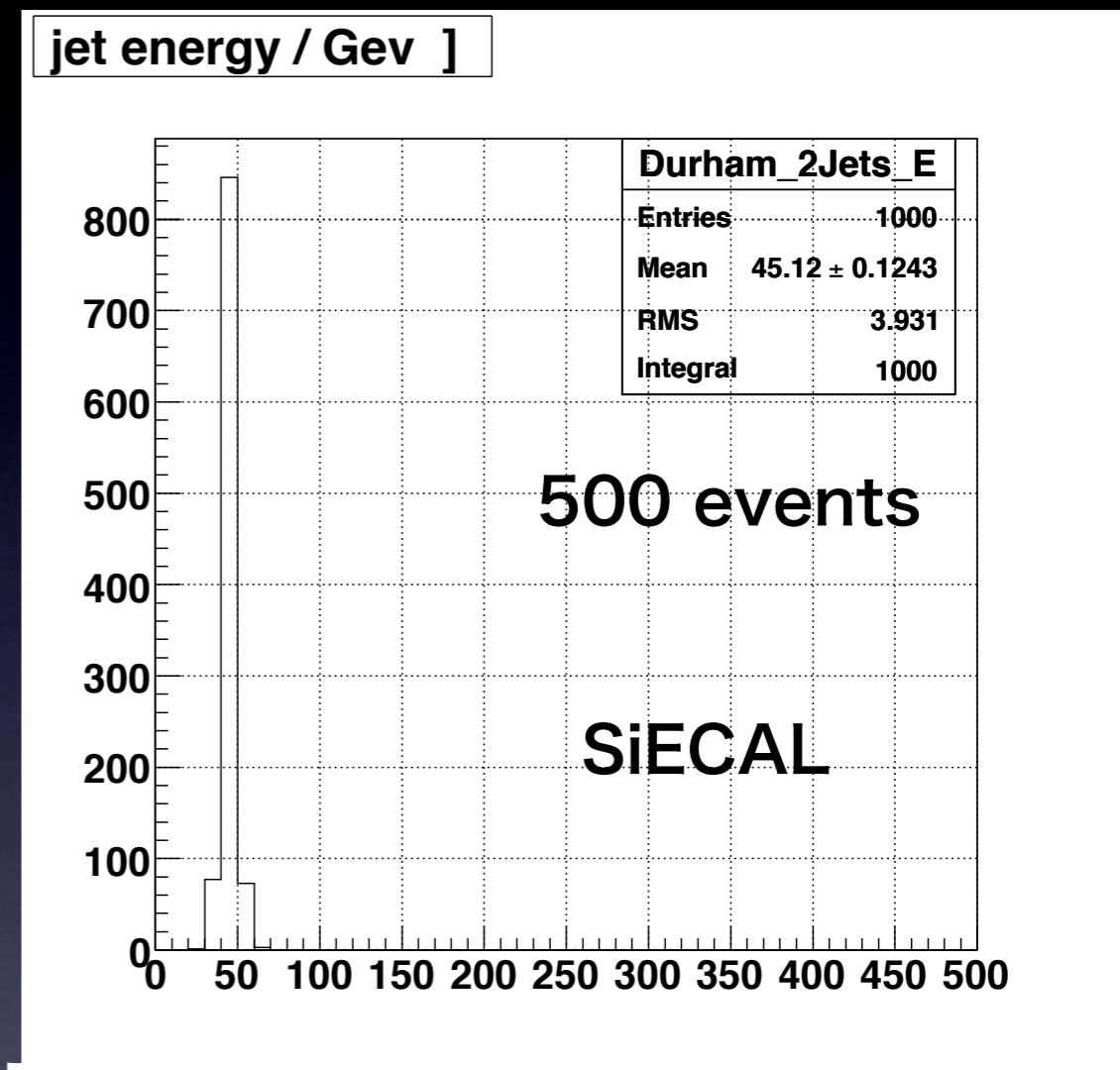# Status of the strip clustering
