

Lumical Reconstruction Soft Update

- LumiCalClusterer Marlin Processor
- Lucas simulation tool

LumiCalClusterer

- Andre ported Iftach's reco package into Marlin environment and made it compilable and available within official ilcsoft release
- after that, triggered by Beata complaints, I made following modifications to achieve reasonable reconstruction results:
 - ✓ implemented gear interface
 - ✓ moved “hardwired” parameters to steering file
 - ✓ fixed reference system (made it working for non-zero crossing crossing angle), global<-->local
 - ✓ fixed output LCIO objects (LumiCalClusters, LumiCalRecoParticles)
 - ✓ and several bugs fixed....
- Not everything yet done !
- Latest version available with svn co (HEAD), steering file in examples

LumiCalClusterer (steering)

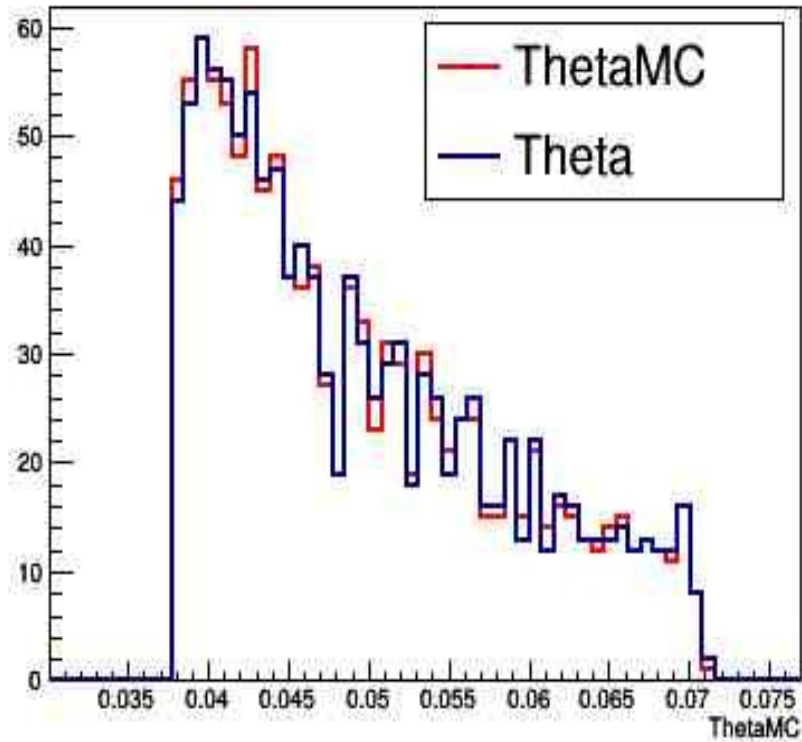
- Example of steering file available in examples

```
<processor name="MyMarlinLumiCalClusterer" type="MarlinLumiCalClusterer">
<!--whatever...-->
<!--verbosity level of this processor ("DEBUG0-4,MESSAGE0-4,WARNING0-4,ERROR0-4,SILENT")-->
<parameter name="Verbosity" type="string"> MESSAGE </parameter>
<!--Collection Containing the Hits in the LumiCal-->
<parameter name="LumiCal_Collection" type="string" lcioInType="SimCalorimeterHit">LumiCalCollection </parameter>
<!--Collection of Cluster found in the LumiCal-->
<parameter name="LumiCal_Clusters" type="string" lcioOutType="Cluster">LumiCalClusters </parameter>
<!--Collection of Reconstructed Particles found in the LumiCal-->
<parameter name="LumiCal_RecoParticles" type="string" lcioOutType="ReconstructedParticle">LumiCalRecoParticles </parameter>
<!-- Number of events to skip at the beginning of the LCIO file-->
<parameter name="SkipNEvents" type="int">0 </parameter>
<!-- Number of event to work with-->
<parameter name="MaxRecordNumber" type="int">10 </parameter>
<!--Name of output directory-->
<parameter name="OutDirName" type="string">rootOut </parameter>
<!--Name of output ROOT file ( without suffix)-->
<parameter name="OutRootFileName" type="string">LcalRootOut </parameter>
<!-- Place for ROOT tree memory(1) or disk(0 recommended)-->
