FTK with hi-lumi events & truth

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Track multiplicity for $10^{34}$

Fiducial cuts are applied on $d, z0, \cot(\theta), pt$. Special cut applied on barcode ($<10,000$).

Truth track multiplicity is still extremely high!
Effect of barcode cut

10^34

Mean: 203

Entries: 250
Mean: 202.7
RMS: 109.2
Underflow: 0
Overflow: 1

10^33

Mean: 67

Entries: 250
Mean: 91.6
RMS: 33.21
Underflow: 0
Overflow: 0

Mean: 46

Entries: 250
Mean: 46.49
RMS: 26.8
Underflow: 0
Overflow: 0

Entries: 250
Mean: 27.36
RMS: 15.5
Underflow: 0
Overflow: 0
Red – matched to truth; blue – unmatched to truth

The “barcode” variable has a cut < 10000. Thus, overflow = 0.

The unmatched (blue) distribution peaks at roughly the same place, and doesn't have any long tails.

Note however that matched (red) events have a peak at barcode=16 (hist value = 100). Will check if b-quark track is often attached a barcode of 16.

10^{34} case!
Barcodes

- Definition: “Particles and vertices are uniquely identified by an integer referred to as a “barcode”, which is meant to be a persistent label for a particular particle instance.”
- Classical truth scheme: “For example, an electron before and after a bremsstrahlung is represented by two different GenParticle objects, with different barcodes. So a track from a single "physical" particle, reconstructed as such, may correspond to a "chain" of GenParticles and not just to a single GenParticle as it is assumed in the ClassicalTruth code.”
- Potentially we have many truth tracks that are very similar because they are different representations of the same particle?
  - If we loop over two similar truth tracks that both would match to the same ftk track, do we label both of them as matched, or only the closest one?
Red – matched to truth; blue – unmatched to truth

Phi of matched FTK tracks
- Entries: 42445
- Mean: -0.02363
- RMS: 1.79
- Underflow: 0
- Overflow: 3.226e+04

Phi of matched IPAT tracks
- Entries: 42046
- Mean: -0.01565
- RMS: 1.79
- Underflow: 0
- Overflow: 3.228e+04

Cot(theta) of matched FTK tracks
- Entries: 42445
- Mean: -0.04473
- RMS: 2.209
- Underflow: 0
- Overflow: 0

Cot(theta) of matched IPAT tracks
- Entries: 42046
- Mean: -0.04592
- RMS: 2.214
- Underflow: 0
- Overflow: 0
Red – matched to truth; blue – unmatched to truth

High-pt events. binning?

Large overflows in unmatched
Red – matched to truth; blue – unmatched to truth

Weird dip at around -90mm in the z0 distribution both for FTK and IPAT. It is also present in the efficiency plots.
Matching cuts.
Red = matched to truth; blue = unmatched to truth.

Note that ctheta, curv, and z0 cuts are ctheta-dependent (Corrinne's work)