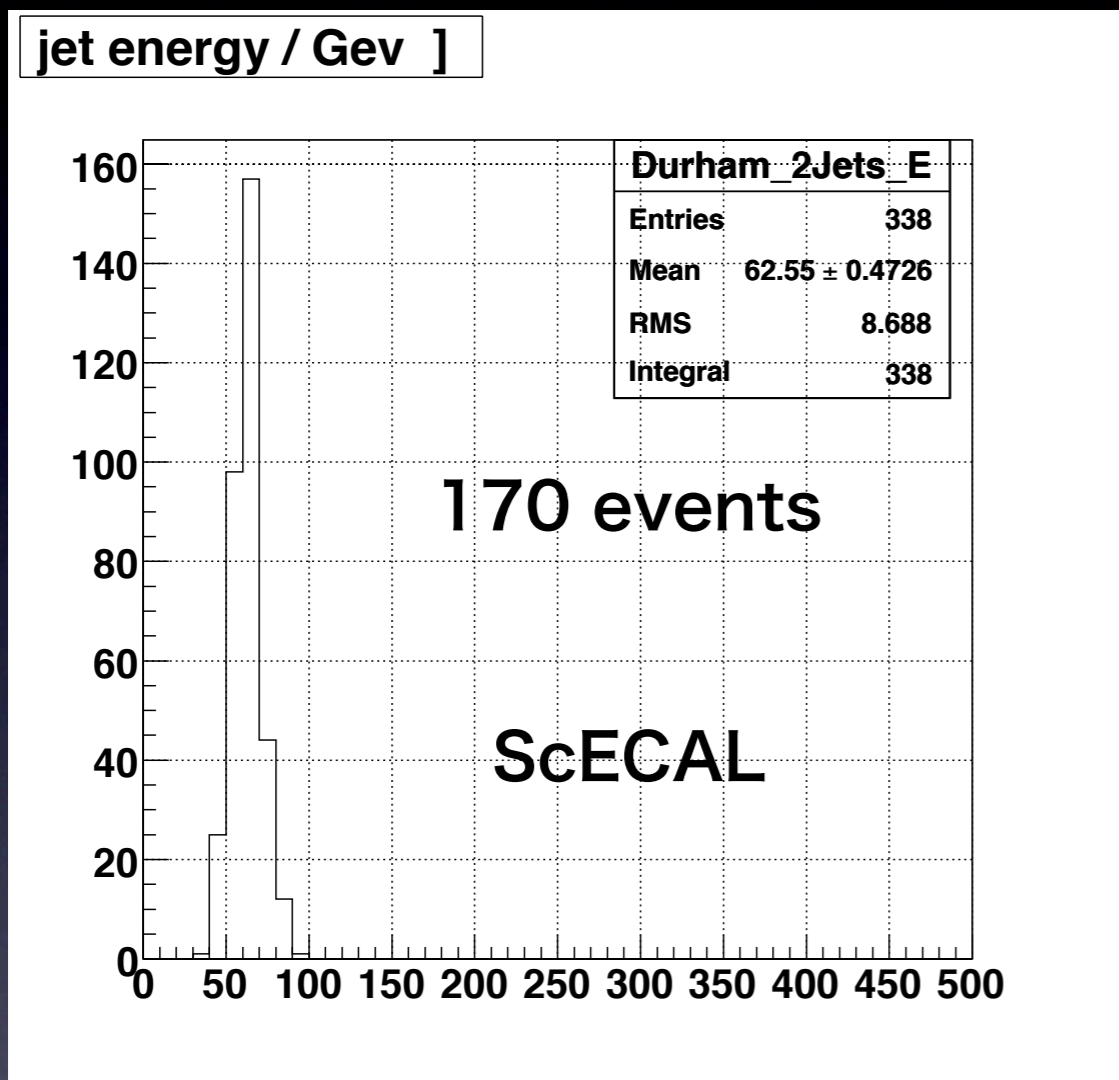
k. kotera, shinshu-u, 10th December 2009

