



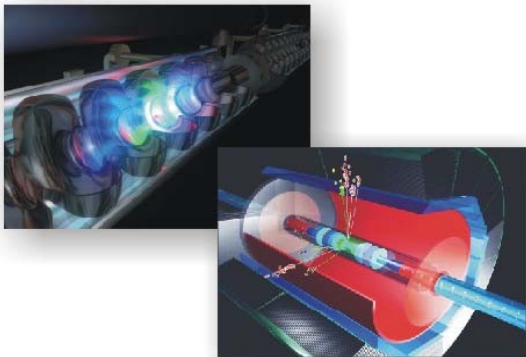
# SLIC and multiple readouts.

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Hans Wenzel  
Fermilab

- Warning: Work in progress!
- Current Status
- Where to find executables, scripts, data sets etc.
- Where to find Documentation
- Wish list





## Uses for multiple readout per sensitive detector

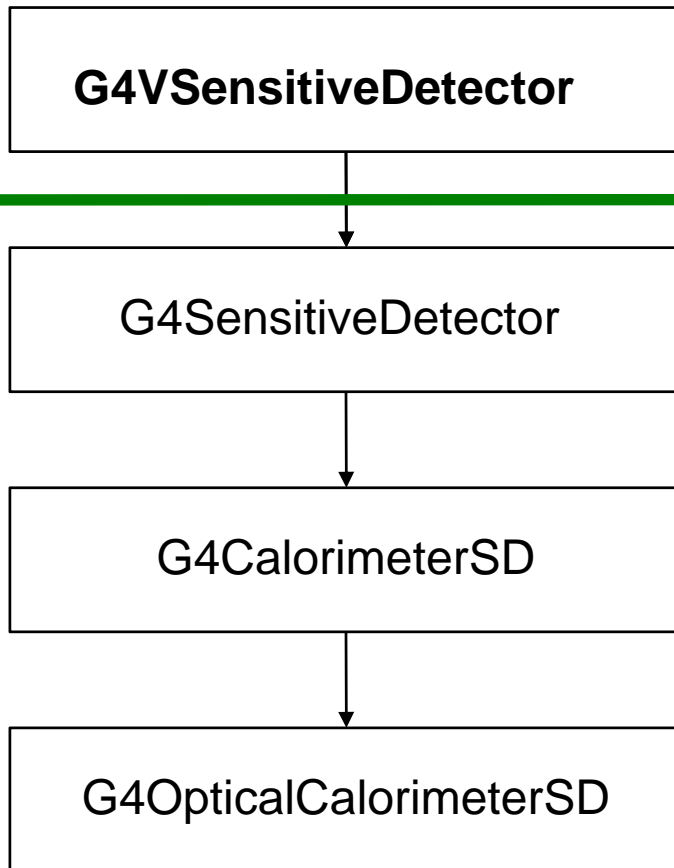
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- Dual/multiple read out calorimeter: Ionization, Cerenkov, neutrons...
- tracker to have different hit collection e.g. for hits created by neutrons/photons or other particles
- probably many other possibilities.

# Class Structure:

Geant4

LCDD



- Geant 4 abstract base class actually allows for multiple Hit Collection. Good we don't have to modify LCDD and SLIC!
- This gets completely lost in the concrete implementation which allows for only a single hit collection. This has been replaced by vectors and Arrays (may be change all to vectors)
- Classes have to be rewritten without breaking anything that uses this classes. (Only used by LCDD?) (member functions, data members, constructors need to be modified) conserving the current behaviour.



# Files that had to be changed:

(everything has been committed to CVS and is now part of the official release )

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## LCDD:

G4CalorimeterSD.cc

G4OpticalCalorimeter.cc

G4SensitiveDetector.cc

G4TrackerSD.cc

SensitiveDetectorFactory.cc

G4CalorimeterSD.hh

G4OpticalCalorimeterSD.hh

G4SensitiveDetector.hh

## SLIC:

LcioHitsCollectionBuilder.cc

HitsCollectionUtil.cc

- DataSets
- Programs
- tree-0
  - Histograms
    - Ceren Energy
    - Ceren Time
    - Ceren energy
    - Ceren radius
    - Ceren z
    - Ceren\_vs\_Edep
    - Edep Energy
    - Edep Time
    - Edep energy
    - Edep radius
    - Edep z
    - ratio

