Lumi Updates

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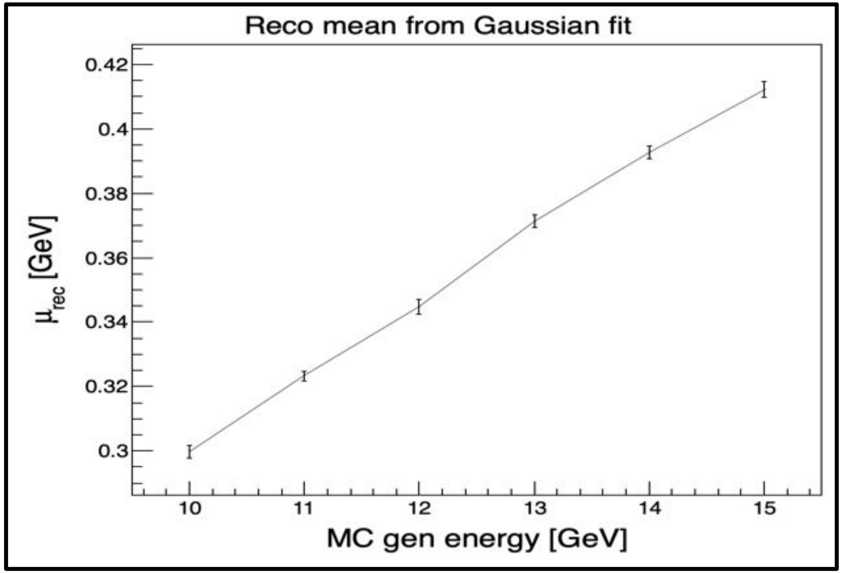
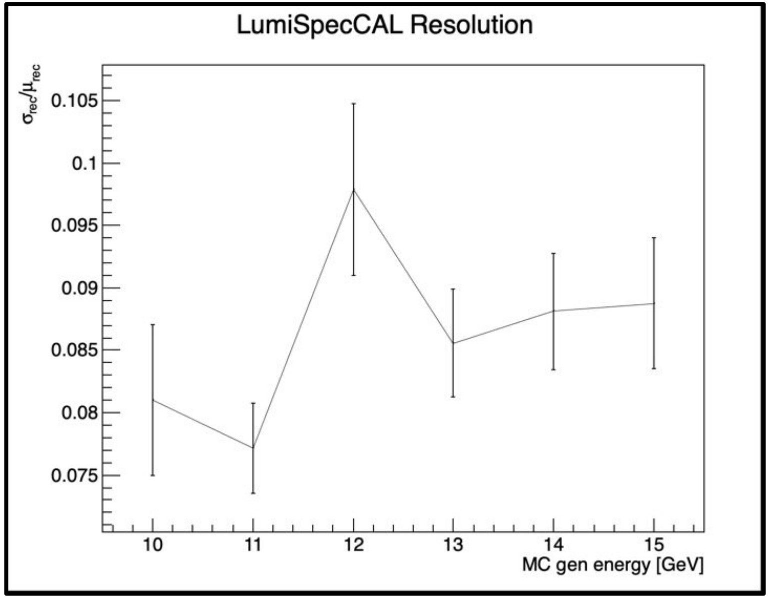
General Analysis Direction

- <u>Focus</u> on generic simulation codes in eic (eicsub) sdcc computing facility.
    - Suitable for very high statistics simulation campaigns.

- Simulation codes in repository : /eic/u/aranya/eic/sim_code
- Data Repository : /gpfs/mnt/gpfs02/eic/aranya/data_UserDef