<parameter name="MemoryResidentTree" type="int">0 </parameter>
<!-- Number of events in memory resident ROOT tree.-->
<parameter name="NumEventsTree" type="int">500 </parameter>

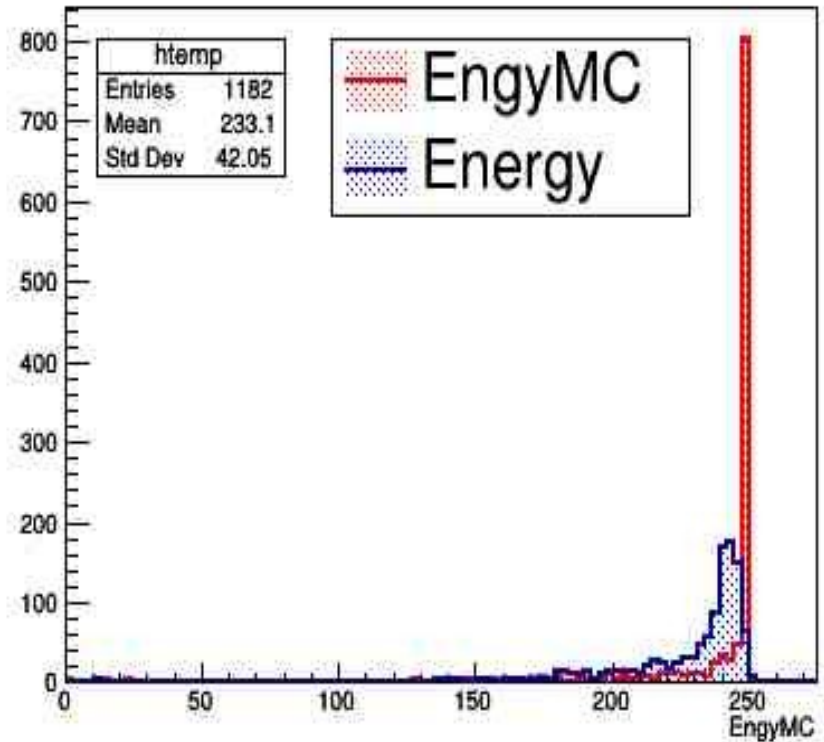
<!-- Clustering/Geometry Parameters -->
<!-- Minimal number of hits in cluster-->
<parameter name="ClusterMinNumHits" type="int">15 </parameter>
<!-- BP: Not sure what it is-->
<parameter name="ElementsPercentInShowerPeakLayer" type="double">0.03 </parameter>
<!-- Sets minimum for logarithmic energy weights-->
<parameter name="LogWeigthConstant" type="double">6 </parameter>
<!-- BP: see explanation in LumiCalClusterer.cpp-->
<parameter name="MiddleEnergyHitBoundFrac" type="double">0.01 </parameter>
<!-- Sets minimum energy deposit for cluster to be accepted [GeV]-->
<parameter name="MinClusterEngy" type="double">2 </parameter>
<!-- Calibration factor - converts cluster energy to energy of primary particle ( E_cluster = EngryCalibConst*E_primary default value for LCal ILD )-->
<parameter name="EnergyCalibConst" type="double" value="0.0121"/>
<!-- Hit energy cut - minimum hit energy required [GeV] -->
<parameter name="MinHitEnergy" type="double">5e-06 </parameter>
<!-- Moliere radius, controls clusters separation distance [mm]-->
<parameter name="MoliereRadius" type="double">16 </parameter>
<!-- Relative z-layers phi offset [deg] (default for model ILD_o1_05, must go to gear sometimes)-->
<parameter name="ZLayerStagger" type="double">3.75 </parameter>
<!--Number of neighbor hits to consider -->
<parameter name="NumOfNearNeighbor" type="int">6 </parameter>
<!-- Choose cluster hit position weights LogMethod=-1 or simple EnergyMethod=1 -->
<parameter name="WeightingMethod" type="string">LogMethod </parameter>
</processor>
```

LumiCalClusterer (results example)

ThetaMC



EngyMC



Lucas status

- available from : <https://svnsrv.desy.de/basic/FCAL/>
- fixed LCIO output (get hits positions in Icio file)
- creates GEAR file usable with LumiCalClusterer within Marlin

Summary

- LumiCalClusterer processor usable within Marlin environment – need still few fixes and tune-up
- LuCaS fully compatible, may be used with Marlin LumiCalClusterer