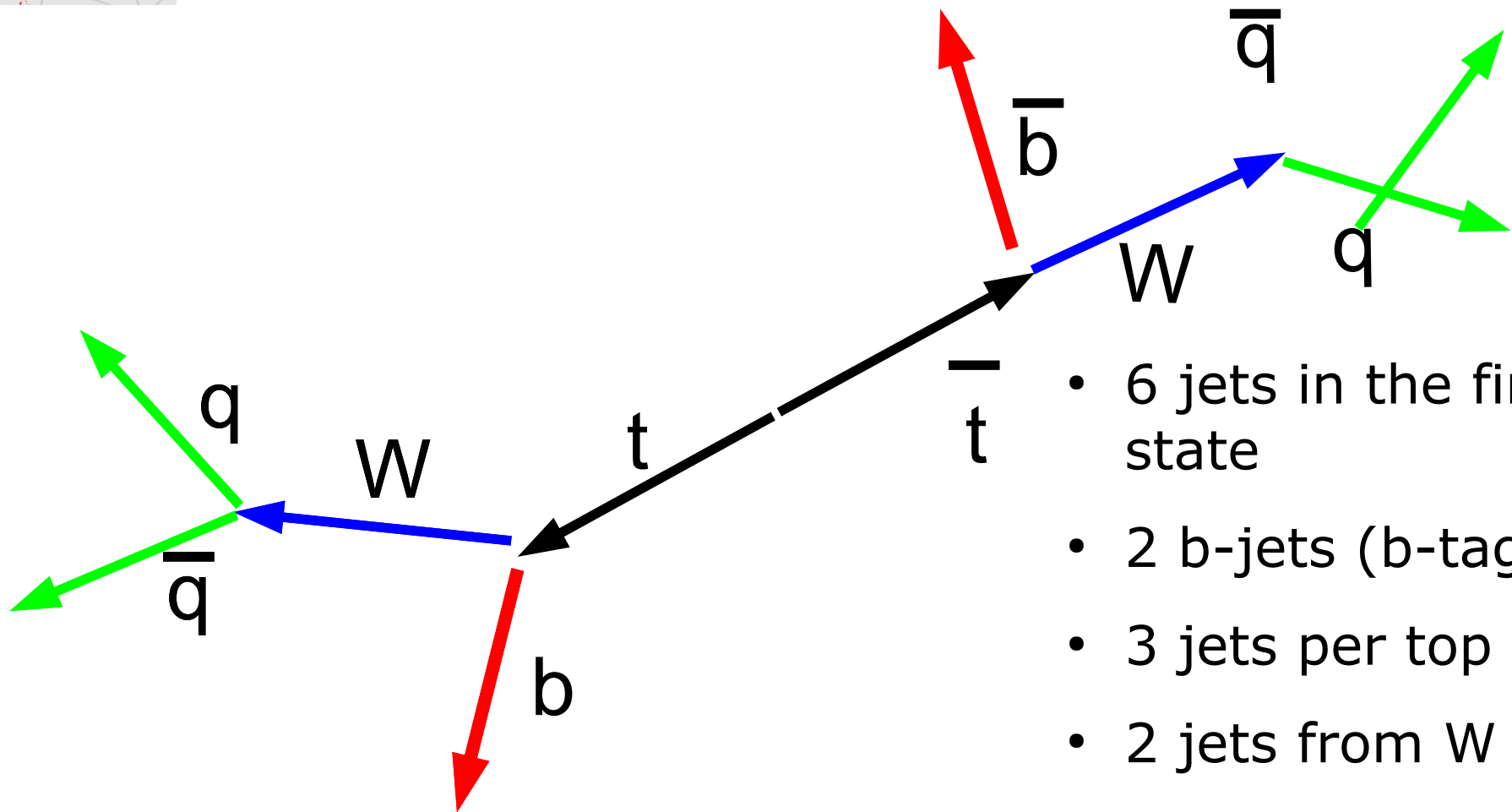
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Some go at ttbar

