Update on hadronic reconstruction with full sim

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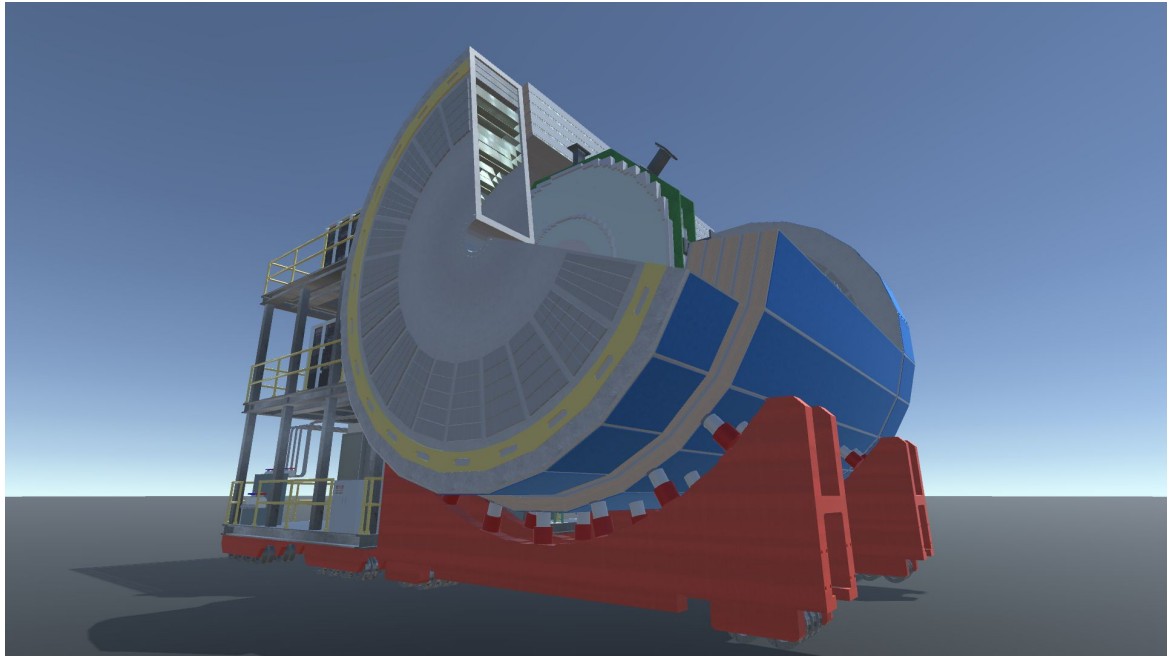
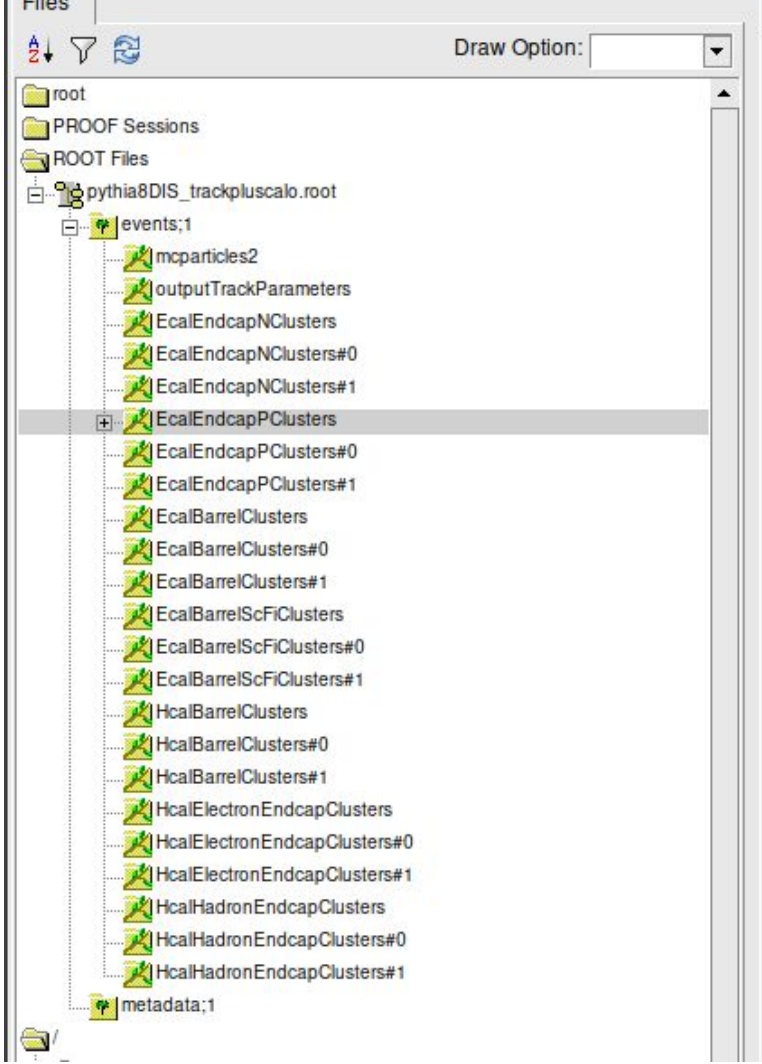
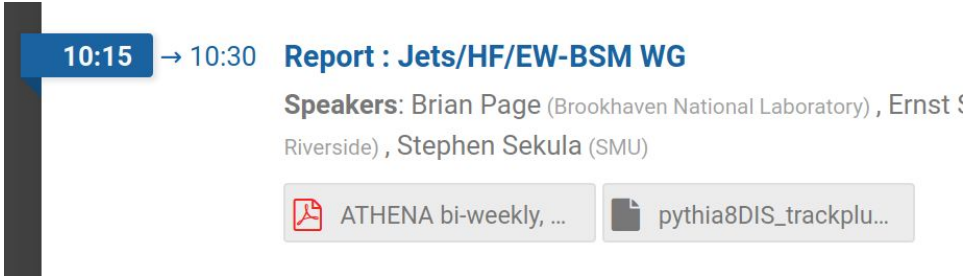
ATHENA