Physics Software meeting of ILD Asia

Status until the last meeting
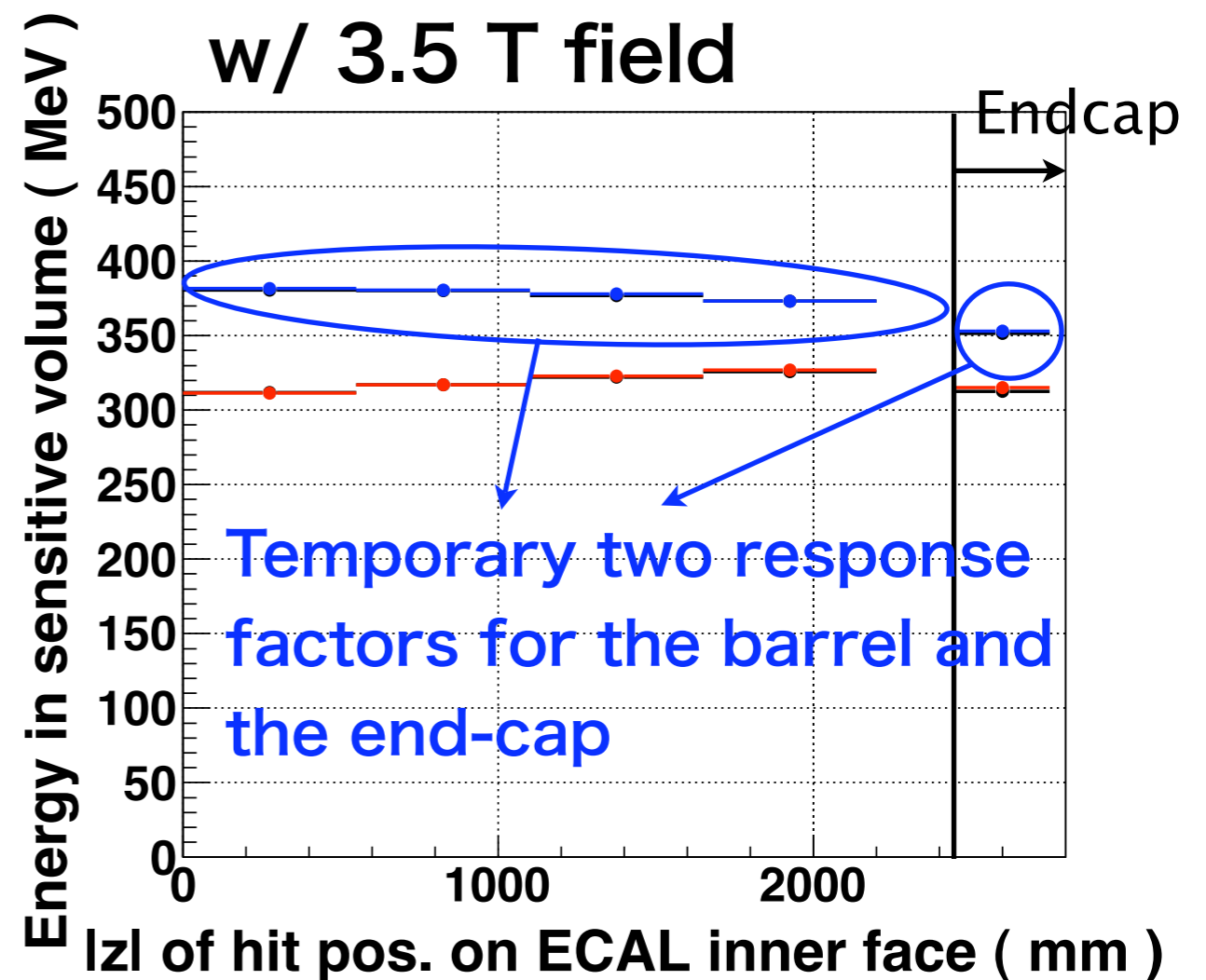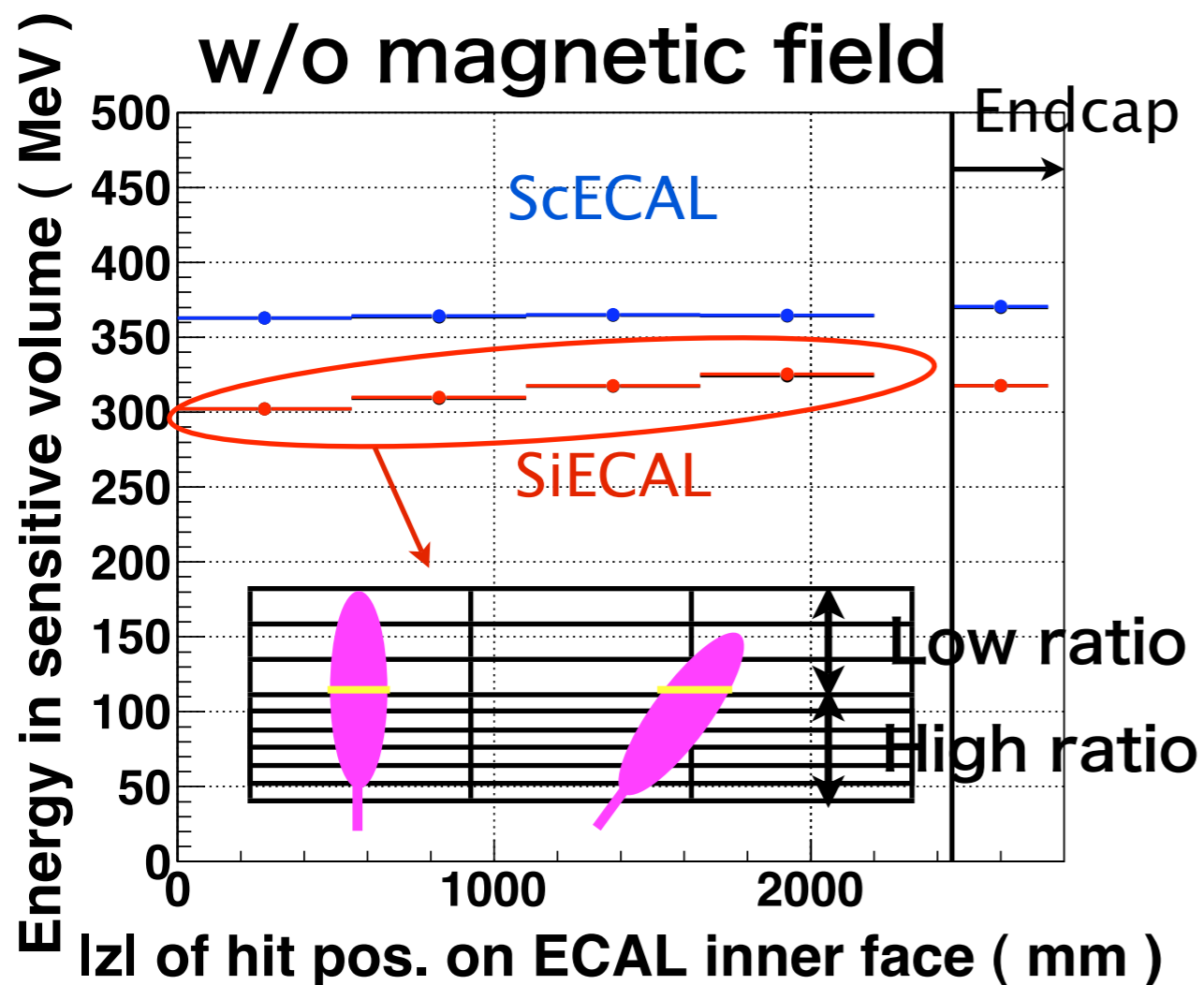# √s=91 GeV uds