- Exercise the entire chain
  - MAPS Digi package
  - Pandora
  - Jet Cluster

- Build Analysis on LCIO reconstructed objects
  - proof of principle (it can be done)
  - prototype analysis (lots of things not optimal)

- ttbar channel is a RAL group effort (Steve, Kristian, Konstantin, Talini, Mike, Giulio, Marcel)
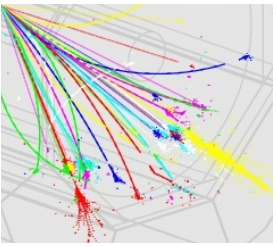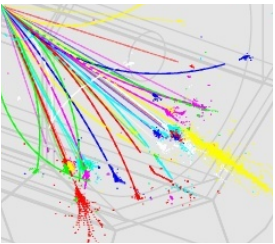
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The all-hadronic channel

- 6 jets in the final state

- 2 b-jets (b-tag!)

- 3 jets per top !

- 2 jets from W

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Ingredients so far

- PandoraPFA

- Jet-Clustering 6 Jets

- CDF KinFitter from the GZZ package

- To come:

  - B-tagging

  - backgrounds
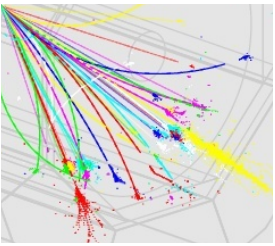
  - More statistics

  - doing the same with org.lcsim

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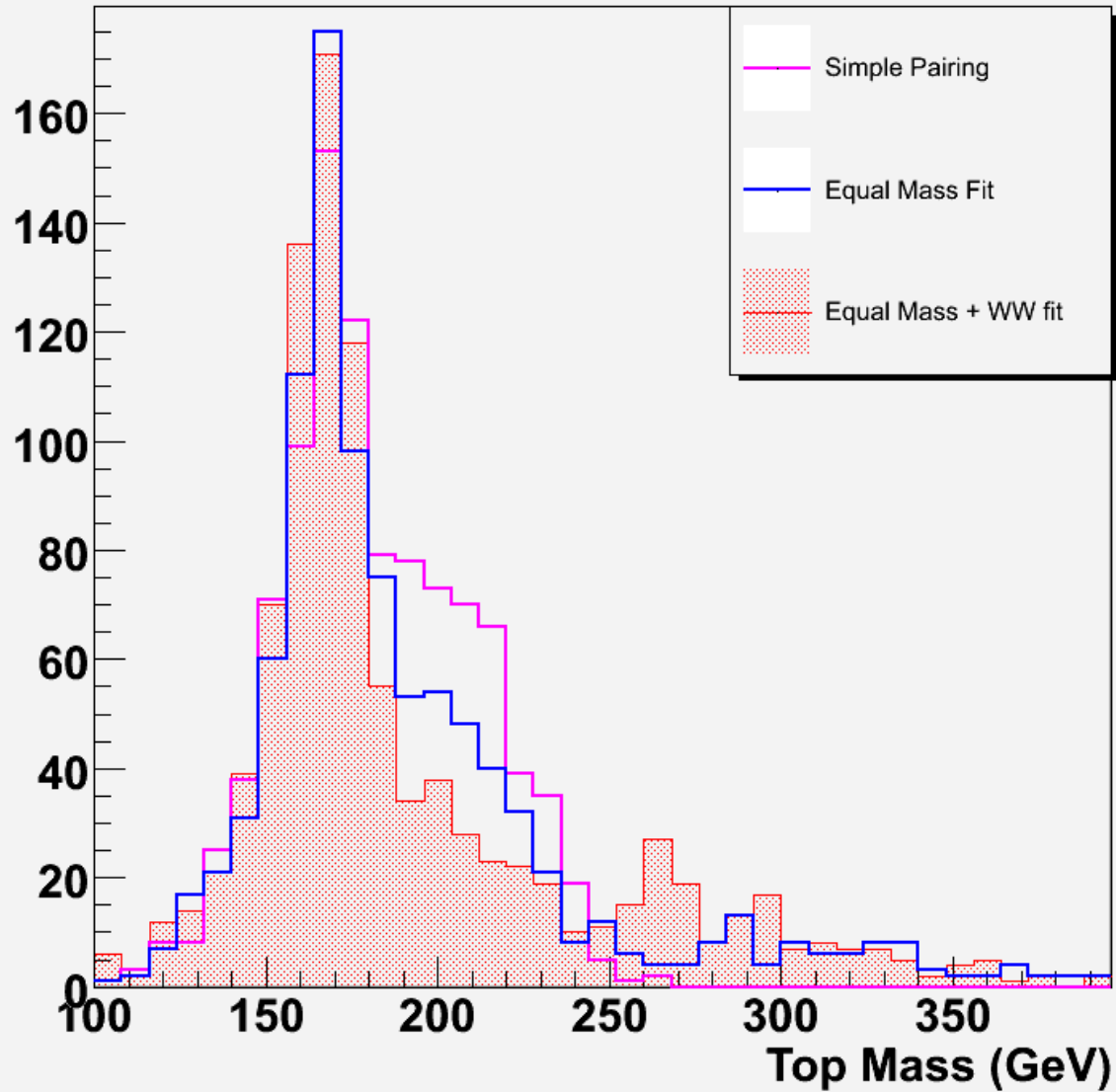Rutherford Appleton Laboratory

