

Workfest tracking goals

Plenary session

September 29, 2021

Future tracking upgrade projects

Update/modify TrkrCluster, SvtxTrack objects to reflect changes, improve memory use.

Improve low p_T track reconstruction efficiency (plot tracking efficiency on a log scale)
—TPC seeding and TPC-silicon tracklet matching

Update ACTS, this is long overdue but will be a major headache...

Secondary tracks in the TPC — find matching silicon hits when no silicon seed exists.

ACTS track projection to calorimeters - possibly solved?

Improved TPC clustering algorithm (better performance in high occupancy).

Develop compact DST format

Code speedup and memory reduction.

Space charge distortions (necessary by MDC2):

— Implement two pass track reconstruction, have SCD run by default.

Implement electron tracking algorithm.

Possible workfest projects - 1

Improve low p_T efficiency of CA seeder (Michael)

Test the new workflow in p+p with pileup:

- Tracking should work essentially the same as in HIJING
- Vertexing will probably need tuning, at least (DCA cut, beamline cut, track p_T cut).
- Start developing analysis techniques for dealing with
 - Spurious primary vertices (there will be some)
 - Multiple vertices in same bunch crossing
 - Multiple vertices in neighboring bunch crossings (identify them, for starters!)

Rerun timing/memory analysis - we need 5 s per pass, average 4 MB per job

- For Hijing + 50 KHz pileup and for pp + pileup

Test Acts track projection to calorimeters vs Genfit module, and test stability.

Effect of laser flash “electron wall” on TPC readout baseline.

Test pass 1 and 2 reconstruction of tracks with space charge distortions

- Pass 1: Seeding + fitting after static distortions corrected.
- Pass 2: Need a second seeding pass before final fitting?

Possible workfest projects - 2

Quantify 2-track separation with current code.

- Relevant for Jet substructure

Develop physics oriented tracking QA for Hijing/Pythia with pileup.

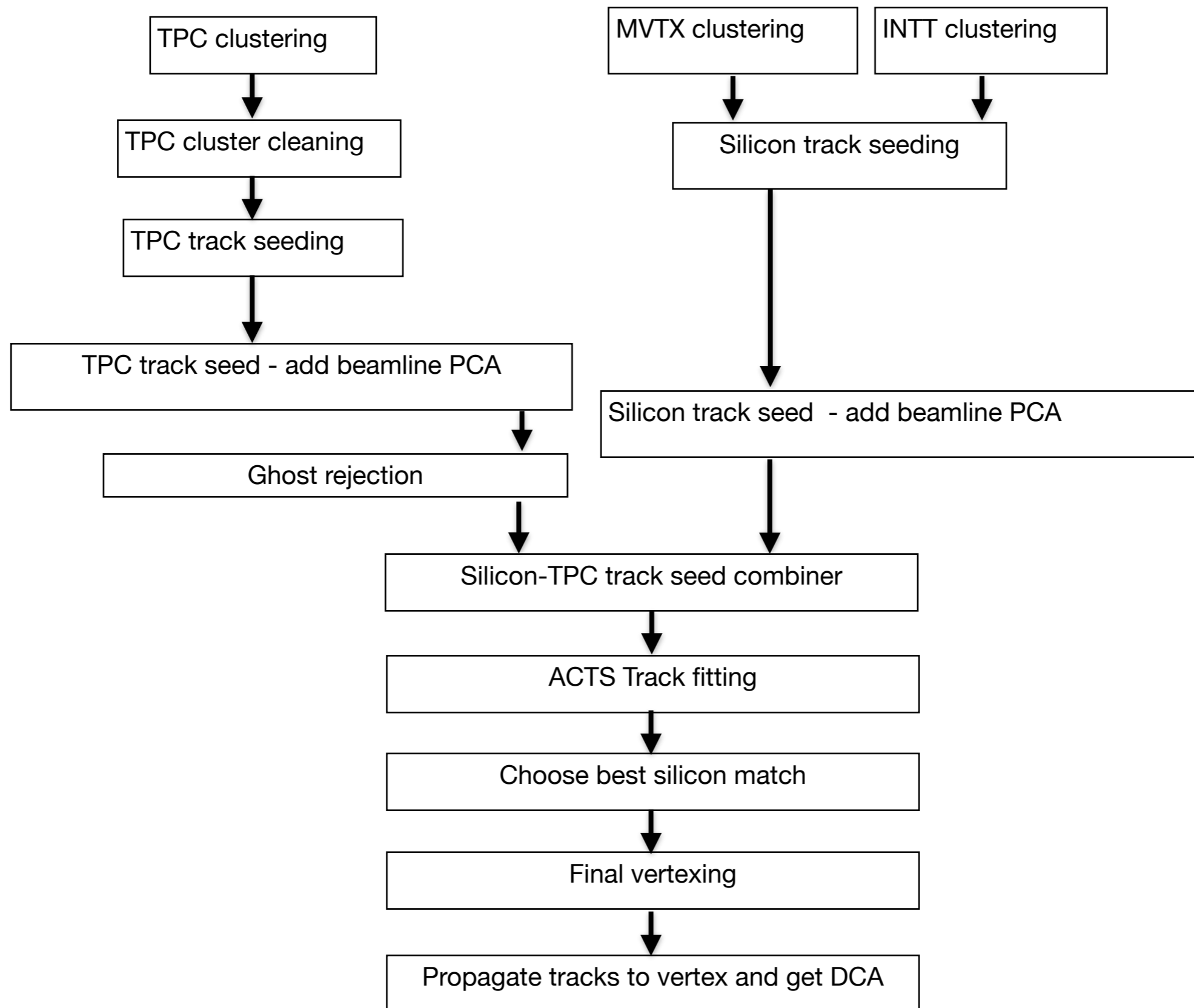
Explore effect of DCA cut on open HF rejection in Upsilon analysis.