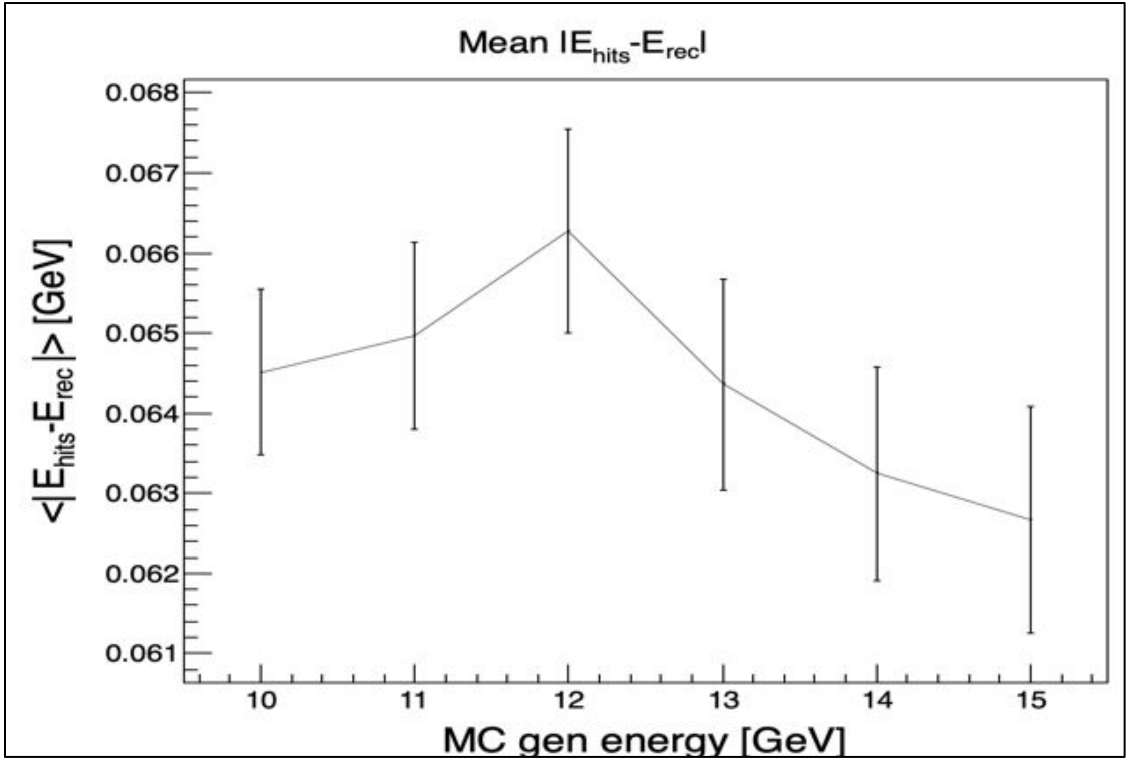
Usual checks





- Resolution slightly lower.
- Sampling fraction slightly higher.

Geant Hits vs EICrecon reconstructed hits



- Is this due to EICrecon's reconstruction parameters ?

Reconstruction Parameters

EICrecon / src / detectors / ZDC / **ZDC.cc**

Code | Blame — 383 lines (360 loc) · 16.4 KB

```
void InitPlugin(JApplication* app) {
#endif
        "HcalFarForwardZDCRawHitAssociations"},
       {
           .eRes{},
           .tRes          = 0.0 * dd4hep::ns,
           .capADC        = 65536,
           .dyRangeADC    = 1000. * dd4hep::MeV,
           .pedMeanADC    = 400,
           .pedSigmaADC   = 2,
           .resolutionTDC = 10 * dd4hep::picosecond,
           .corrMeanScale = "1.0",
           .readout       = "HcalFarForwardZDCHits",
       },
       app // TODO: Remove me once fixed
       ));

   app->Add(new JOmniFactoryGeneratorT<CalorimeterHitReco_factory>(
       "HcalFarForwardZDCRecHits", {"HcalFarForwardZDCRawHits"}, {"HcalFarForwardZDCRecHits"},
       {
           .capADC          = 65536,
           .dyRangeADC      = 1000. * dd4hep::MeV,
           .pedMeanADC      = 400,
           .pedSigmaADC     = 2,
           .resolutionTDC   = 10 * dd4hep::picosecond,
           .thresholdFactor = 3.0,
           .thresholdValue  = 0.0,
           .sampFrac        = "1.0",
           .readout         = "HcalFarForwardZDCHits",
           .layerField      = "layer",
           .sectorField     = "system",
       },
       app // TODO: Remove me once fixed
       ));
```

EICrecon / src / detectors / LUMISPECCAL / **LUMISPECCAL.cc**

Code | Blame — 149 lines (141 loc) · 6.13 KB

```
void InitPlugin(JApplication* app) {
         "EcalLumiSpecRawHitAssociations"},
        {
            .eRes           = {0.0 * sqrt(dd4hep::GeV), 0.02, 0.0 * dd4hep::GeV}, // f
            .tRes           = 0.0 * dd4hep::ns,
            .capADC         = 16384,
            .dyRangeADC     = 20 * dd4hep::GeV,
            .pedMeanADC     = 100,
            .pedSigmaADC    = 1,
            .resolutionTDC = 10 * dd4hep::picosecond,
            .corrMeanScale = "1.0",
            .readout        = "EcalLumiSpecHits",
        },
        app // TODO: Remove me once fixed
        ));
  app->Add(new JOmniFactoryGeneratorT<CalorimeterHitReco_factory>(
        "EcalLumiSpecRecHits", {"EcalLumiSpecRawHits"}, {"EcalLumiSpecRecHits"},
        {
            .capADC          = 16384,
            .dyRangeADC      = 20. * dd4hep::GeV,
            .pedMeanADC      = 100,
            .pedSigmaADC     = 1,
            .resolutionTDC   = 10 * dd4hep::picosecond,
            .thresholdFactor = 0.0,
            .thresholdValue  = 2.0,
            .sampFrac        = "1.0",
            .readout         = "EcalLumiSpecHits",
        },
```

Is there a need for changes ?

Some issues still unresolved.

- Unable to obtain sector, layer information in the reconstructed file.
  - Worked perfectly with analyzeLumiHits reconstruction file.

```
# --- DDSIM ---
echo "Running ddsim..."
ddsim --inputFiles "$inFile" --outputFile "$simOut" --compactFile "$decPath" -N 500

# --- EICRECON ---
echo "Running eicrecon..."
eicrecon -Ppodio:output_file="$recOut" \
         -Ppodio:output_collections=MCParticles,EcalLumiSpecRawHits,EcalLumiSpecRecHits,EcalLumiSpecHits \
         -Pjana:nevents=500 \
         -Pdd4hep:xml_files="$decPath" "$simOut"
```

- Progress is slightly slow but will take pace after SQM (March).