jet energy / Gev]

Durham_2Jets_E
Entries	338
Mean	62.55 ± 0.4726
RMS	8.688
Integral	338

170 events

ScECAL

jet energy / Gev]

Durham_2Jets_E
Entries	1000
Mean	45.12 ± 0.1243
RMS	3.931
Integral	1000

500 events

SiECAL

1.4 : 1

Without any tune for WcECAL,
mean of energy for ScECAL is larger with factor 1.4 than for SiECAL.
Large RMS for ScECAL is caused by difference of energy response
between the barrel and the end-caps.
These are consistent with ....

Deposited energy by 10 GeV photons dep.on |z|

100 k events

w/o magnetic field

Energy in sensitive volume (MeV)

Endcap

ScECAL

SiECAL

Low ratio

High ratio

|z| of hit pos. on ECAL inner face (mm)

w/ 3.5 T field

Energy in sensitive volume (MeV)

Endcap

Temporary two response factors for the barrel and the end-cap

|z| of hit pos. on ECAL inner face (mm)

- z dependence of deposited energy in SiECAL is reasonable and it is removed in the reconstruction process using two factor for the layers.
- Both ScECAL and SiECAL are affected by the field, but larger for ScECAL. → I temporarily made two factors of response for the barrel and the end-cap. The factor I calculated for SiECAL is similar as the default value of MarlinReco.

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Status

1. I found the ProcessorParameter to set the response factor in SimpleCaloDigi.cc in MarlinReco.

2. I added a new ProcessorParameter which set the ratio of response factor between the barrel and the end-cap, in SimpleCaloDisi.cc. However, it does not work so far.

3. Still Marlin is trapped in some loop in several events even using Pre-2009-11-24 version.
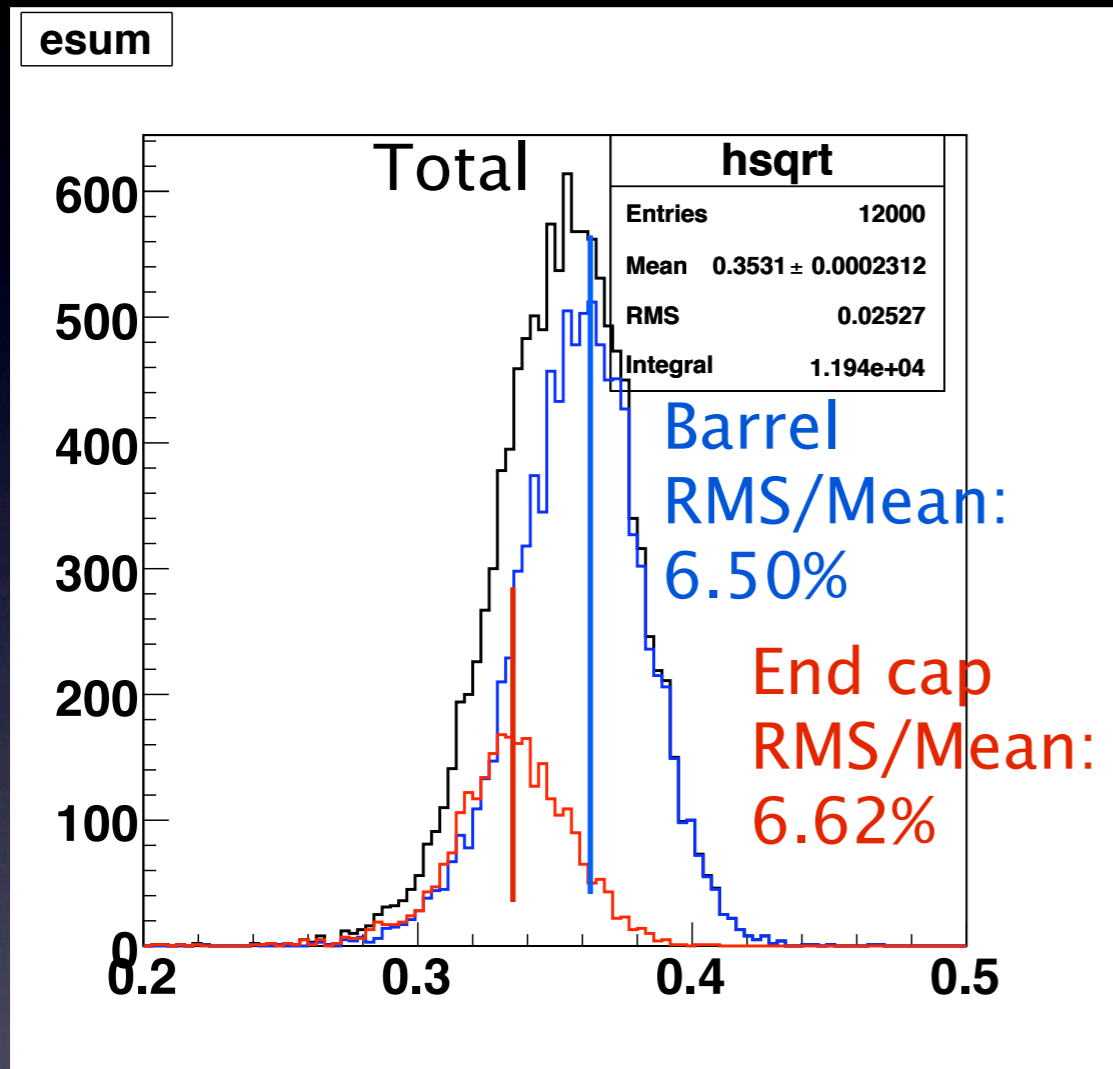
Plan

