

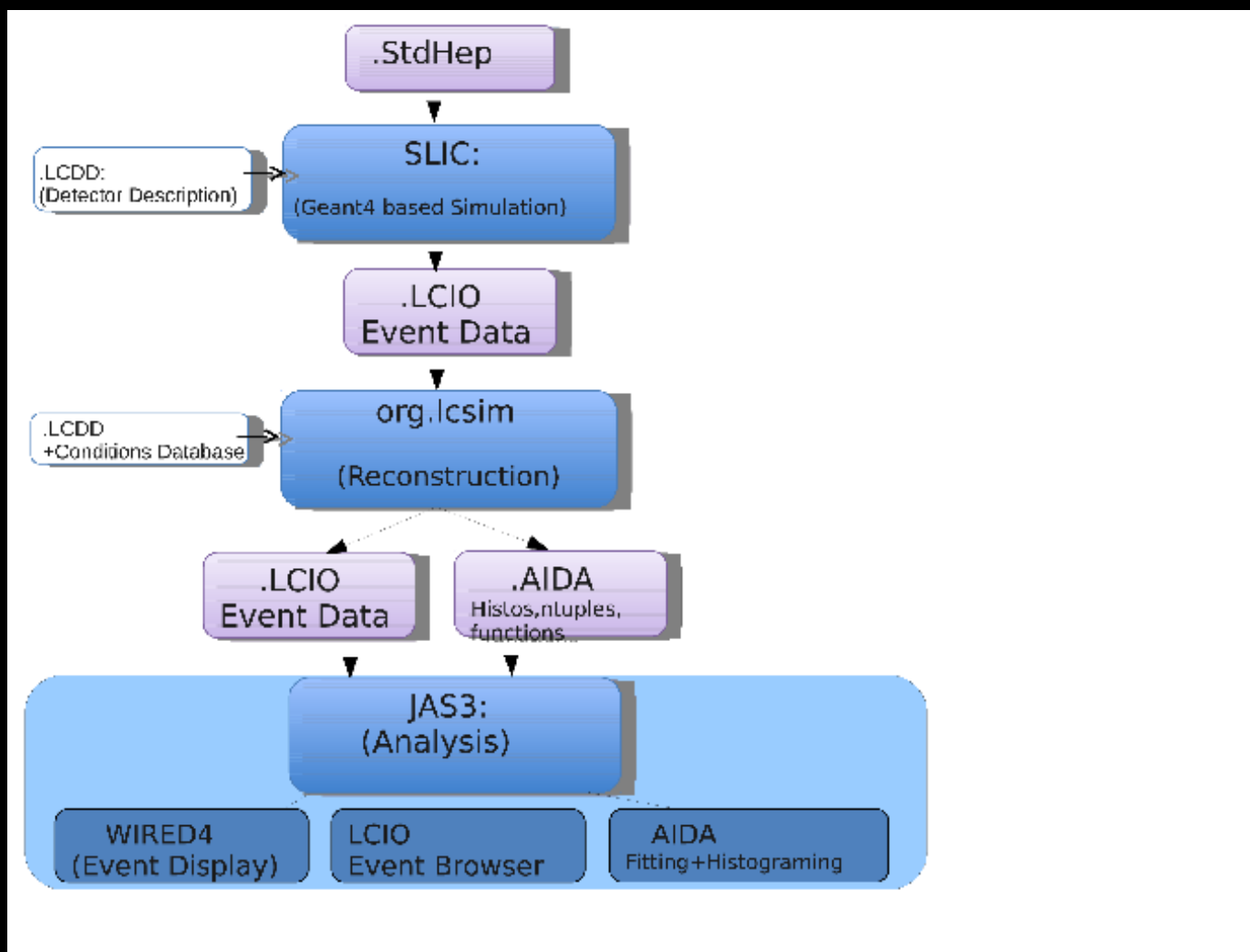
Higgs Factory simulation @ FNAL

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Muon Collider Documentation

- [Created Confluence page:](#)
- <https://confluence.slac.stanford.edu/display/MCPDS/Home>
- Currently:
 - Overview
 - Event Generation
 - Timing studies
 - Detector Models
 - Available Datasets
- You can sign up here:
- <https://jira.slac.stanford.edu/signup/>

detsim:/ilc/sid/wenzel/muoncollidersw



Event Generation

Pythia 6: $\mu^+ \mu^-$ @ 125 GeV CMS

with the following data cards:

