

Update on PFO creation in Marlin Pandora



ILD software/analysis meeting
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Content

- Update on LCIO clusters
 - Update on LCIO reconstructed particle
 - Update on LCIO vertex
 - Update on track creator
 - Some distributions of parameters
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- - follow up from high level reconstruction workshop in DESY
 - - some quantities are not filled pending to updates from to other classes

LCIO cluster

Red: new or changed

- getType: Not filled
- **getEnergy**: Pandora Corrected Energy, defined by energy plugin
- **getEnergyError**:
 - Hadronic, $(60\%/\sqrt{\text{energy}}+3\%)*\text{energy}$
 - EM: $(17\%/\sqrt{\text{energy}}+1\%)*\text{energy}$
- getSubdetectorEnergies:
 - Sum of raw hit: unchanged
- getHitContribution: Not filled

LCIO cluster

Red: new or changed

- getPosition: centre of gravity, unchanged
 - Potentially photon can use an improved centre of gravity
- getITheta, Iphi, **positionError, Itheta/Iphi error**: Filled from updated cluster shape class

LCIO reconstructed particle

Red: new or changed

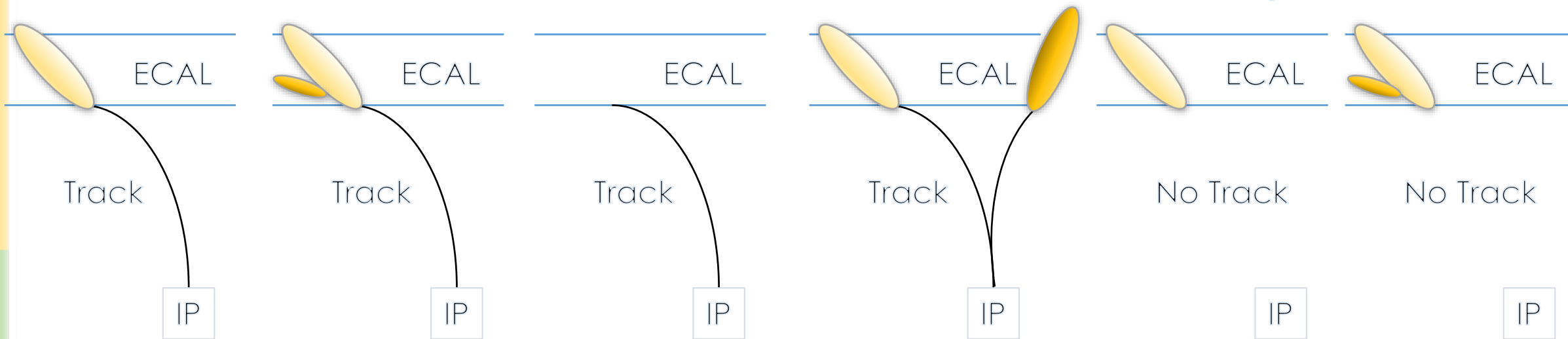
- getType: particle ID by Pandora, unchanged
- isCompound: Not filled
- Momentum, energy, charge: unchanged
- Mass: by pandora, unchanged
- **getCovariance**: Not filled at the moment, waiting for updates in cluster shape class
- **getReferencePoint**:
 - Charged: x_0, y_0, z_0 , weighted over momentum if multiple tracks
 - $x_0 = D_0 * \cos(\Phi_0), y_0 = D_0 * \sin(\Phi_0)$
 - Neutral: cluster position weighted over energy if multiple clusters

LCIO reconstructed particle

- Reference point calculation

Charged: with tracks; use impact parameters of tracks

Neutral: no track; use cluster positions



Charged: impact parameters, x_0, y_0, z_0 , weighted over track momenta if multiple tracks
 $x_0 = D_0 * \cos(\Phi_0)$, $y_0 = D_0 * \sin(\Phi_0)$

Neutral: cluster positions weighted over corrected energies if multiple clusters

LCIO reconstructed particle

Red: new or changed

- `getParticleIDs`: not filled
- `getParticles`: not filled
- `getTracks`, `getClusters`: unchanged

