

Track Branches tmb_tree

D0DFWG Meeting

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Criteria for Including Data in Trees

- Is this data intrinsically interesting? To whom?
 - Analyzers.
 - Developers.
- Can this data be (easily, quickly) recalculated?
- Is this the best branch to store this data?
- Does this data need to be stored for each instance of the branch object?
- TRefs: which way, or bidirectional?
- User feedback. Existing formats.

Charged Particle & Track Classes

- DST
 - ChargedParticleChunk.
 - ChargedParticle.
- TMB
 - ChTmbObj (all tracks/charged particles).
 - ChIsoTmbObj (isolated track/charged particles, $p_T > 2.5$ GeV).
- Tmb_tree
 - TMBTrks (branch Trks).
 - TMBIsoTrks (branch IsoTrks).

TMBTrks Class Contents

- p_x, p_y, p_z (Cartesian 3-momentum @ dca(0,0)).
- p_T, η, ϕ (Cylindrical 3-momentum @ dca(0,0)).
- E (Energy assuming charged pion mass).
- q (Charge).
- Hit mask (three ints).
- r (Radius (?) -- not used, always 999.9).
- $\Delta r, \sigma_r, \Delta z, \sigma_z$ (dca & error wrt best vertex, four floats).
- Trf track parameters @ dca(0,0) (five floats).
- Trf error matrix (15 floats).

TMBTrks Class Contents (cont.)

- Track Chisquare/dof.
- dE/dx & error in smt and cft (cft not implemented).
- Chisquare wrt up to two primary vertices.
- Chisquare wrt up to two secondary vertices (not implemented due to lack of secondary vertices in tmb).
- Associations (TRefs).
 - Isolated track object.
 - Primary vertices.
 - Secondary vertices (not implemented).
- Total 41 floats, 3 ints, ~3 TRefs

TMBIsoTrks Class Contents

- r, ϕ, z @ PS.
- $\Delta\eta, \Delta\phi$ wrt PS (not implemented).
- CPS match chisquare (several).
- Track E_T flow (sum E_T , N tracks in cone, two floats).
- x, y, z near vertex.
- Calorimeter.
 - MTC: e_mtc_tot, e_mtc[14], i_mtc (bit mask).
 - E33 and E55 (3x3 and 5x5 cells).

TMBIsoTrks Class Contents (cont.)

- Associations (TRefs)
 - Regular (non-isolated) track object.
 - CPS clusters (not implemented).
 - FPS clusters (not implemented).

TMBTrks Recommendations

- Eliminate the following attributes that are trivially derivable from track parameters or are unused (can be methods).
 - $p_x, p_y, p_z, p_T, \eta, \phi, E, q, r$.
- Lose dE/dx in cft (not useful, probably never be implemented).
- Lose associations, dca & chisquare to vertices. These things logically belong to vertices, or can be recalculated wrt a given vertex.
- Get rid of all TRefs (use reverse TRefs).
- Add r, ϕ, z @ PS. Currently in TMBIsoTrks, but potentially quite useful for all tracks, not easy to calculate in root, only three numbers.
 - Unfortunately, this is not stored in tmb. Might be too slow to recalculate (best to calculate from GTracks).

TMBTrks Recommendations

- Keep:
 - Track parameters & errors at $dca(0,0)$.
 - Track chisquare.
 - Hit mask.
 - dE/dx & error in smt.
 - r, ϕ, z @ PS.
 - Total 26 floats, 3 ints, 0 TRefs.
- It would be useful to have a method to return track parameters in the vicinity of a specified vertex (short-distance propagation). Can be method. Currently doesn't exist. Easy to do in root. Doesn't need full power of D0Propagator.

TMBIsoTrks Recommendations

- Lose r, ϕ, z @ PS (move to TMBTrks).
- Lose x, y, z near vertex (method of TMBTrks).
- Lose associations, chisquare, separation, etc. wrt PS clusters.
- Lose track E_T flow stuff (not very useful & can be recalculated if necessary).
- Keep:
 - Cal, MTC energy variables.
 - TRef to TMBTrks.