MSEL=0

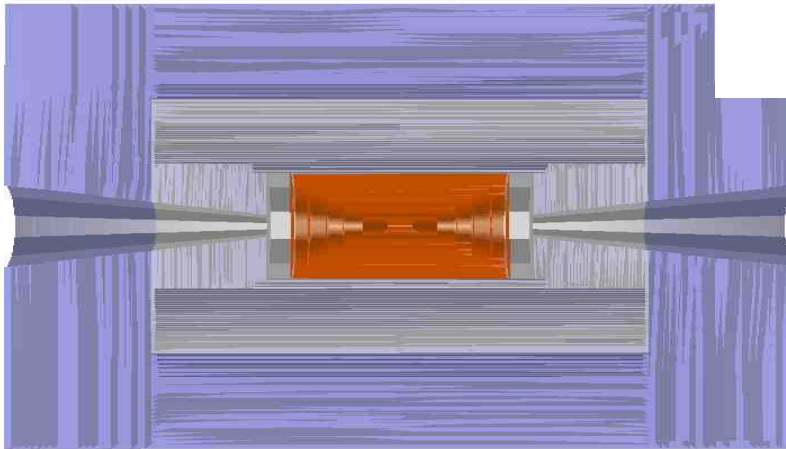
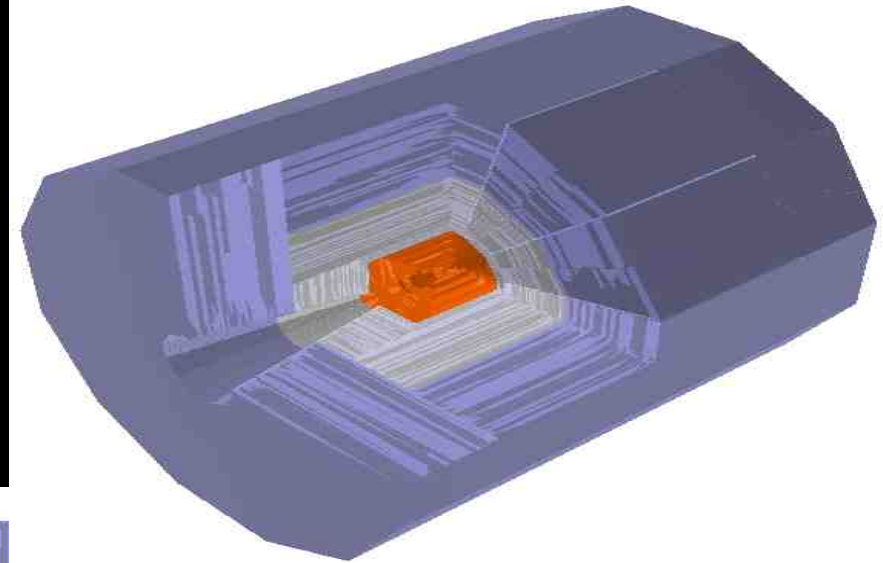
MSUB(3) = 1 ! ff -> H0

