New SVT Track States

Bradley Yale

03/01/2017

New track states

- Currently, recon only saves 3 track states: IP, last hit, and Ecal
- Extrapolating the track to each sensor position that it should pass through based on its slope and curvature, 14 states can be stored
  - Need to confirm the half-module numbers for L4-6 with someone…
- These states are created even if the track has no hits in that layer.

Track Extrapolation in Track Utils

- extrapolateTrackUsingFieldMap(TrackState, double startPositionX, double endPositionX, double stepSize, FieldMap fieldMap)

- startPosition = 7cm
- stepSize = 0.5cm

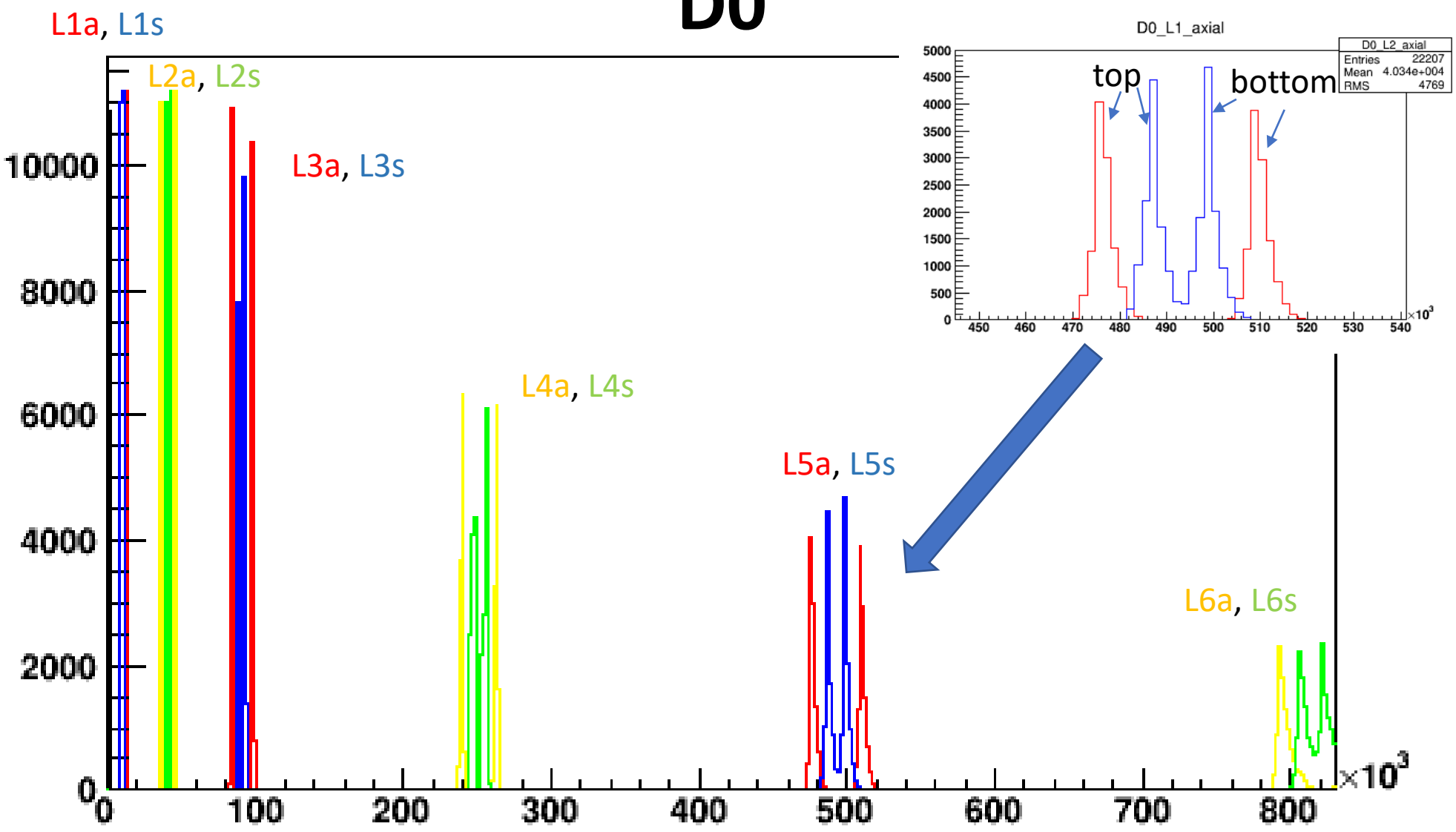
- Currently extrapolates IP state to each sensor position

