Proposals for HNL background files part 1

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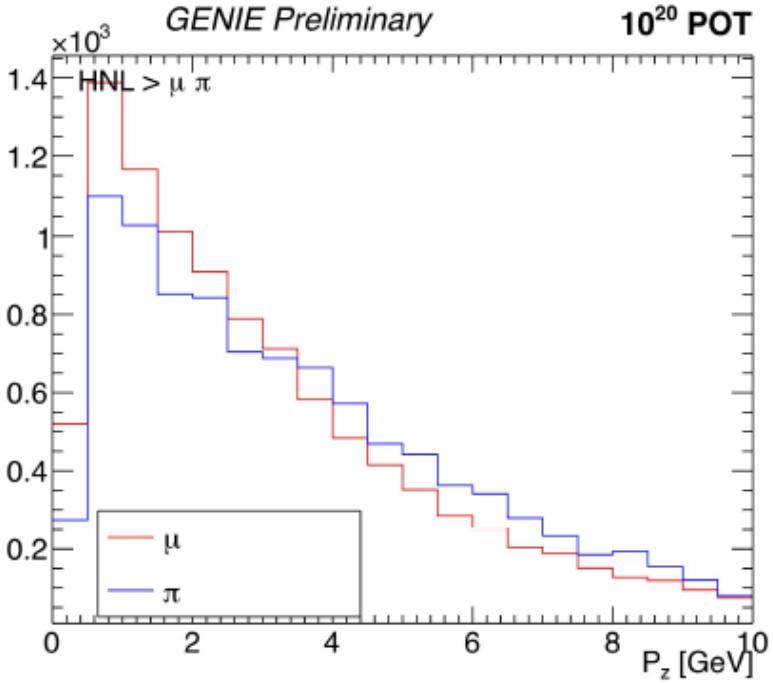
To start the discussion for the request

DUNE-HNL group meeting

1/21/21

Lepton spectrum extends

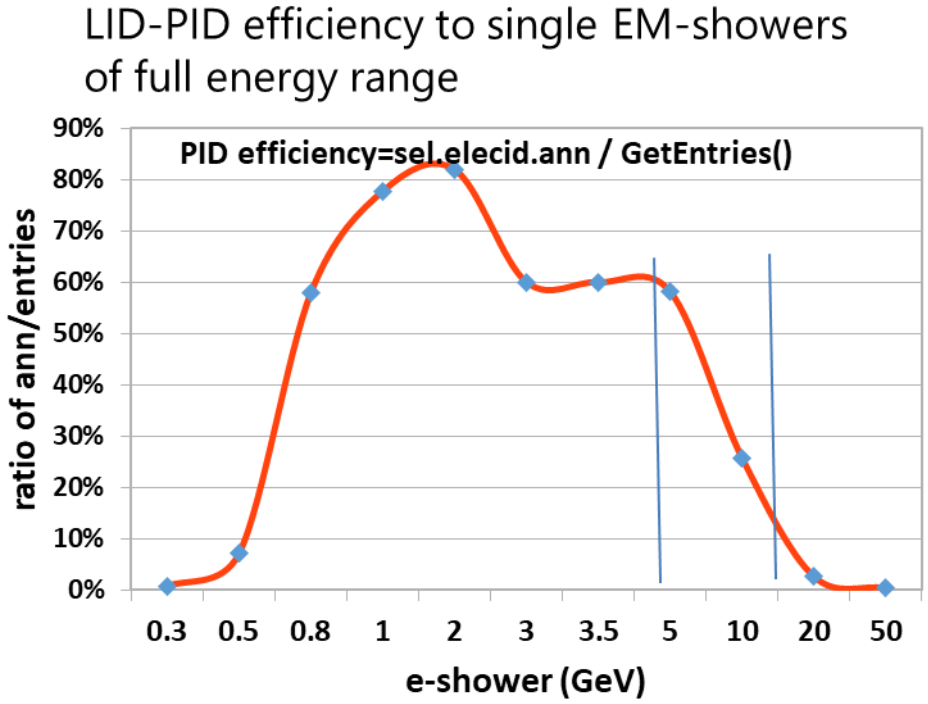
- Main decay or scattering produces leptons.
- Most of the parent momenta is shared to the final products.
  - This is not the case in the neutrino scattering.
  - Mentality low energy products (besides muons) drives file production.
- HNL-decay products share up to the max kinetic.
  - See Haifa's sim.
  - Working on a sim for electrons as well.



Lessons learned from NOvA.

- File production driven from neutrino interaction interests.
- Causes efficiency per energy level to drop above 5 GeV.
  - See my unofficial NOvA efficiency estimation.
  - This distributions folds with the spectrum.
  - Results in reduced PID efficiency at higher energies.

Unofficial and preliminary



Proposal (1 of many)

- Add to the requests from the production group lists of large files with a “flat”-unreal distribution od final products instead of “realistic” distribution of final product particles.
  - Type:
    - Electron, positron, muons
  - Energy range:
    - Spectrum: 0.5 to 25 GeV
    - Bins : 0.5 GeV
    - Frequency per bin: 1M events