PMAS(25,1)= 125

The mcdrcal00 detector in org.lcsim

5T solenoidal field,
radius=3m

Calorimeter dimensions:
Rmin: 1.25 m
Rmax: 2.96 m
Length: 2x7.4 m



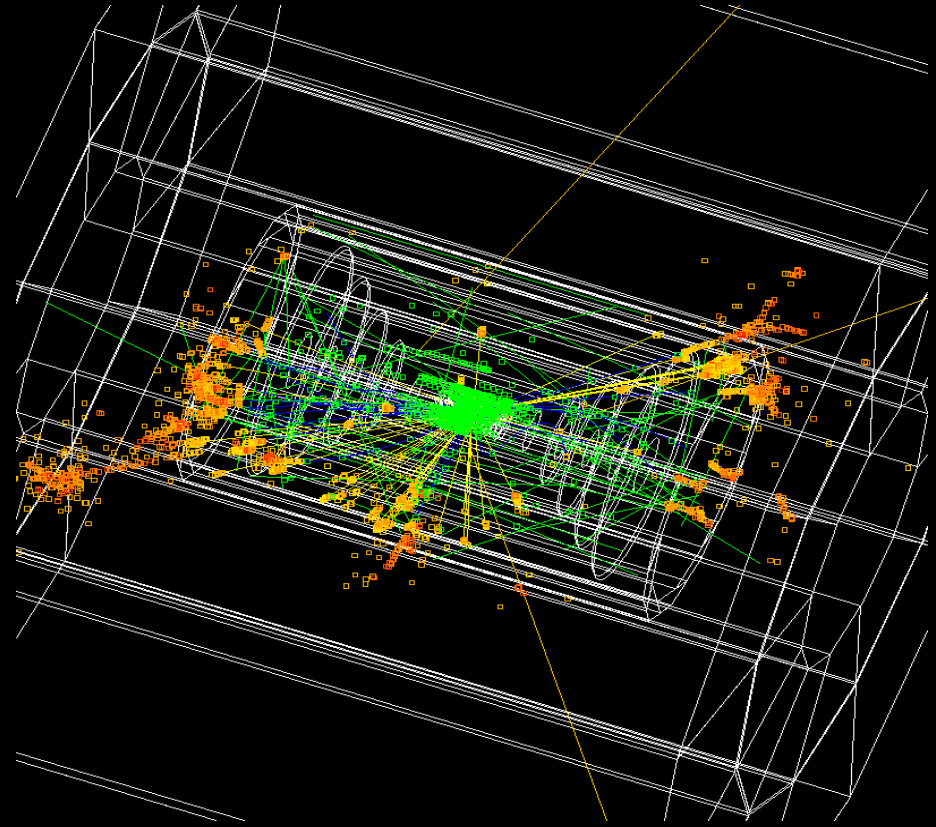
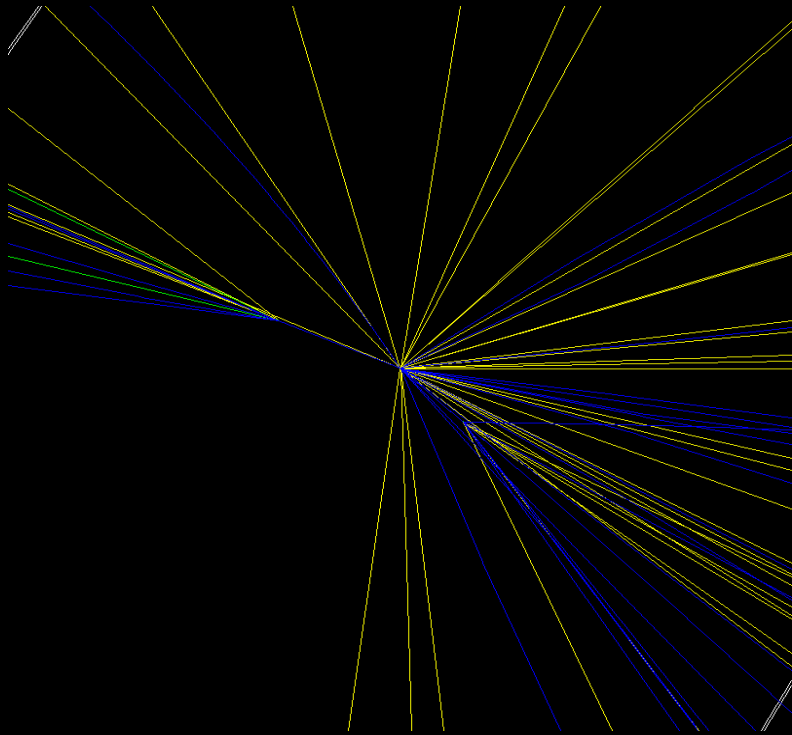
Tracker: SLAC