LCIO vertex

Red: new or changed

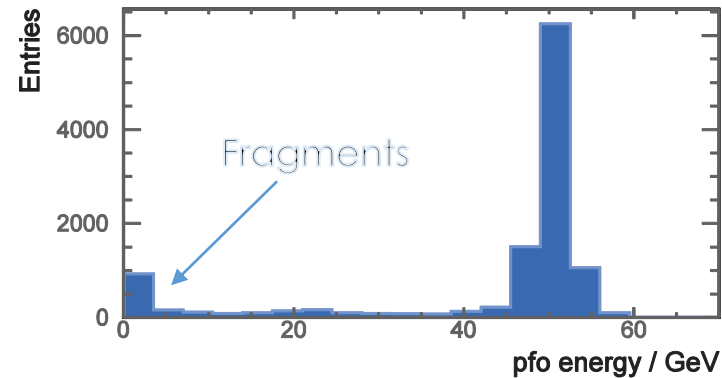
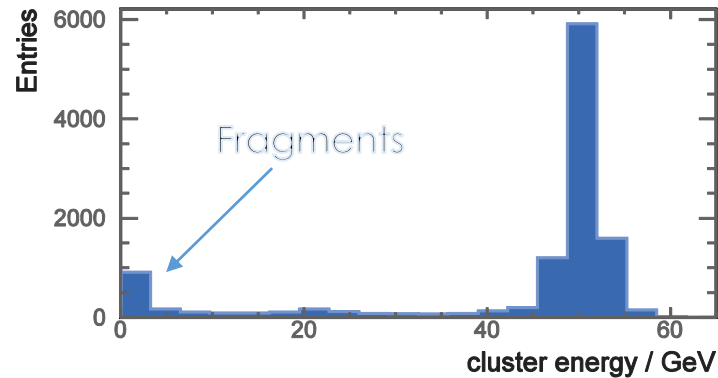
- A new vertex collection
- Vertex collection name: default PandoraPFANewStartVertices
- Algorithm Name: default “PandoraPFANew”
- Position: same as reference point
- Associated Particle: pfo

Track Creator

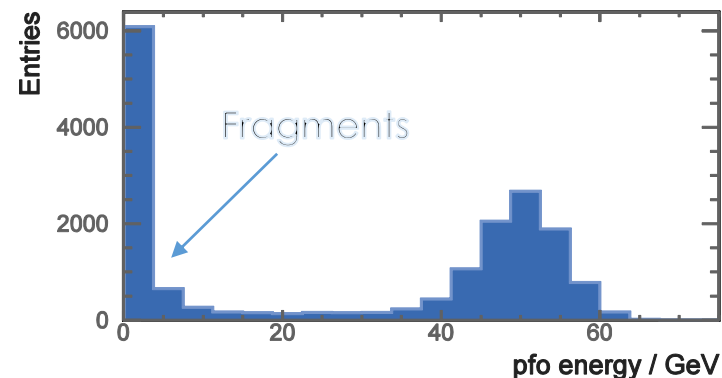
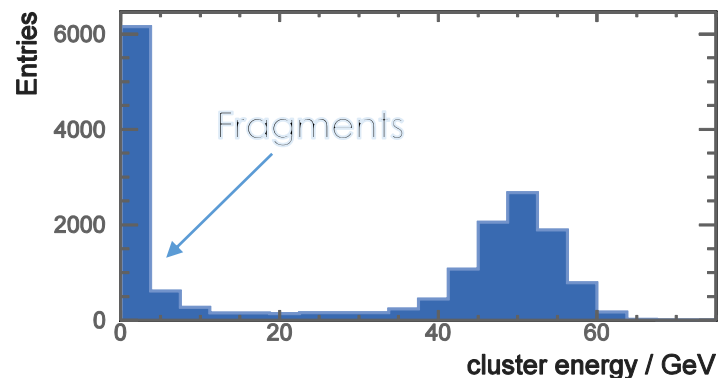
- Track time At Calorimeter has been calculated as the minimum to reach any surface of ECAL.

Distributions of parameters

- Tested with ILCSoft v01-17-07, ILD o1-v6.