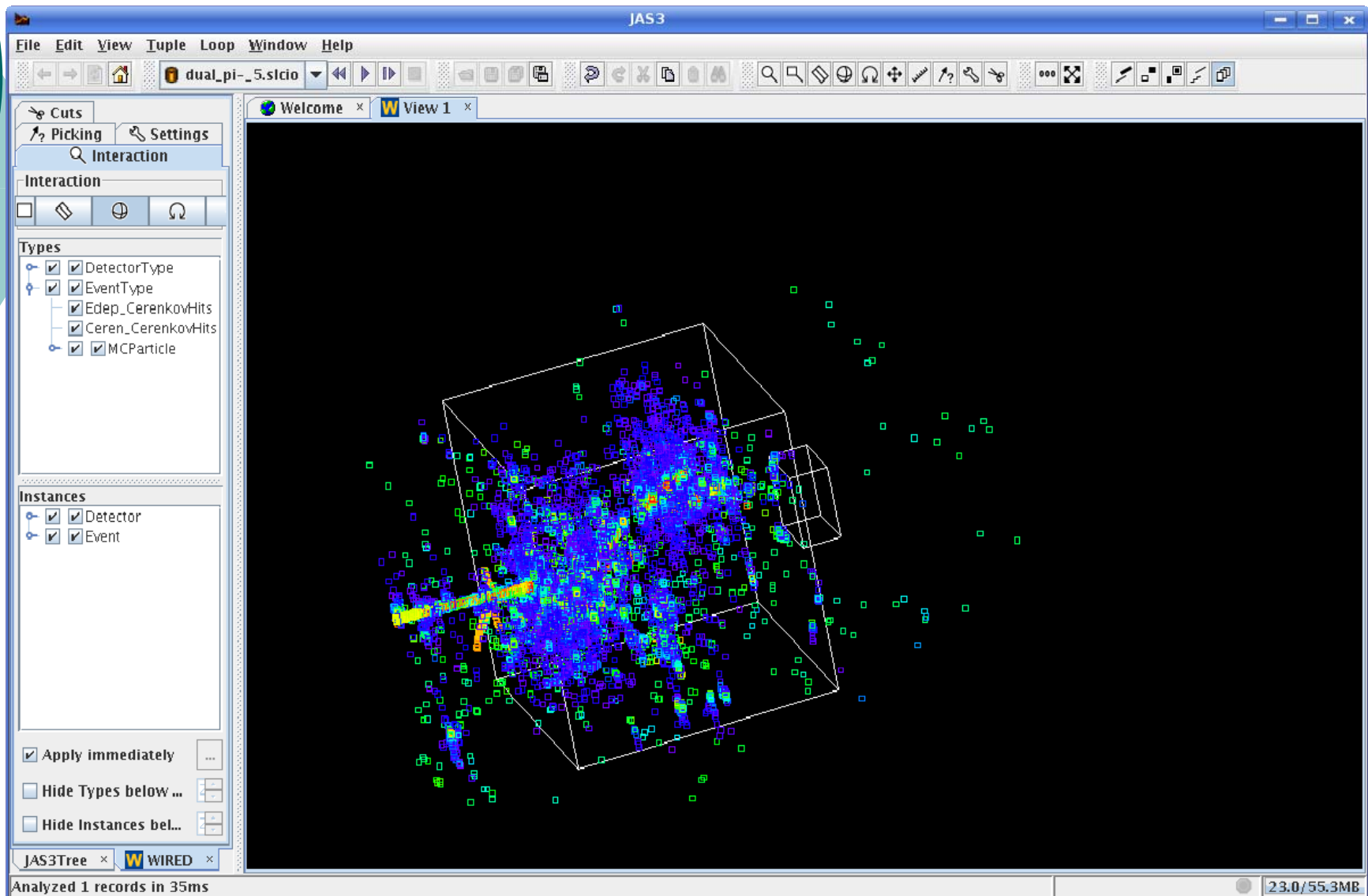
- Run:0 Event: 0
- Event
    - Ceren\_CerenkovHits
    - Edep\_CerenkovHits
    - MCParticle
    - MCParticleEndPointEnergy
    - MCParticleTree