Calorimeter Properties for Barrel and Endcaps

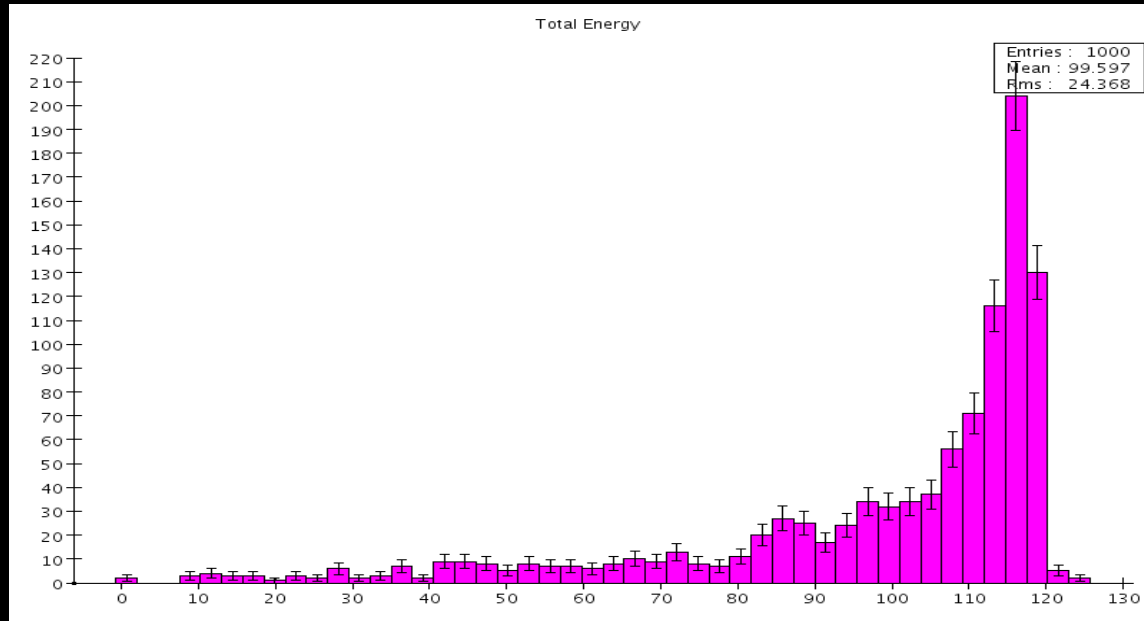
| | EM | Hadron | Muon |
|--|-------------------------|-------------------------|-------------|
| Material | BGO (PbF ₂) | BGO (PbF ₂) | Iron |
| Density [g/cm ³] | 7.13 (7.77) | 7.13 (7.77) | 7.85 |
| Cell size [cm ³] | 1x1x2 | 2x2x5 | 10x10x10 |
| Layers | 10 | 30 | 22 |
| Detector Depth [cm] | 20 | 150 | 220 |
| Radiation Length [cm] | 1.1 (0.93) | 1.1 (0.93) | 1.76 |
| Nuclear Interaction Length [cm] | 22.7 (22.4) | 22.7 (22.4) | 16.8 |
| Total Nr of IA length (em+had) | 7.5 (7.6) | | |

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`/ilc/sid/wenzel/muoncolliderdata/slci/signal/Higgs125_1000.slci`



