

Muon Collider Full Simulation Studies

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Preliminary studies

Generated 20 events for process $\mu^+\mu^- \rightarrow HH\nu\bar{\nu} \rightarrow b\bar{b}b\bar{b}\nu\bar{\nu}$.

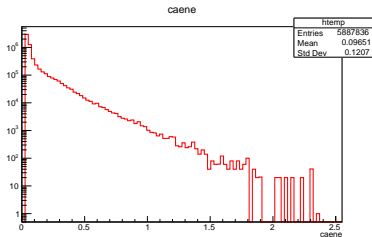
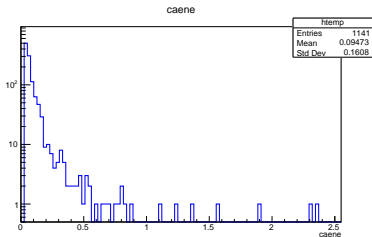
Full BIB overlay strategy:

- Merge Calorimeter hits only
- Merge MC Particle hits with $E > 10$ MeV. Reduces file size by 1 order of mag, Marlin can handle

Before generating more events, check if reconstruction looks okay
(**HH signal only** and **HH + full BIB**)

Calorimeter hits Energy

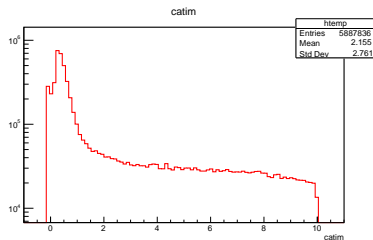
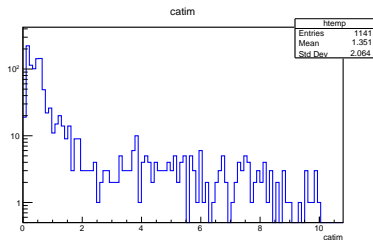
ECal $E_{th} = 1$ MeV and HCal $E_{th} = 5$ MeV (Trial selection)



-Energy cuts can be further optimized to reduce BIB

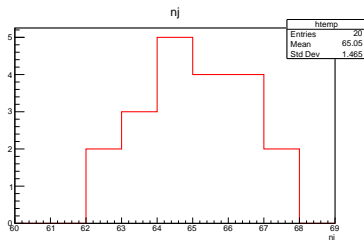
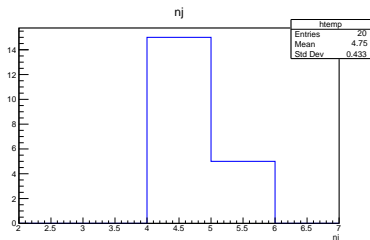
Calorimeter hits Time

T - ToF: -1 to 10 ns



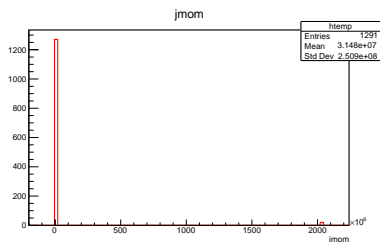
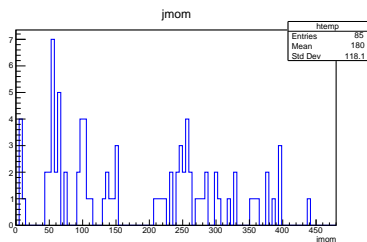
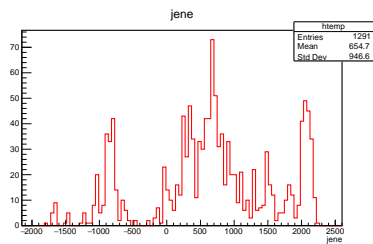
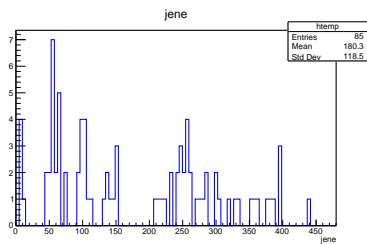
-Check if timing selections can further reduce BIB

Uses Tracker and Calorimeter hits
Anti-kT algorithm with $R=0.4$ (AK4)
No selections yet



Get rid of 'bib jets' using E or P cuts

Jets Energy and Momentum



- Negative E values
- Jet P not filled properly

Next steps

- Use condor to generate more statistics
- Recheck negative Jet E and P distributions
- Optimize E_{th} and T selections