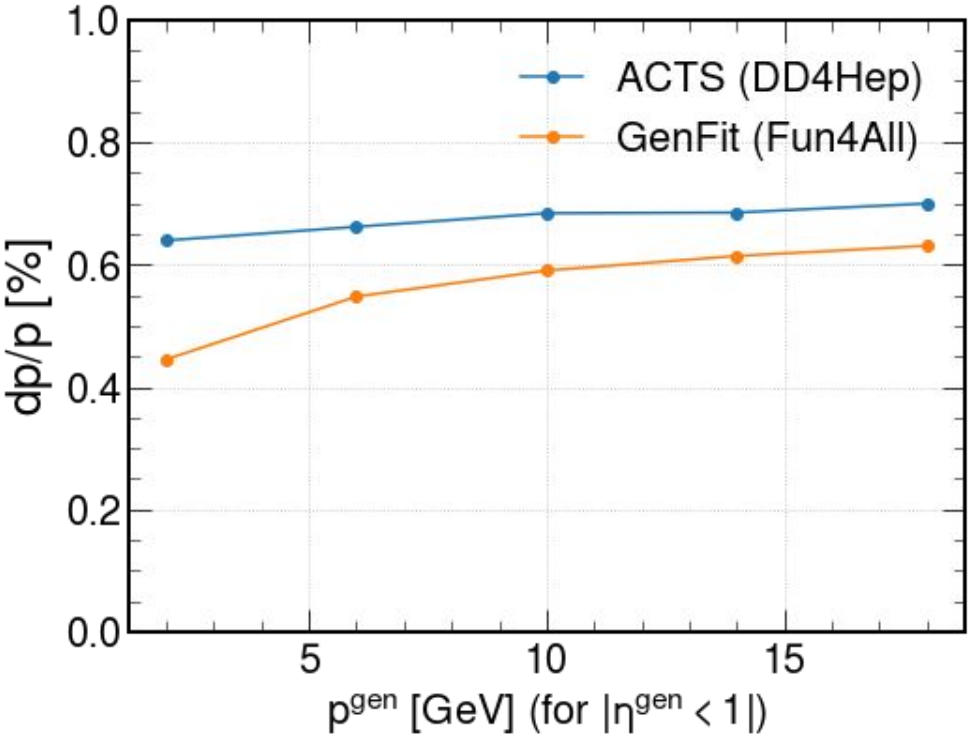


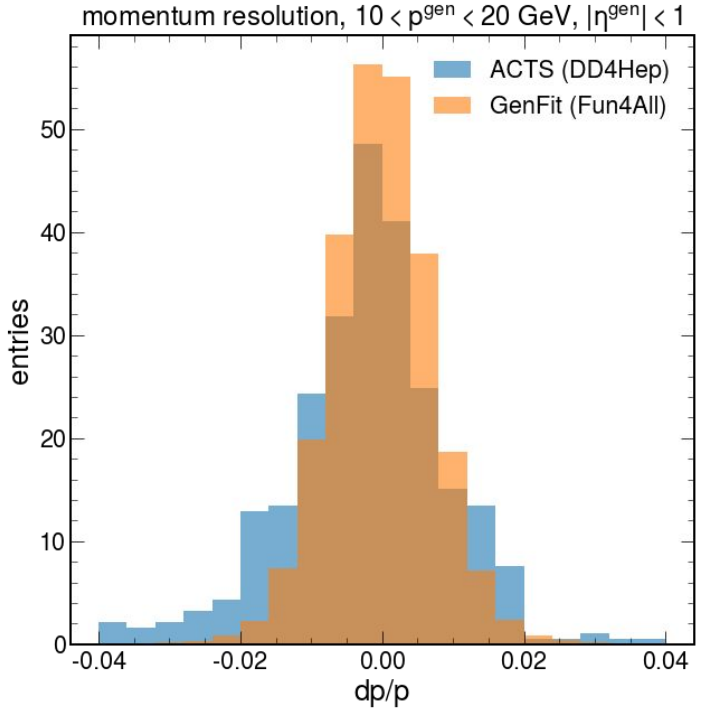