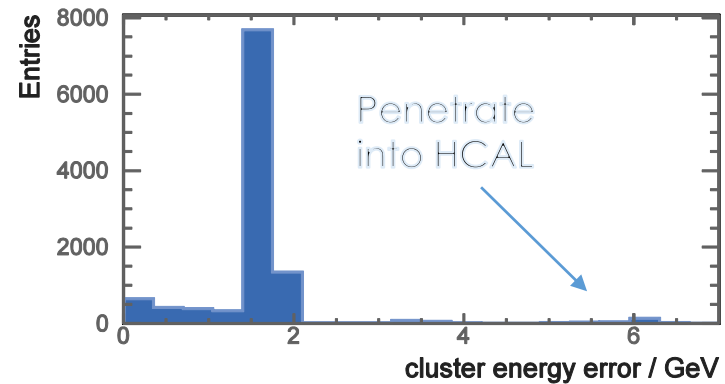
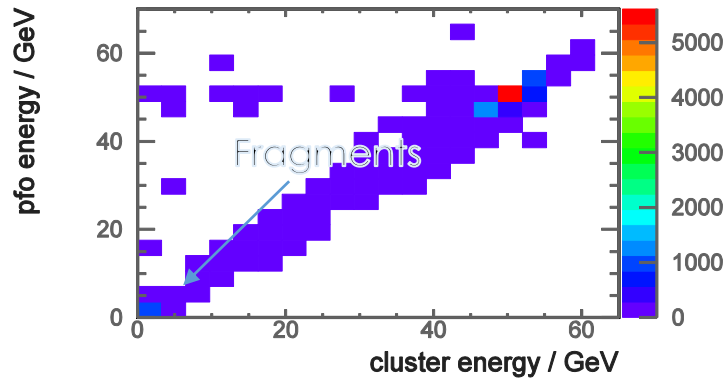
10000 50GeV photons



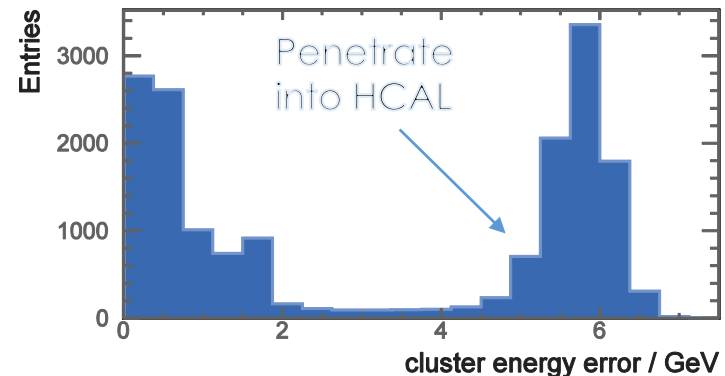
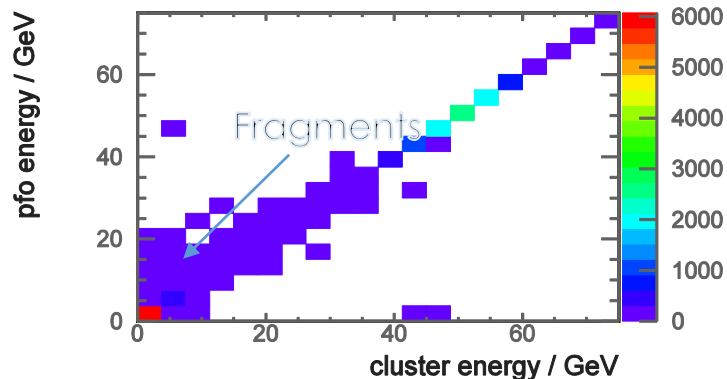
10000 50GeV Kaon L

Distributions of parameters

- Tested with ILCSoft v01-17-07, ILD o1-v6.



