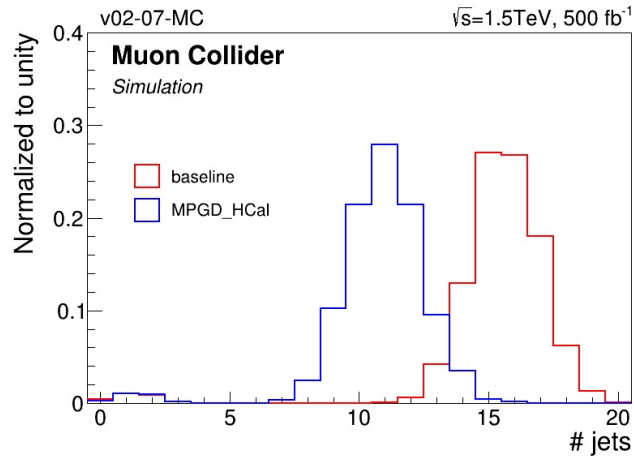


Muon Collider Simulation

MPGD-based HCal

Status and Plans – 04/07/22

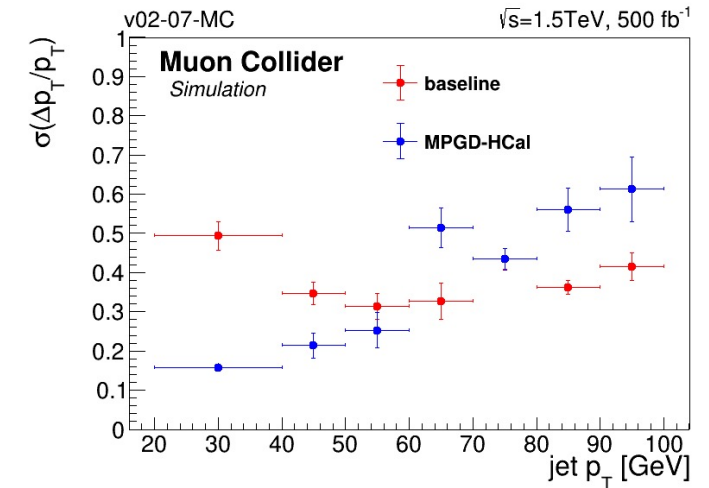
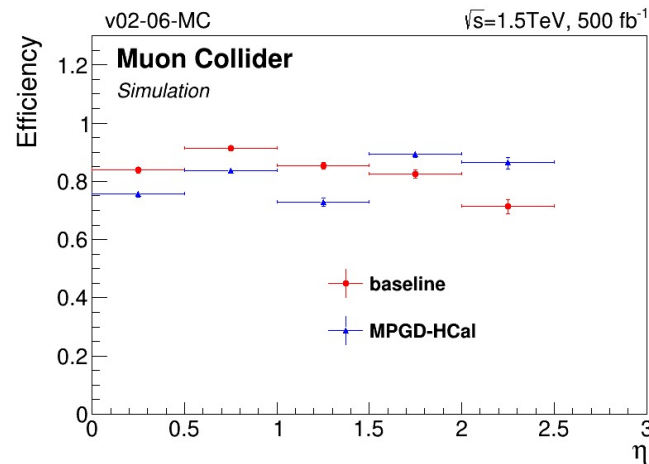
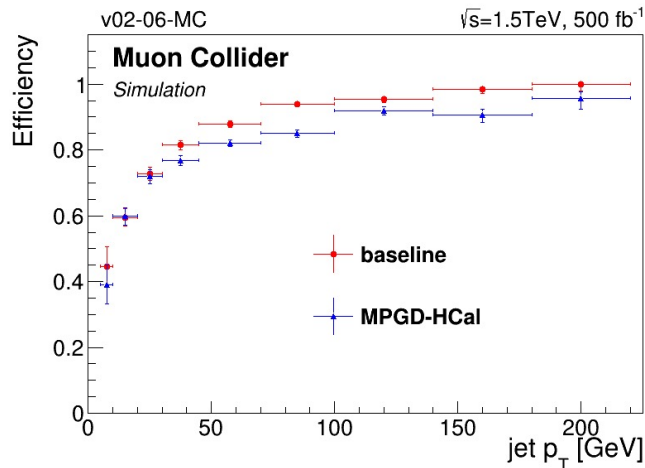
Last presentation at the Muon Collider meeting



Reconstruction Steer file (HCal variations)

- Hit time cut: $\pm 5\text{ns}$
- HCal threshold 300 eV
- Conversion to MIP: ~ 2496