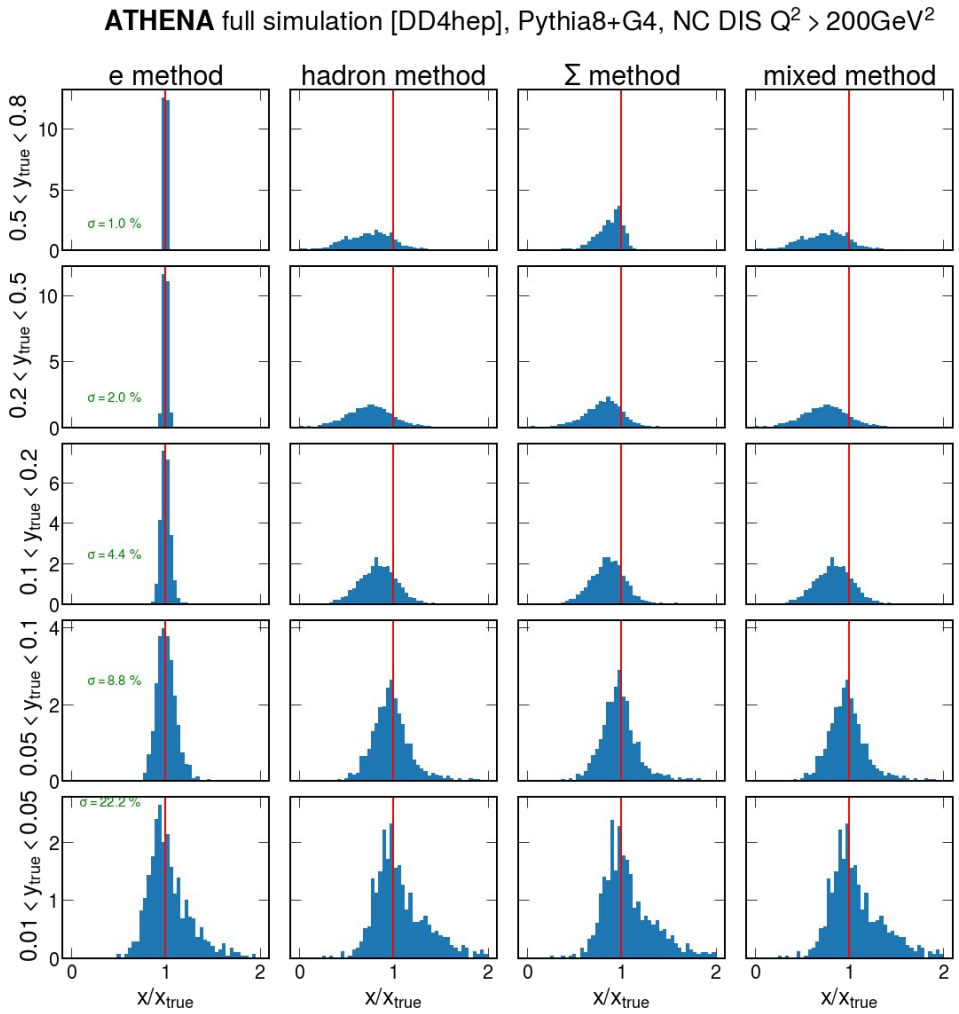
While both tracking still needs development, we can work on benchmark analyzes code.