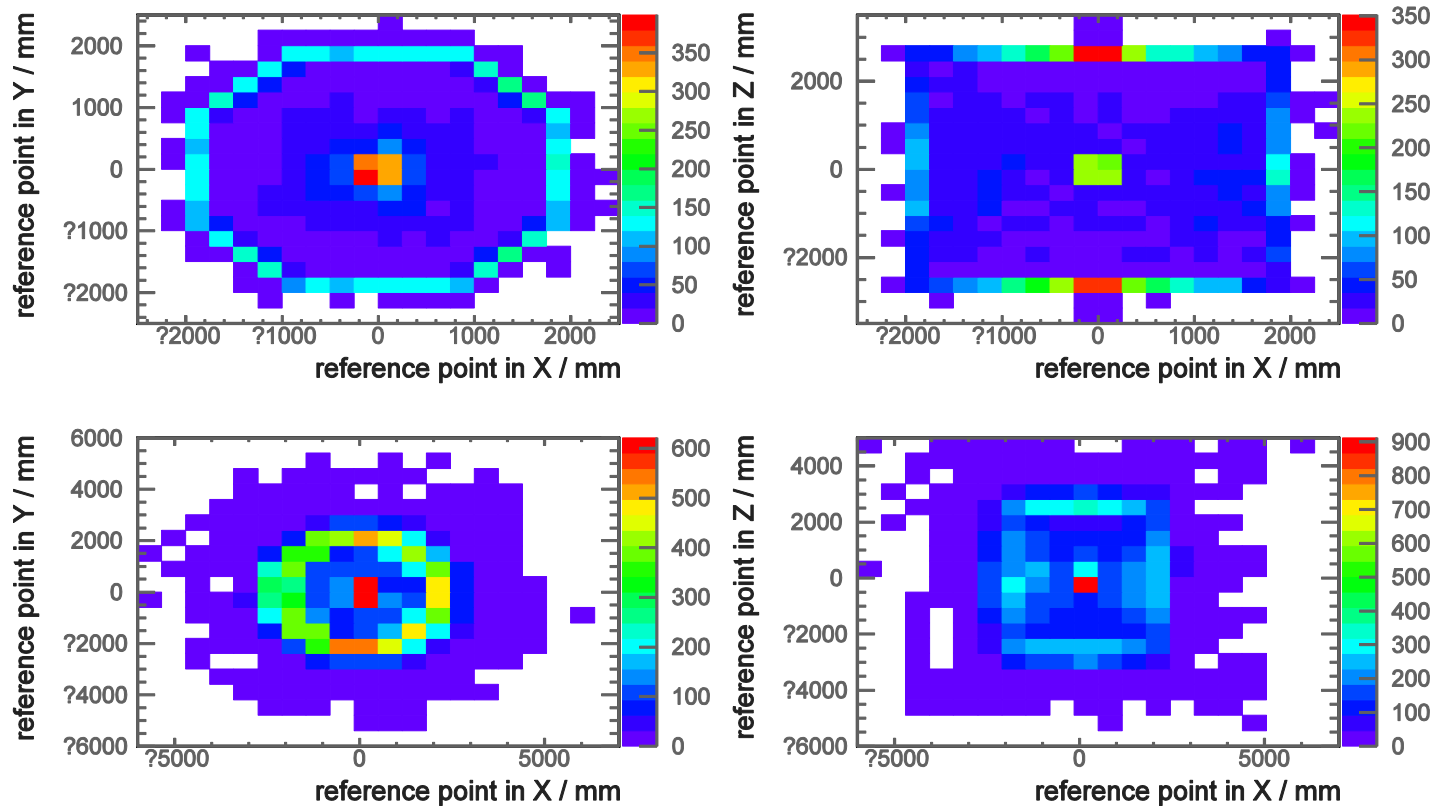
10000 50GeV photons



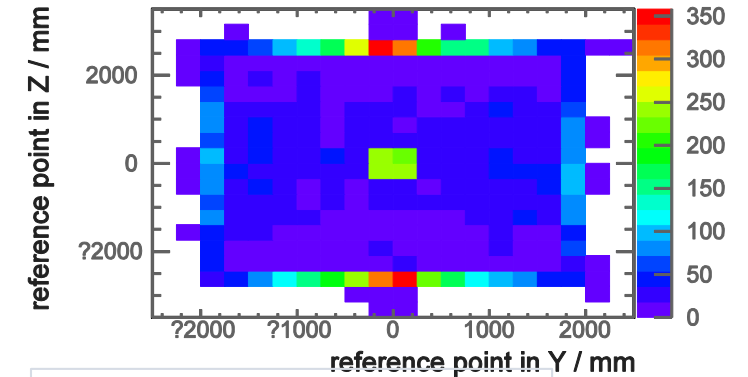
10000 50GeV Kaon L

Distributions of parameters

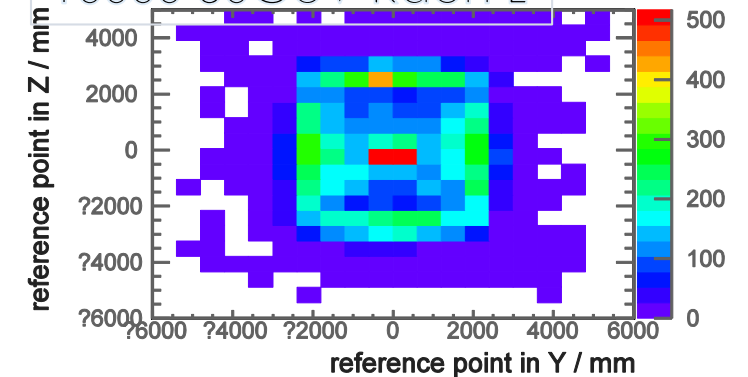
- Tested with ILCSoft v01-17-07, ILD o1-v6.



10000 50GeV photons



10000 50GeV Kaon L



Future Plan

- Commit changes to Pfo Creator class in MarlinPandora
- Also commit changes to Track Creator class
- Update relevant entries in Pandora Analysis and commit changes



Thanks for listening!