Trk, Vtx, PID

C.Zhang/06Dec2024

PID

- PID for CyberPFO has been developed, MR submitted
- Analysis user can get PID info. with **a single line "pfo.getType()"**, which returns PDG ID
- For neutral particles, ToF+TPC doesn't work for them, this method returns zero
- To reproduce previous K/pi/proton separation starting from "CyberPFO" objects instead of "ComleteTracks"

tpc and tof pid for cyber pfo

Open **zhangcg@ihep.ac.cn** requested to merge `zhangcg/CEPCSW:master` into `master` 1 day ago

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Many thanks to Fangyi Guo for the discussion on this MR.

This MR fulfills PID values at the CyberPFO level, which may be urgent for JOI development or some analyses.

Only two scripts, tracking.py and rec.py, need to be updated for this FinalPIDAlg plugin. The other two scripts (sim.py and digi.py) are the same as the official ones.

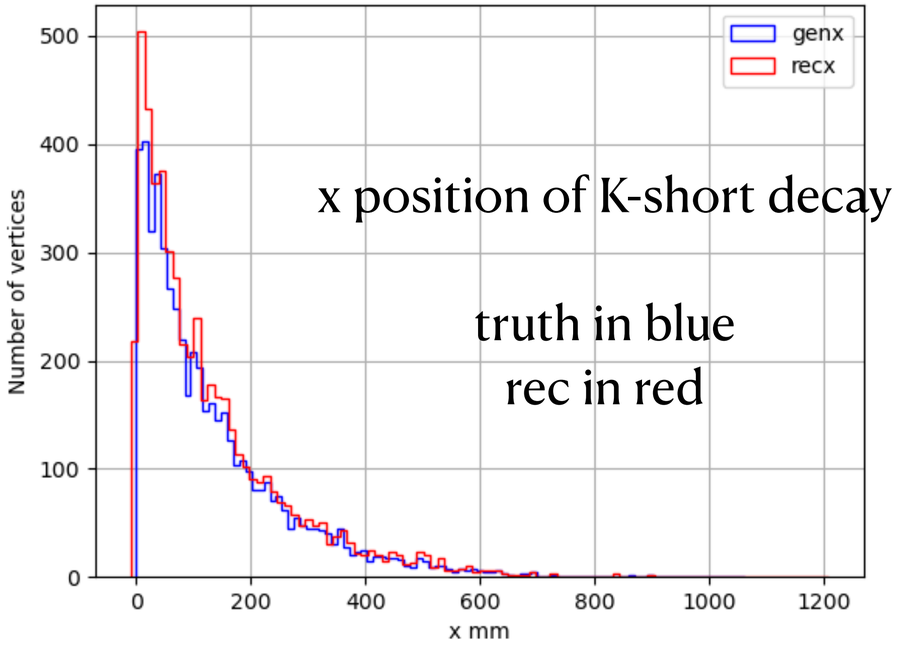
These scripts reconstruct CyberPFOPID, which is a copy from CyberPFO but with PDG values assigned. Users can access the PID information with a single line `pfo.getType()`.

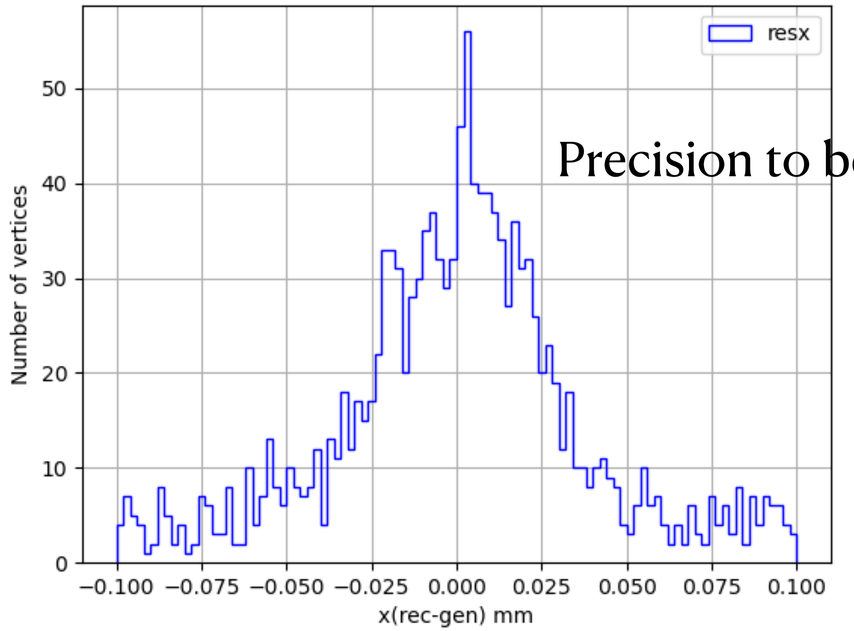
Sometimes this method returns 0, indicating that the corresponding PID cannot be provided by the gas chamber or time-of-flight detector. This limitation is especially evident for neutral particles. Further PID developments with other sub-detectors, such as ECAL and MUON, may help address this.

Edited 1 day ago by zhangcg@ihep.ac.cn

Vtx

- ACTS doesn't work for secondary vertex
  - vertexFitter is common for all vertex fitting tasks
  - vertexFinder in ACTS only searches vertex seeds along beam-line
  - Algorithm to find displaced vertex seeds developed
  - 10k particle-gun K-short, pT=2GeV, $\theta = 85°, \phi = 0°$
    - 70% $K^0_s \rightarrow \pi^+\pi^-$ events, agree with K-short BR
    - 20% of them has more than 2 tracks , remove them from this test. By eyes, probably due to multi-circles, to be checked





Precision to be investigated