- Track-cluster matching.
- electron ID algorithms
- “Track subtraction” algorithms from calo energy (aka energy flow algo)
- Hadronic reconstruction
- Background rejection algorithms
- etc etc etc.

Early tests are very encouraging, tracking will converge pretty soon







Hadronic reconstruction methods are obtained using calorimeter information only (ECAL + HCAL).

Next step is to add tracking. This requires track-cluster matching and subtraction of charged-energy from HCAL

To keep in mind while analyzing samples

- Need to consider that barrel ECAL is divided in two: EcalBarrel (silicon-tungsten) and EcalBarrelScFi (scintillator-tungsten). The SciFi has no longitudinal segmentation, so you need to match clusters in silicon to SciFi to get polar angle of electron (and any cluster).
- Small samples (~10k) events or so are easier to generate provided you have HEPMC format. (recipe is in slack)

First, get eic container from https://eic.phy.anl.gov/tutorials/eic_tutorial/getting-started/quickstart/

Then follow the instructions shown on the right. Then use the commands shown Below. Voila! You will get a ROOT file with tracks and clusters.

development directory

```
mkdir development
export LD_LIBRARY_PATH=$PWD/development/lib:$LD_LIBRARY_PATH
export PATH=$PWD/development/bin:$PATH
```

intall athena

```
git clone https://eicweb.phy.anl.gov/EIC/detectors/athena.git
cd athena
mkdir build && cd build
cmake .. -DCMAKE_INSTALL_PREFIX=../../development
make install
cd ../..
```

intall beamline

```
git clone https://eicweb.phy.anl.gov/EIC/detectors/ip6.git
cd ip6
mkdir build && cd build
cmake .. -DCMAKE_INSTALL_PREFIX=../../development
make install
cd ../..
```

copy beamline compact files to detector

```
cp -r ip6/ip6 athena/
```

install juggler

```
git clone https://eicweb.phy.anl.gov/EIC/juggler.git
cd juggler/
mkdir build && cd build
cmake .. -DCMAKE_INSTALL_PREFIX=../../development -DCMAKE_CXX_STANDARD=20
make install
cd ../..
```

set environment needed by benchmark

```
export DETECTOR_PATH=$PWD/athena
export JUGGLER_DETECTOR=athena
export JUGGLER_INSTALL_PREFIX=$PWD/development
```

↓ Latest messa

```
git clone https://eicweb.phy.anl.gov/EIC/benchmarks/reconstruction_benchmarks.git
cd reconstruction_benchmarks/
```

bash benchmarks/clustering/full_trackpluscalo.sh -n NEVENTS -t YOURHEPMC

Happy analysing,
Go ATHENA!