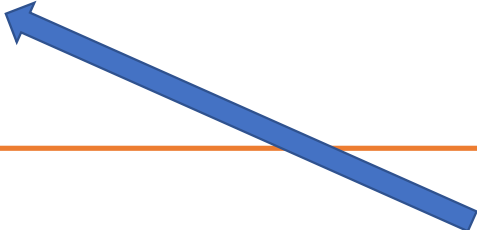
https://indico.cern.ch/event/1159929/contributions/4871428/attachments/2441158/4181940/MPGD_HCal_Bari.pdf



Conversion to MIP: evaluation

You can check the calculations at : <https://docs.google.com/document/d/1QAFYp9Lpf3dt5VVk6f5oJkw7hdbfznfb32xtWUmvAdA/edit?usp=sharing>

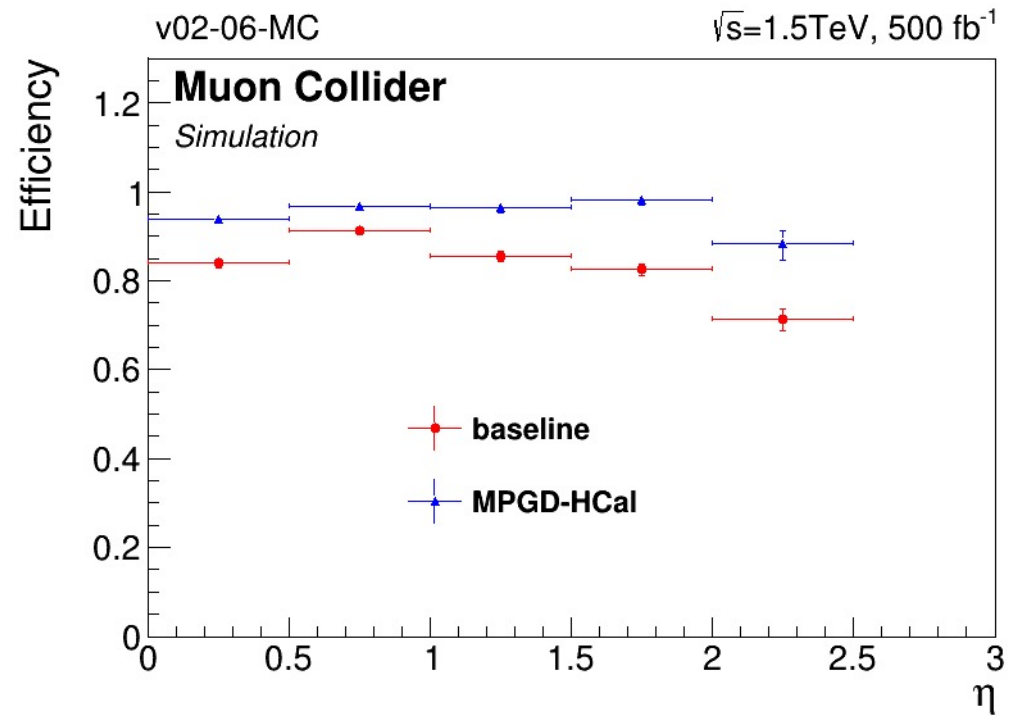
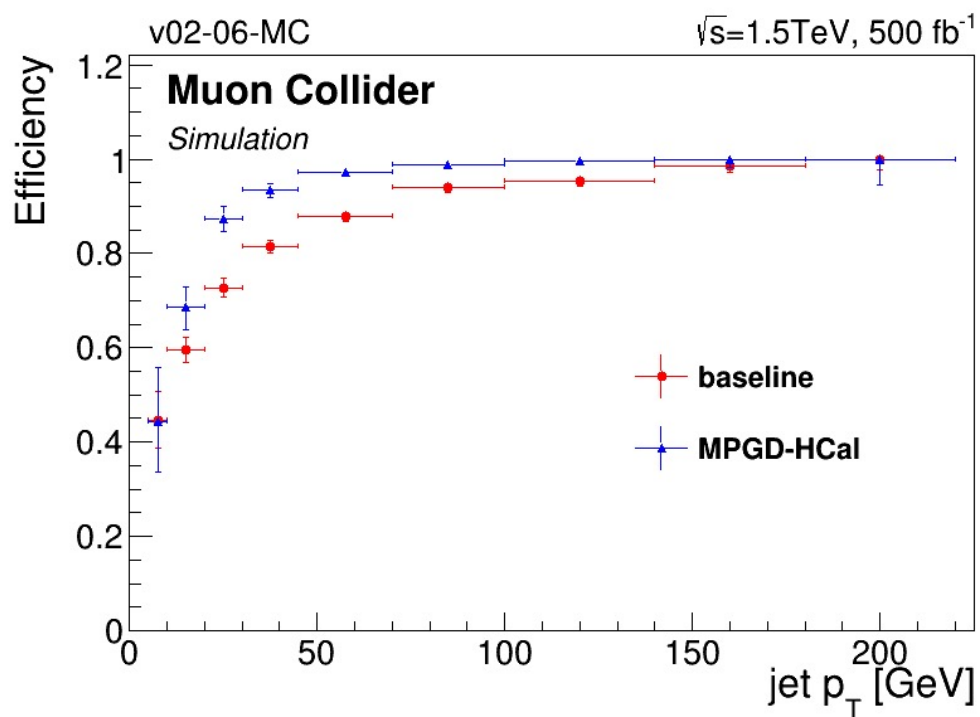
- Energy released in 3 mm Argon = $7.47 \cdot 10^{-4}$ MeV
- Energy released in 20 mm Iron = 23.6 MeV
- Ratio = ~ 31600
- GeVToMIP ~ 43