1. fix the problem with using new Processor Parameter.

2. fix the infinite loop problem occurring in some events, this is not the case for Miyamoto-san (I'm going to KEK 18th - 20th Dec).

3. merging tiles to make strip ScWECAL,

4. developing the strip clustering algorithm,

5. comparing the performance between tile ScWECAL and strip ScWECAL,

6. comparing the performance between SiECAL and ScWECAL.
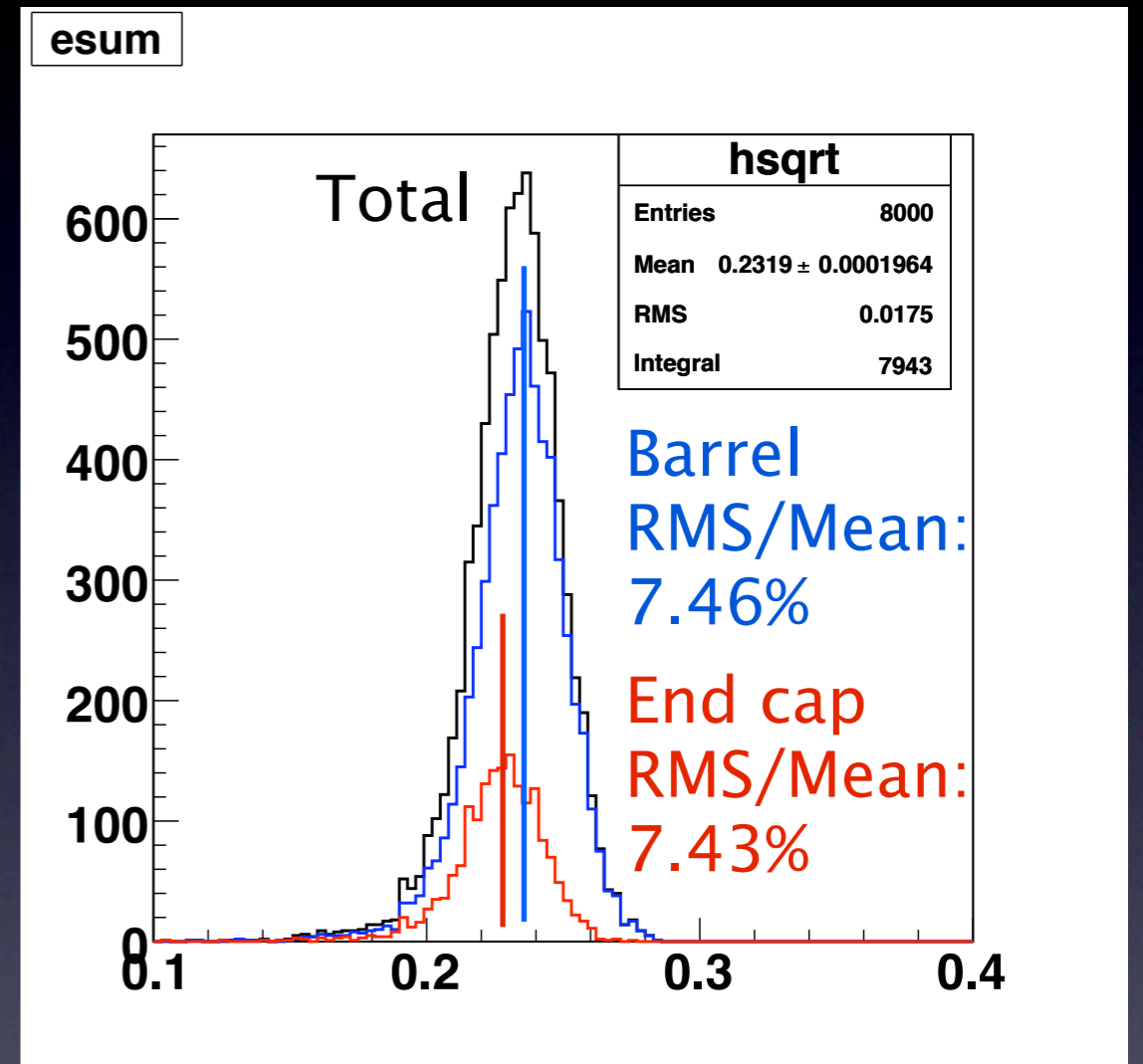
backup