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The Fitter

- Basic approach (without fitting)
  - choose parings with least mass difference

- Tevatron-Style Fitter (no beam constraint)
  - Force 3 and 3 jets to equal mass
  - Force 2 of these three to be compatible to W mass
  - pick solution with best χ^2
  - a lot of combinations :90 per event
  - Constants and error matrices still very CDF-like, need to have ILC style errors
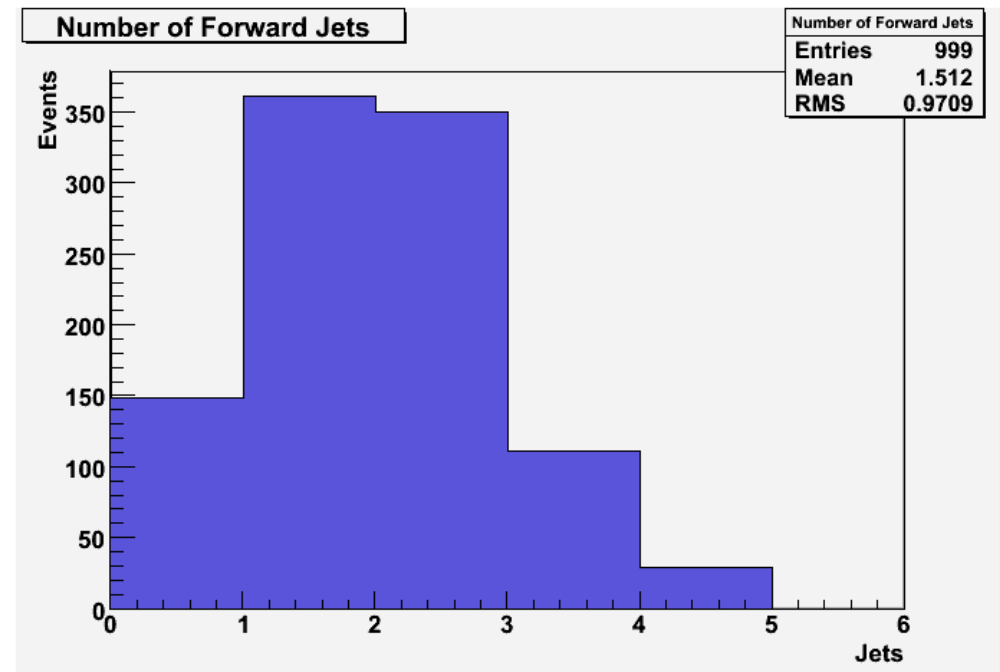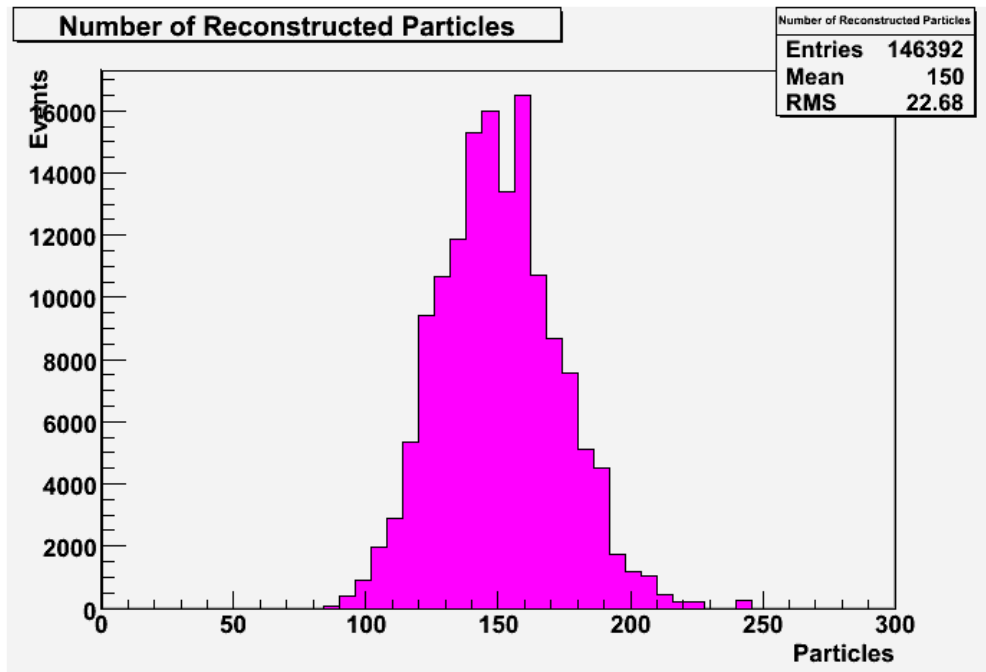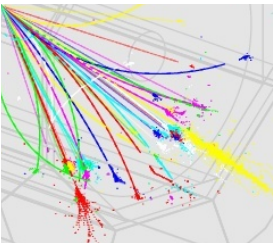 - Any ILC calorimeter is a lot better than the CDF one