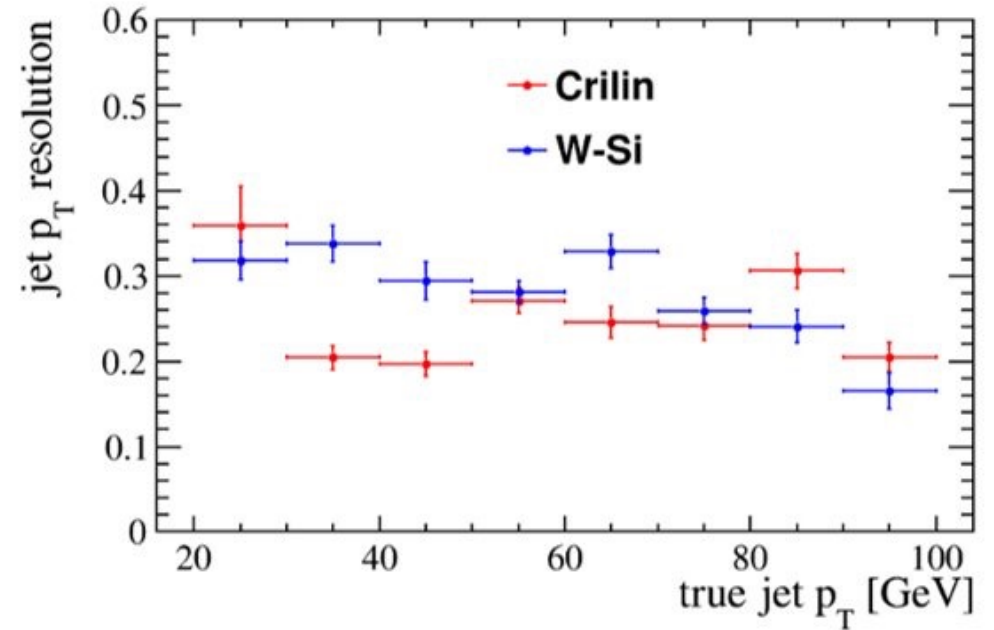
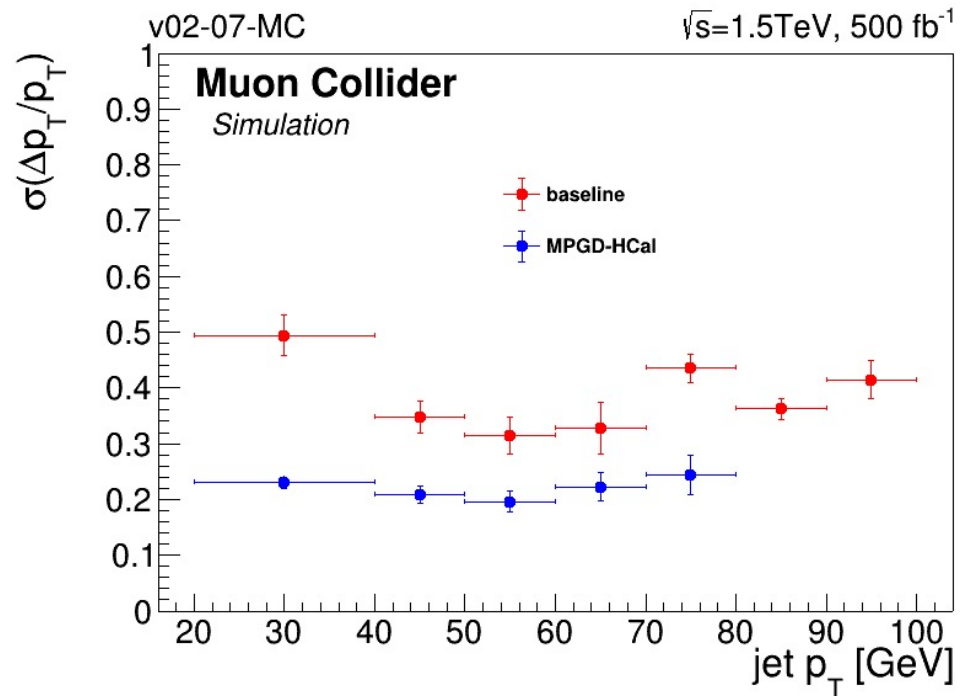
Verified by Anna S. with
GEANT4 simulations