Collection: Edep\_CerenkovHits size: 15122 flags:e0000000

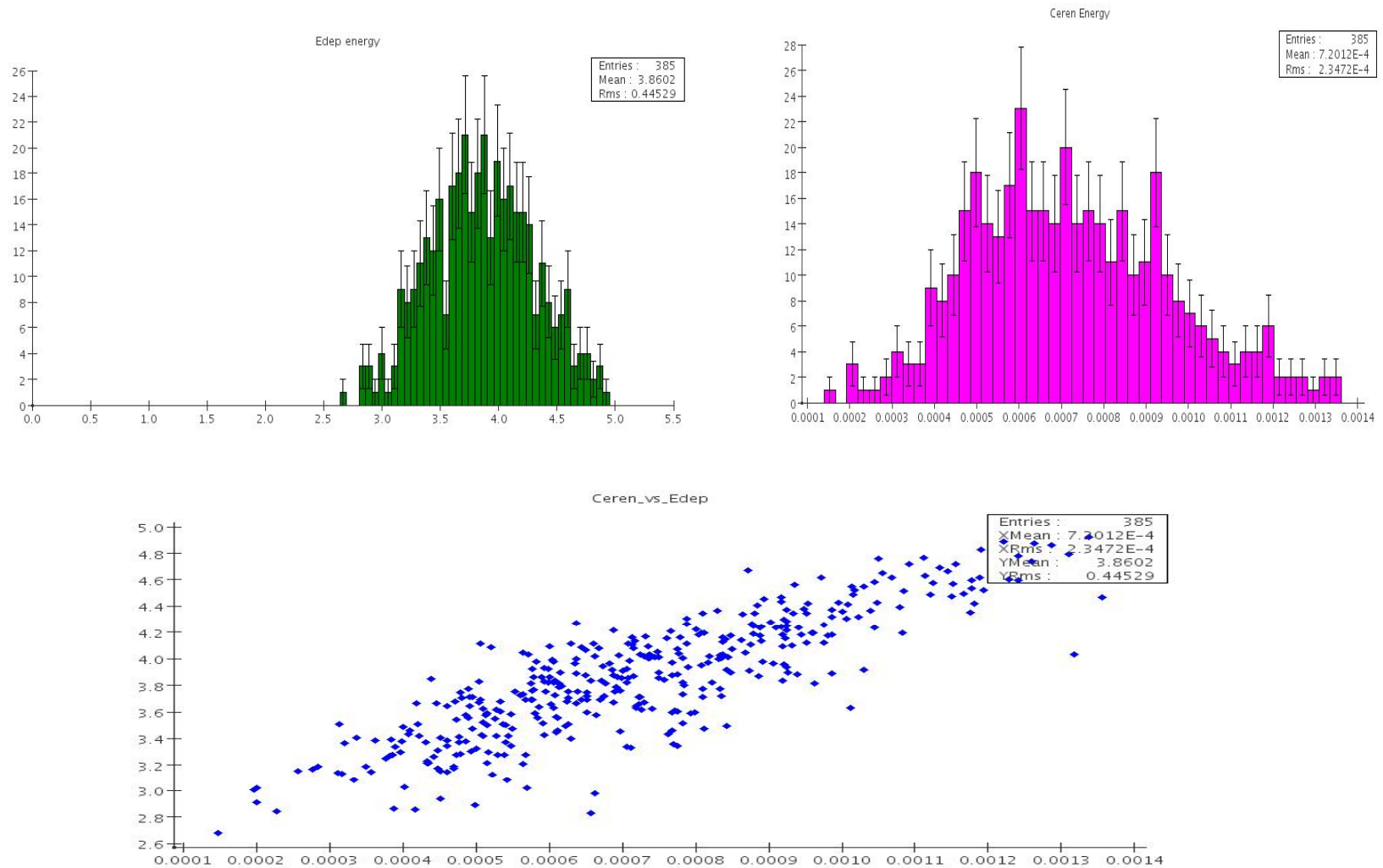
id	raw energy (GeV)	corrected energ...	x (mm)	y (mm)	z (mm)	time (ns)
0	4.4242E-6	NaN	5.0000	-5.0000	-1345.0	56712
0	3.2571E-6	NaN	-5.0000	5.0000	-1345.0	56745
0	4.0833E-6	NaN	-5.0000	-5.0000	-1345.0	56731
0	2.5028E-6	NaN	5.0000	5.0000	-1345.0	54754
0	6.1551E-6	NaN	5.0000	-5.0000	-1335.0	60053
0	1.4324E-6	NaN	5.0000	-15.000	-1335.0	61130
0	6.6654E-6	NaN	-5.0000	-5.0000	-1335.0	60081
0	2.6311E-6	NaN	-5.0000	5.0000	-1335.0	58834
0	2.1965E-6	NaN	5.0000	5.0000	-1335.0	60050
0	3.6350E-9	NaN	-305.00	-205.00	-1335.0	4.6309
0	5.5570E-8	NaN	-35.000	25.000	-1335.0	.78559
0	2.5530E-7	NaN	-15.000	-15.000	-1335.0	.68117
0	8.5065E-7	NaN	-15.000	5.0000	-1335.0	.61166
0	5.8461E-7	NaN	-15.000	15.000	-1335.0	.61680
