

Offline Overview

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What's in this talk?

- Summary of what was run in last production. Very schematic as updates will follow from authors later today. I will call out where I think there are projects that need doing before the next round.
- Discussion of how urgently next round of production is needed. What I want to end with is a list of projects and their priority. Choices range from “just run it now” to “wait for the all-singing-dancing reconstruction”

Summary of What Was Run Last Time

TPC Reco

- This has been around for quite a while. Track finding and helix fit are quite stable.
- Cluster fits not included in last iteration. *Hoping to get into next production round.*
- Vertex finding algorithm to form pair-wise associations between tracks, then groups pairs. Vertex location based on weighted average of pair crossings. *Efficiency of this algorithm has never been studied systematically*
- TPC-only fits stored on their own tree in DST files
- dE/dx calculated w/ only gain corrections. No PID likelihood calculated. *What can we expect in next round? (See Jenn's talk)*
- Drift velocity calibrated on run-by-run basis. Mysterious ~6 cm y-offset still present. Single offset for all runs. *No new ideas about the origin of this offset.*

Summary of what was run last time

Tracking

- TrkRBase forms clusters in beam chambers. *Seems to be over efficient. Need study to tune this up.*
- TrkRBase forms clusters in CH123 and CH456
- These are matched to TPCTracks by “SPFit” package. SPCFit makes global fit to entire track. *May have accurate enough TPC fits to pick up wires on its own*
- Vertex *associations* are not remade – just uses associations made during TPC stage. Vertex *position* is updated using SPCFit information.
- Drift wire timing calibration has been done, but drift times are not used during fits

Summary of what was run last time

Particle ID

- dE/dx calculated but no likelihood written to DST (*Could add function to calculate at DST level*)
- CKOV track associations attempted but incorrect
- TOF track-bar associations made. Being used for calibration (See Andrew's talk)
- RICH circle finding and fitting run. Rings matched to tracks. Simple likelihood calculated based on ring radius and track momentum (*See Mark's talk later about how well this works. May want to replace with recalculation.*)

Next production pass: Tracking

1. TPC

Size of project

Priority

- Check results for a representative sample of data with cluster fits turned on and make sure everything still works
- Study and decide how best to handle fit clusters vs. non-fit clusters

Small

Must do

Medium

Must do

Next production pass: Tracking

2. Global Tracking

Size of project

Priority

- Continued development of Kalman code

I) Vertex fitting

Big

Medium

II) Extending fits to chambers

Medium

High

III) Use of drift time information

Medium

Medium

- Continued development of SPFit code

I) Improved vertex fit algorithm

Medium

Medium

II) Add straight segments to RBTrack for CH123 and CH456

Small

High

III) Search for additional hit wires on track in cases where segments are not matched

Medium

Medium

IV) Use of drift time information

Medium

High

Next production pass: Particle ID

3. Particle ID

Size of project

Priority

- Beam tagging: fix low momentum bugs
- TPC: What improvements are reasonable to expect in the dE/dx calculation given cluster fitting?
- TOF:
 - a. Complete calibration code
 - b. Estimate of track beta or equivalent
- DCKOV:
 - a. Correct matching
 - b. Likelihood estimate
- RICH
 - a. Use CH456 track segment for matching
 - b. Include Sharon's alignment numbers
 - c. Switch to using Sharon's likelihood fit

Small?

High

Medium?

High

Big

High

Medium

High

Done?

High

Medium

High

Small

High

Medium

High

Medium

High

Next production pass: Calorimeters and DST...

4. Calorimeters

Size of project

Priority

Insert pedestal and gain calibration in DB
Add information to DST

Medium
Small

Done?
High

5. DST

Switch to light-weight beam track class
Implement spill tree
Add $x[]$ and $p[]$ to tracks at tracking surfaces
Add list of detectors used in fits to tracks

Medium
Medium
Small
Small

Done?
Done?
High
High

List of projects

A few projects that I can think of that need doing. Help me add to this list

- Run-by-run chamber alignment
- Detailed track residual studies
- “By hand” handling of remaining TPC distortion corrections
- Detailed study of K0 mass (run-by-run, momentum, location...)
- Monte Carlo (see Andre's talk)
- Monte Carlo generation of standard STPHEP files
- Monte Carlo studies of track finding, momentum scale, vertex finding, etc.
- Monte Carlo tuning
- Trigger efficiency

Monte Carlo

The MC is close to usable. Proposal is:

1. Tune up TPC and DC's to the point where tracking works
2. Digitize the SCI interaction counter
3. Generate a few small (~5000 events) files. For example:

- p-C at 120 GeV
- pi-H at 69 GeV
- k-H at 69 GeV
- p-H at 69 GeV
- ~1000 Beam tracks at several momenta

Reconstruct them and make them available. If studies of these small samples are promising we can ramp up production.