Experimental: Hands-on Software Tutorial

Simone Pagan Griso (Lawrence Berkeley National Laboratory)
Alexander Tuna (University of Tennessee, Knoxville)

https://indico.fnal.gov/event/64493/

The tutorial

Today: simulate individual particles passing through a muon collider detector

Follow commands provided on the wiki (next slide), starting from nothing and ending with reconstructed particles, tracks, clusters

Self-learning approach: follow commands at your speed, play with code and data as best suits your interests

Experts will be roaming and answering questions

Slack channel: USMCC/2024-tutorial-fermilab

USMCC slack workspace has dedicated tutorial channel: #2024-tutorial-fermilab

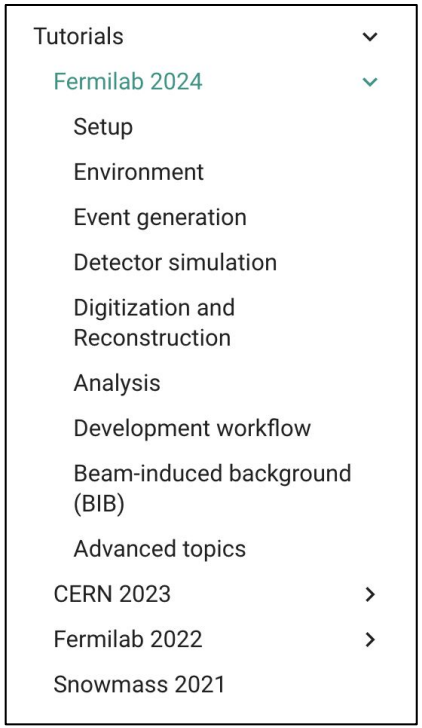
You are welcome to post comments and questions!

All topics welcome: computing account, muon collider software, physics meaning, …

https://join.slack.com/t/usmcc-slack/shared_invite/zt-2ob5707x2-Jvbrf6XVklBwQt7HfvMydA (Warning: link expires 30 days after tutorial)

Tutorial wiki

https://mcd-wiki.web.cern.ch/software/tutorials/fermilab2024/



Information gathered on Fermilab 2024 tutorial wiki

Each stage of tutorial feeds into subsequent stages

Reference files available in case you want to skip around

Check out CERN 2023 and Fermilab 2022 tutorials for complementary information

Host machine: ***ap23.uc.osg-htc.org***

Tutorial today runs on ap23.uc.osg-htc.org,
which part of Open Science Grid

Interactive machine for running software, developing code, and similar activities

- Helpful for a quick tutorial today
- Can also be used in the future, proven to be a useful resource!
- Not mandatory: code easily transferable to your local cluster or laptop

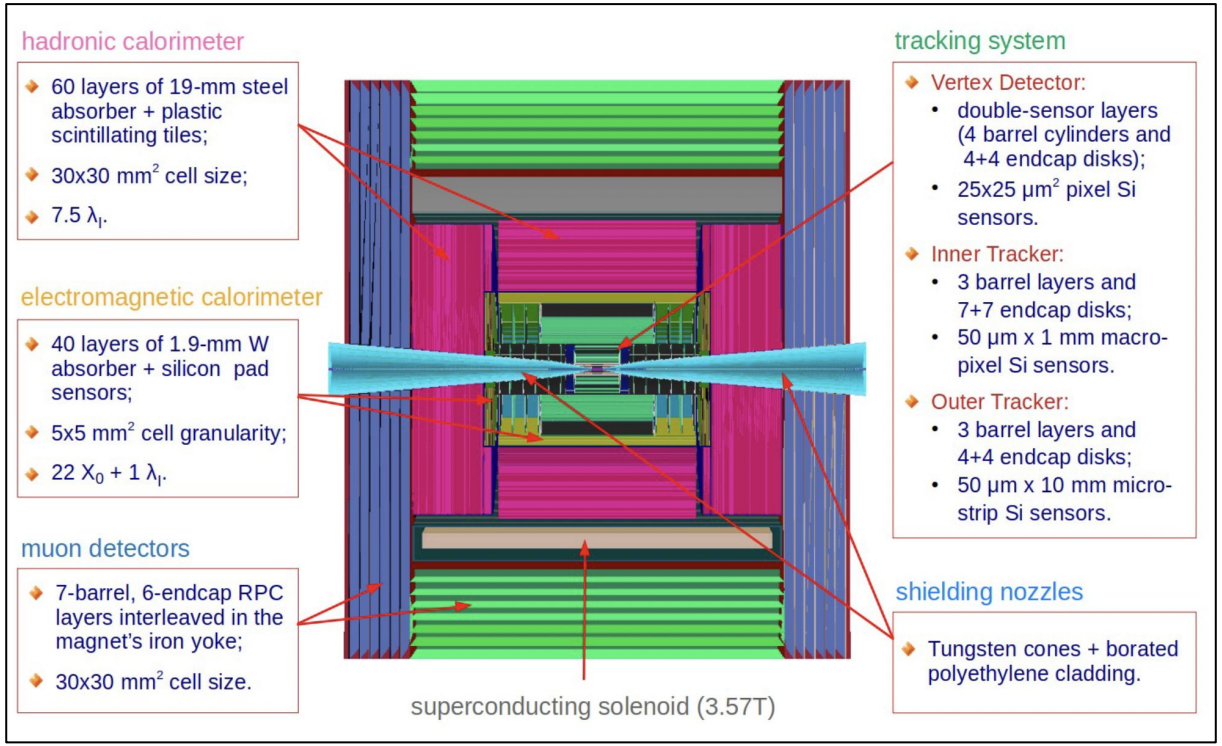
Connected to Open Science Grid resources for large-scale batch data processing

Simulated detector: MuColl_v1

Simulating same detector as previous tutorials

Important to study other detectors or modify existing designs! But not necessary for today

From M. Casarsa, *Introduction to the Muon Collider Software Tutorial*



Bonus homework

Did you finish the tutorial with time to spare? Here is some extra homework.

1. Find an Advanced Topic from a previous tutorial which is missing from this tutorial. Try it in the environment of this tutorial. Fix it if it doesn't work.

2. Produce particle gun samples for a different detector geometry.
   For example: MuColl_10TeV_v0A.xml, which is the MAIA detector

3. Produce particle gun samples for a detector geometry which you modified.
   An example exists in the CERN 2023 tutorial

4. If you ran `print_reco_objects.py` on the 100 GeV electrons, you saw the reconstructed energy was not always 100 GeV. Can you find out why?