0	4.6071E-8	NaN	-25.000	-25.000	-1335.0	.82914
0	1.9994E-8	NaN	-5.0000	25.000	-1335.0	.79241
0	3.4461E-7	NaN	-15.000	-5.0000	-1335.0	.63094
0	5.5244E-8	NaN	-5.0000	15.000	-1335.0	.71203
0	3.9941E-7	NaN	5.0000	15.000	-1335.0	.62402
0	7.0779E-8	NaN	-25.000	-5.0000	-1335.0	.75115
0	6.5082E-7	NaN	-25.000	5.0000	-1335.0	.61577
0	4.2474E-9	NaN	-35.000	-15.000	-1335.0	1.0466
0	4.6611E-7	NaN	-25.000	15.000	-1335.0	.61819
0	2.1778E-8	NaN	-35.000	45.000	-1335.0	1.0019
0	2.2155E-9	NaN	-95.000	-105.00	-1335.0	2.1801

```

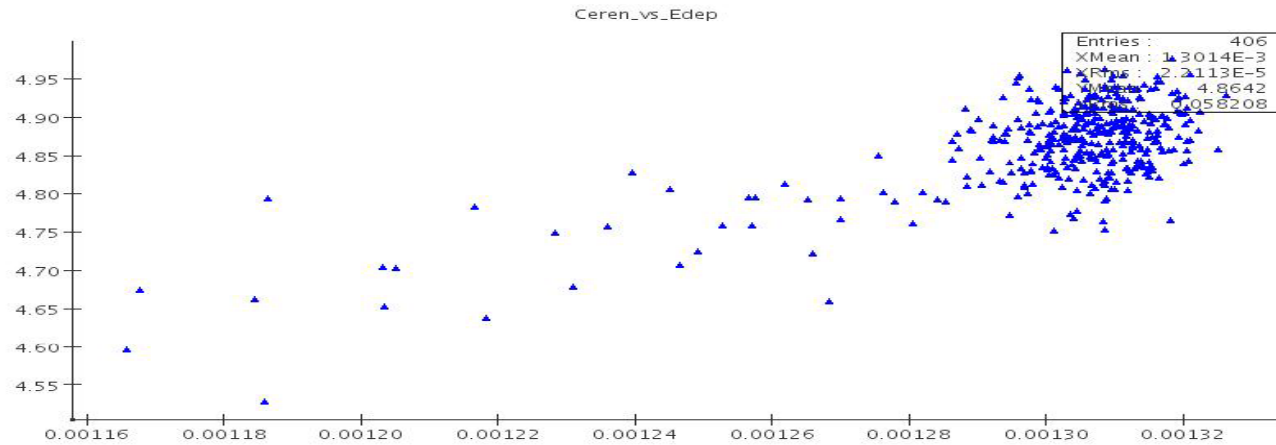
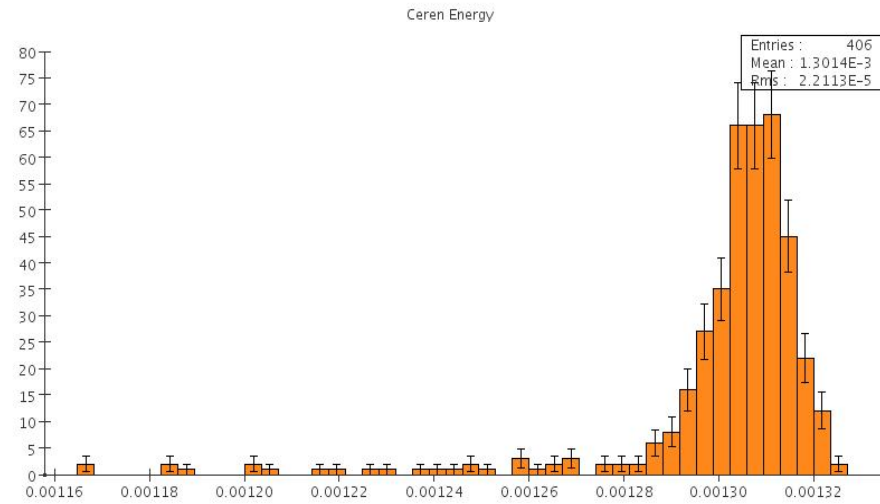
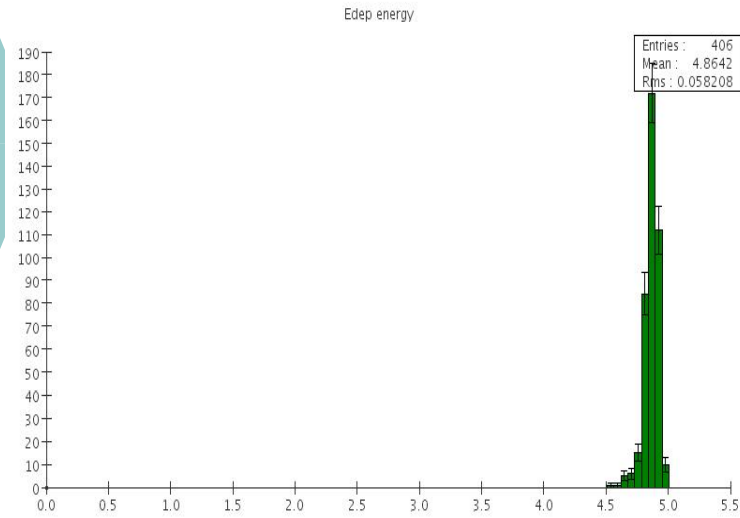
Ceren_CerenkovHits
Run 0 Event 0 (Mon Dec 10 20:57:28 CST 2007) Detector: CERCAL
MCParticle
Edep_CerenkovHits
Ceren_CerenkovHits
MCParticleEndPointEnergy
Edep_CerenkovHits
Ceren_CerenkovHits
    
```