Sc/Si ECAL parameter

- Ecal_Barrel_halfZ = 2350
- Ecal_Sc_thickness = 2.
- Ecal_Slab_H_fiber_thickness = 0.55
- Ecal_Slab_PCB_thickness = 0.8
- Ecal_Slab_copper_thickness = 0.4
- Ecal_Slab_glue_gap = 0.1
- Ecal_Slab_ground_thickness = 0.1
- Ecal_Slab_shielding = 0.1
- Ecal_barrel_number_of_towers = 5
- Ecal_cables_gap = 100.
- Ecal_cells_size = 4.9
- Ecal_fiber_thickness = .15
- Ecal_front_face_thickness = 2
- Ecal_guard_ring_size = 0.010
- Ecal_lateral_face_thickness = 2
- Ecal_nlayers1 = 14
- Ecal_nlayers2 = 13
- Ecal_radiator_layers_set1_thickness = 3.0
- Ecal_radiator_layers_set2_thickness = 3.0
- Ecal_radiator_material = tungsten
- Ecal_sensitive_material = polystyrene
- Ecal_support_thickness = 9.3

- Ecal_Barrel_halfZ = 2350
- Ecal_Si_thickness = .5
- Ecal_Slab_H_fiber_thickness = 0.55
- Ecal_Slab_PCB_thickness = 0.8
- Ecal_Slab_copper_thickness = 0.4
- Ecal_Slab_glue_gap = 0.1
- Ecal_Slab_ground_thickness = 0.1
- Ecal_Slab_shielding = 0.1
- Ecal_barrel_number_of_towers = 5
- Ecal_cables_gap = 100.
- Ecal_cells_size = 4.9
- Ecal_fiber_thickness = .15
- Ecal_front_face_thickness = 2
- Ecal_guard_ring_size = 0.5
- Ecal_lateral_face_thickness = 2
- Ecal_nlayers1 = 20
- Ecal_nlayers2 = 9
- Ecal_radiator_layers_set1_thickness = 2.1
- Ecal_radiator_layers_set2_thickness = 4.2
- Ecal_radiator_material = tungsten
- Ecal_sensitive_material = silicon_2.33gccm
- Ecal_support_thickness = 9.3

10 GeV photons

ScEcal (left plot):
- Histogram label: esum
- Inset: hsqrt, Entries 12000, Mean 0.3531 ± 0.0002312, RMS 0.02527, Integral 1.194e+04
- Total
- Barrel RMS/Mean: 6.50%
- End cap RMS/Mean: 6.62%

SiEcal (right plot):
- Histogram label: esum
- Inset: hsqrt, Entries 8000, Mean 0.2319 ± 0.0001964, RMS 0.0175, Integral 7943
- Total
- Barrel RMS/Mean: 7.46%
- End cap RMS/Mean: 7.43%

ScEcal   SiEcal

ratio of mean of energy, ScECAL:SiEcAL=1.5 : 1

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