- Try to kill open charm and bottom signals at high p_T / large dielectron mass.

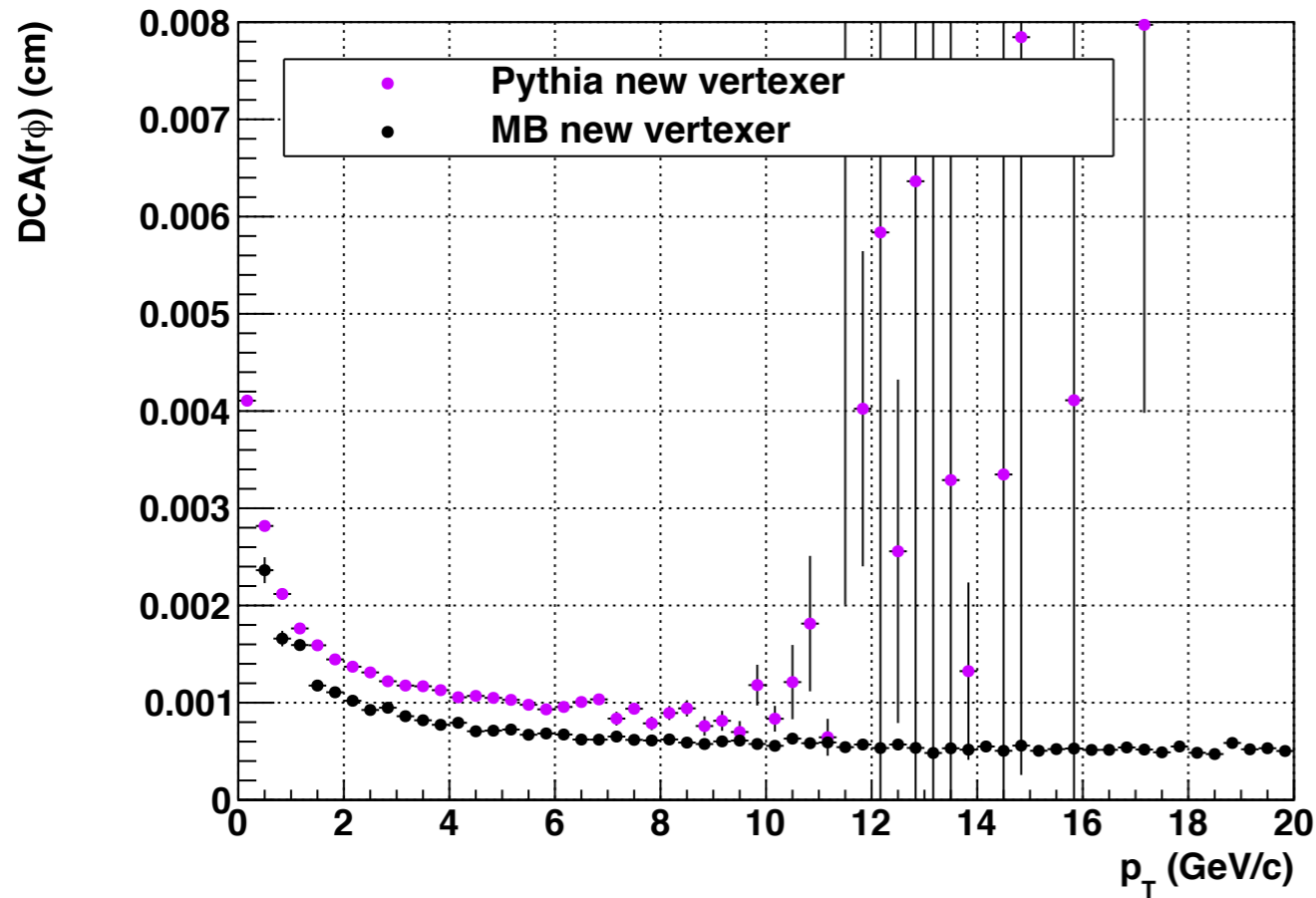
Electron ID: analysis and storage objects development.

Backup

Revised Tracking Workflow



Results - 1



dca3dxy for:

- Single Pythia (violet)
- MB Hijing + 50 KHz + 100 pions (black)

Interesting: For Pythia the dca3dxy resolution at higher p_T is smaller than the p_T integrated vertex resolution.

- Pythia events with high p_T particles have better vertex resolution.

dca3dz for:

- Single Pythia (violet)
- MB Hijing + 50 KHz + 100 pions (black)