# Some first preliminary results: Pions 5 GeV



# Some first preliminary results: electrons 5 GeV







# Confluence WIKI

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Sign Up:

<https://jira.slac.stanford.edu/signup/>

Started dual read out instructions:

<http://confluence.slac.stanford.edu/display/ilc/SLIC+Dual+Read+out+Tutorial>

as example I used the following page:

<https://confluence.slac.stanford.edu/display/ilc/SLIC-LCDD+Tutorial>

Grid (OSG/FermiGrid) Instructions:

<http://confluence.slac.stanford.edu/display/ilc/How+do+I+use+the+OSG+Grid>



## Working on

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- Scripts to analyze the Icio output (we have presented some output in the previous slides.)
- the confluence page that explains how to use and analyze the dual readout data. (should be collaborative effort)
- prepare some data samples.



# Data Samples and scripts to run on the FermiGrid:

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Data samples in:

`/ilc/sid/chercal/grid/results`

Grid scripts in:

`/ilc/sid/chercal/grid`

`<ilcsim> ls *e_10*`

`dual_e_10GeV_grid.mac slic_grid_e_10GeV.csh slic_grid_e_10C`



# SLIC executable available on ilcsim/Grid:

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`/grid/app/ilc/sid/SimDist/v2r4p2`

Contains also tools to merge and concatenate da  
samples (but need to check and write up instructi



## Wish list

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- Compact description to understand Optical Calorimeter and Matrix keywords. Right now we just use lcdd and use a simplified compact description just for the Wired display.