- Next step: carry out all the simulations with the new parameter and increase the statistics

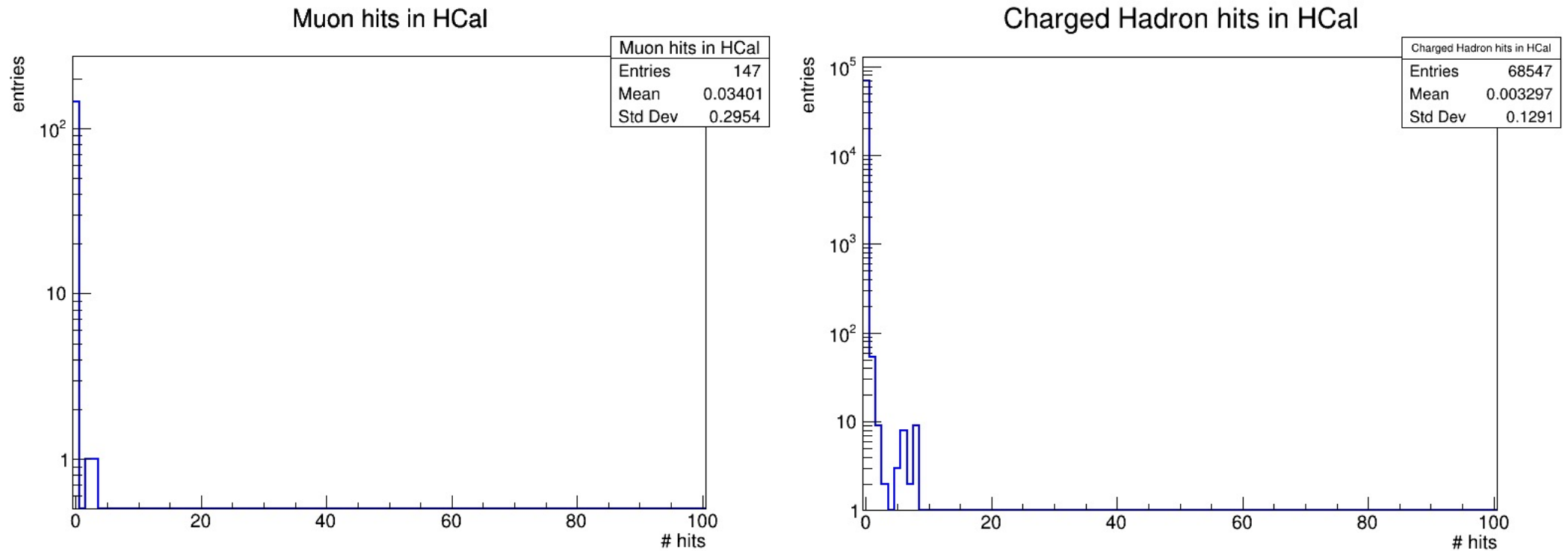
Preliminary plots (small statistics)



Preliminary plots (small statistics)



Hits in HCal (small statistics)



In contrast with the better performance observed in jet reconstruction -> **to be investigated**

Conclusion

- Comparable performance with Scintillator-based and MPGD-based geometry
 - Slightly better with MPGD based → further investigations needed

Next steps

- Further investigation on caloHits reconstruction performance
- Produce pion and muon gun samples
- Meeting on Wednesday with Lorenzo to discuss the configuration of the reco steer parameters for the new HCal geometry