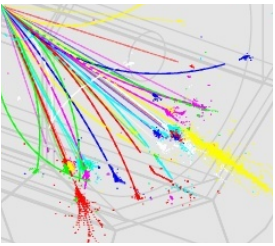Science & Technology Facilities Council
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First result

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A few more plots

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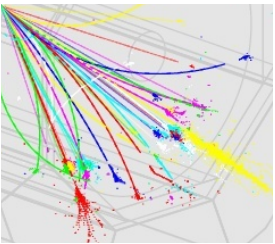Rutherford Appleton Laboratory

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News from SiD

- I have been participating in their calorimeter meeting

  - Every second Thursday 10 pm UK

- Interesting discussions on PFA and detector optimization

  - Feeling that SiD might be a bit to small

  - People want a deeper HCAL

  - M. Breidenbach to recost a larger SiD to get a feel
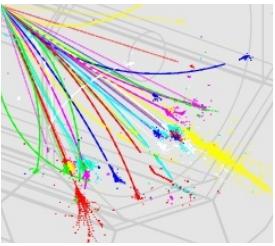
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PFA developments

- SiD Package going to be released soon
  - learning from LDC mistakes
  - Complete package ("Driver") with samples, constants, etc.
  - Should make it real easy to use

- Still arguing about the PFA figure of merit
  - Mark Thomson Style (Jet energy Sum)
  - Di-jet Mass resolution
  -

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PFA task force

- "Task force" formed to look into differences between

  - Detector concepts

  - Algorithms (Pandora vs. rest)

- Andy asked several people to join

  - Norm Graf (SLAC)

  - Steve McGill (ANL)

  - Ray Cowan (MIT)

  - Matthew Charles (Iowa)

  - Marcel Stanitzki (RAL)

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