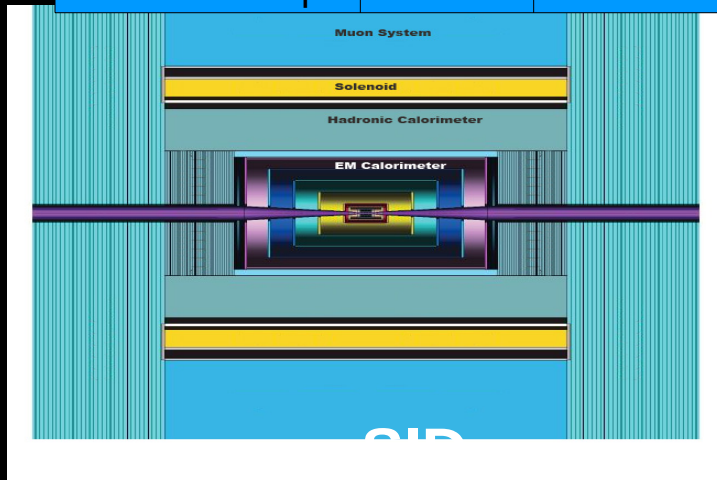
TotalEnergyDriver.java



Not calibrated, No dual readout correction

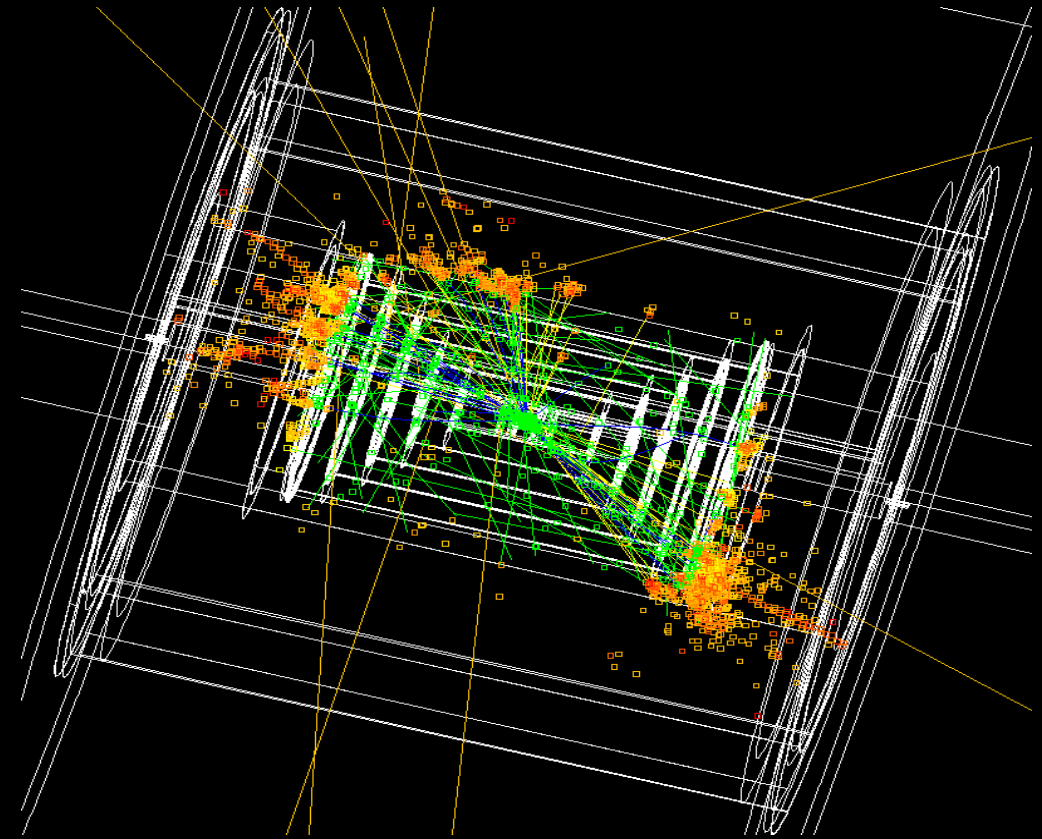
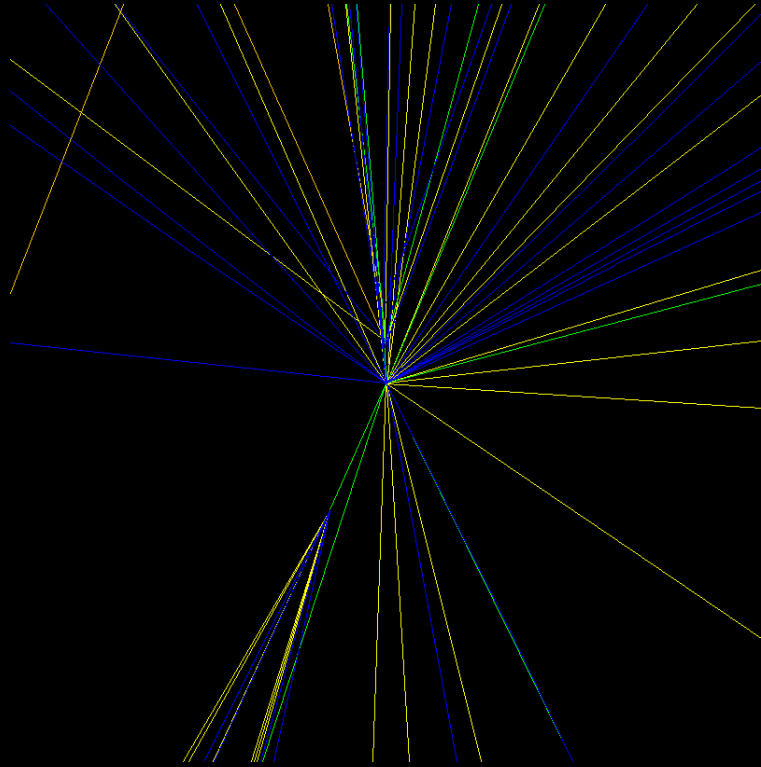
The CCAL02 detector (Crystal Calorimetry version of SID)

| Name | Layers | Thickness/Layer [cm] | Segmentation [cm x cm] | BGO | | PbWO ₄ | |
|--------------|--------|-------------------------|---------------------------|----------------|----------------|-------------------|-----|
| | | | | X ₀ | λ ₁ | X0 | II |
| ECAL Barrel | 8 | 3 | 3 x 3 | 21.4 | 1.1 | 27 | 1.3 |
| HCAL Barrel | 17 | 6 | 5 x 5 | | 4.7 | | 5.7 |
| Total Barrel | 25 | | | | 5.8 | | 7 |
| ECAL Endcap | 8 | 3 | 3 x 3 | 21.4 | 1.1 | | 1.3 |
| HCAL Endcap | 17 | 6 | 5 x 5 | | 4.7 | | 5.7 |
| Total Endcap | 25 | | | | 5.8 | | 7 |

