

Status of preparation for ProtoDUNE MCC8

ProtoDUNE Reco Meeting, 19th December 2016
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MCC8 for ProtoDUNE, and DP

- Tingjun Yang is in charge of incoming MCC for both ProtoDUNE and Dual Phase. I was involved in preparing the list of requirements. Many of us contribute to tests and preparation of the configuration files.
- MCC8 will be done at Fermilab.
- Files will be stored in dCache at Fermilab and will be copied to CERN (/eos/experiment/neutplatform/).

List of requirements for ProtoDUNE–SP

- Update of ProtoDUNE–SP geometry: beam window and front/back CRT (more about CRT implementation in the Elizabeth's presentation <https://indico.fnal.gov/getFile.py/access?contribId=3&resId=0&materialId=slides&confId=13503>).
- To be added in ProtoDUNE reco chain: trajcluster (successor of linecluster), kalman filter, cosmic tracker, emtrackid (EM/track separation).
- Pions, kaons and protons in momenta range 0.5 GeV/c – 7 GeV/c (bins every 500 MeV).
- Pions, kaons and protons in momenta range 0.5 GeV/c – 7 GeV/c (bins every 500 MeV) with space charge included.
- For online/nearline monitoring: beam particle overlaid with cosmics at different noise level and at different electron lifetime.
- Beam particle.
- Beam particle with space charge included.
- Beam overlaid with cosmics.
- Beam overlaid with cosmics and space charge.
- Beam overlaid with cosmics and muon halo.
- Beam overlaid with cosmics and muons halo and space charge effect.

MCC8 for ProtoDUNE-SP

Almost ready but still need testing:

- Update of ProtoDUNE-SP geometry.
- Beam simulation including muon halo (testing the file format using ROOT tree from G4 sim - waiting for the official files from the beam group).

Proposition: run MCC8 in two parts:

- This week: for studies non sensitive to updates of ProtoDUNE geo (hadronic shower reconstruction, online monitoring/prompt processing studies...).
- In January: for detector calibration studies (more details in the talk from Elizabeth:

<https://indico.fnal.gov/getFile.py/access?contribId=3&resId=0&materialId=slides&confId=13503>), and for measurement studies from Thomas talk:

<https://indico.fnal.gov/getFile.py/access?contribId=0&resId=0&materialId=slides&confId=13449>

Ready for this week

Using old ProtoDUNE geo:

- To be added in ProtoDUNE reco chain: trajcluster (successor of linecluster), kalman filter, cosmic tracker, emtrackid (EM/track separation).
- Pions, kaons and protons in momenta range 0.5 GeV/c – 5 GeV/c (bins every 500 MeV).
- Pions, kaons and protons in momenta range 0.5 GeV/c – 5 GeV/c (bins every 500 MeV) with space charge included.
- For online/nearline monitoring: beam particle overlaid with cosmics at different noise level and at different electron lifetime (only up to detsim stage).

Smaller sample to control reconstruction performance:

- Beam particle.
- Beam particle overlaid with cosmics.

Sample for January

- Update of ProtoDUNE–SP geometry.
- Beam particle, ref.:
http://cds.cern.ch/record/2224290/files/ATSNote_addH4v2_CHARITONIDIS.pdf.
- Beam particle, space charge effect included (SCE thanks to Mike).
- Beam overlaid with cosmics (thanks to Elizabeth).
- Beam overlaid with cosmics, space charge effect included.
- Beam overlaid with cosmics and muon halo (μ halo under discussion).
- Beam overlaid with cosmics and muon halo (μ halo under discussion), space charge effect included.

MCC8 for Dual Phase

- ProtoDUNE–DP (6x6x6) geometry on the way, for now studies are done in full Far Detector geometry and Far Detector Workspace.

Proposition for MCC:

- Electrons, photons generated in the isotropic distribution to study e/gamma separation.
- Muons @ 5GeV/c, 1GeV/c at different position w.r.t. anode plane (control sample for the calorimetric studies).
- Sample of neutrinos (if needed).

- Next: cosmic muons and beam particle propagated in the TPC. Beam simulation can use the same interface as for SP. If you are interested, please contact Dorota or Robert so we can show you how to start.

Please let us know if you have some additional wishes for MCC8 for DP