

Sim/Reco tools

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Atmospheric neutrino simulation

- Use GENIE generator
- Use Bartol flux at Soudan
- Spent ~a year tracking down a bug in GENIE Bartol flux driver
 - <https://cdcv.s.fnal.gov/redmine/issues/14881>
 - <https://indico.fnal.gov/event/15181/session/2/contribution/9/material/slides/0.pdf>
- New atmospheric neutrino samples generated (100k events each):
 - prodgenie_atmnu_max_dune10kt_1x2x6_mcc9.2
 - prodgenie_atmnu_min_dune10kt_1x2x6_mcc9.2
 - prodgenie_atmnutau_max_dune10kt_1x2x6_mcc9.2
 - anatree files: /pnfs/dune/persistent/dunepro/v06_55_00/*root
 - art files (temporarily): /pnfs/dune/scratch/dunepro/v06_55_00/mergeana/

Proton decay simulation

- Use GENIE generator
- Right now only simulate $p \rightarrow \nu K$ channel
- Latest sample (10k events):
 - `prodndk_dune10kt_1x2x6_mcc8.0`
- It is easy to increase statistics
- It is easy to simulate other channels

- Similar simulation for $n \rightarrow \bar{n}$ exists.

Reconstruction tools

- The current larsoft reconstruction provides useful TPC and PD information
 - [DUNE-doc-1689-v3](#)
 - Also take a look at the tutorial Alex and I gave on Tuesday.