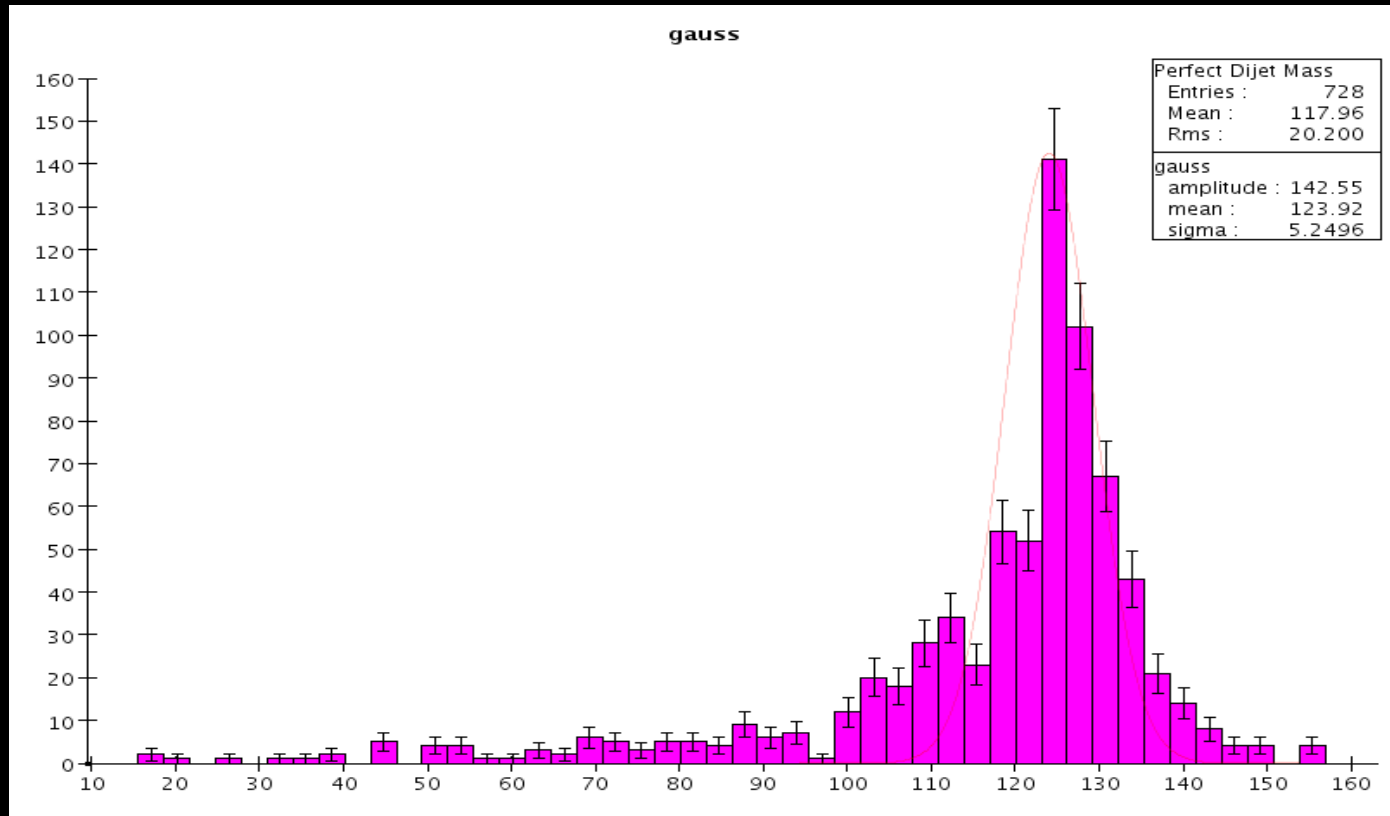


| Material | Density [g/cm ³] | Rad. len. X0 [cm] | IA len. [cm] |
|-------------------|---------------------------------|----------------------|-----------------|
| BGO | 7.13 | 1.12 | 21.88 |
| PbWO ₄ | 8.3 | 0.9 | 18 |
| SCG1-C | 3.36 | 4.25 | 45.6 |

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PFADRSelect.java



Have fun!