TrackStateDriver

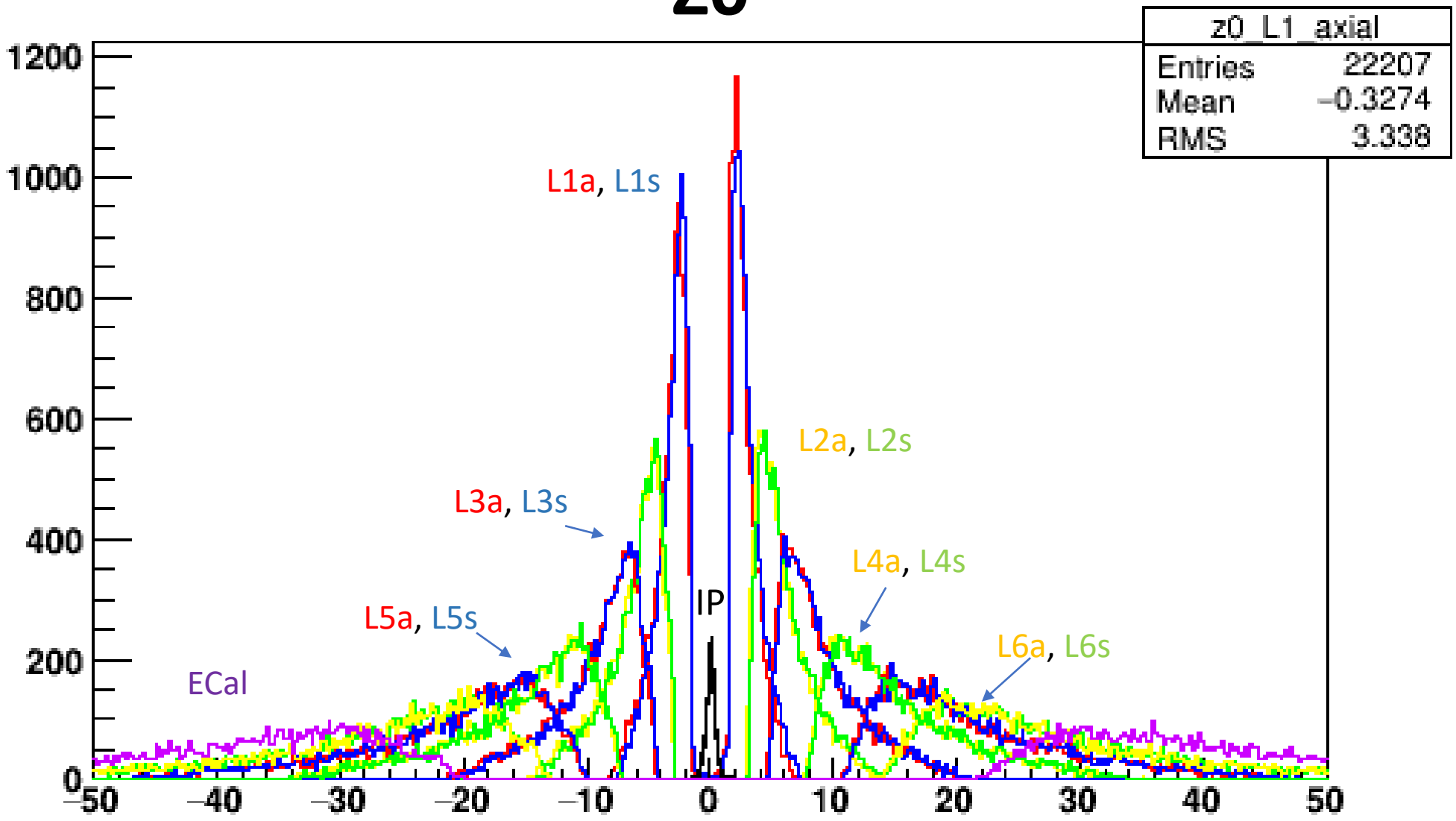
- org.hps.recon.tracking.TrackStateDriver (iss11 branch)
  - Currently extrapolates the IP state from seed tracks and makes these plots
  - I'd like to extrapolate state-to-state, but need to find start positions that work (starting from the same sensor position where the state was first extrapolated to screws things up)

- Once the TrackState locations in the LCSim base class are re-defined, I can add this to recon.

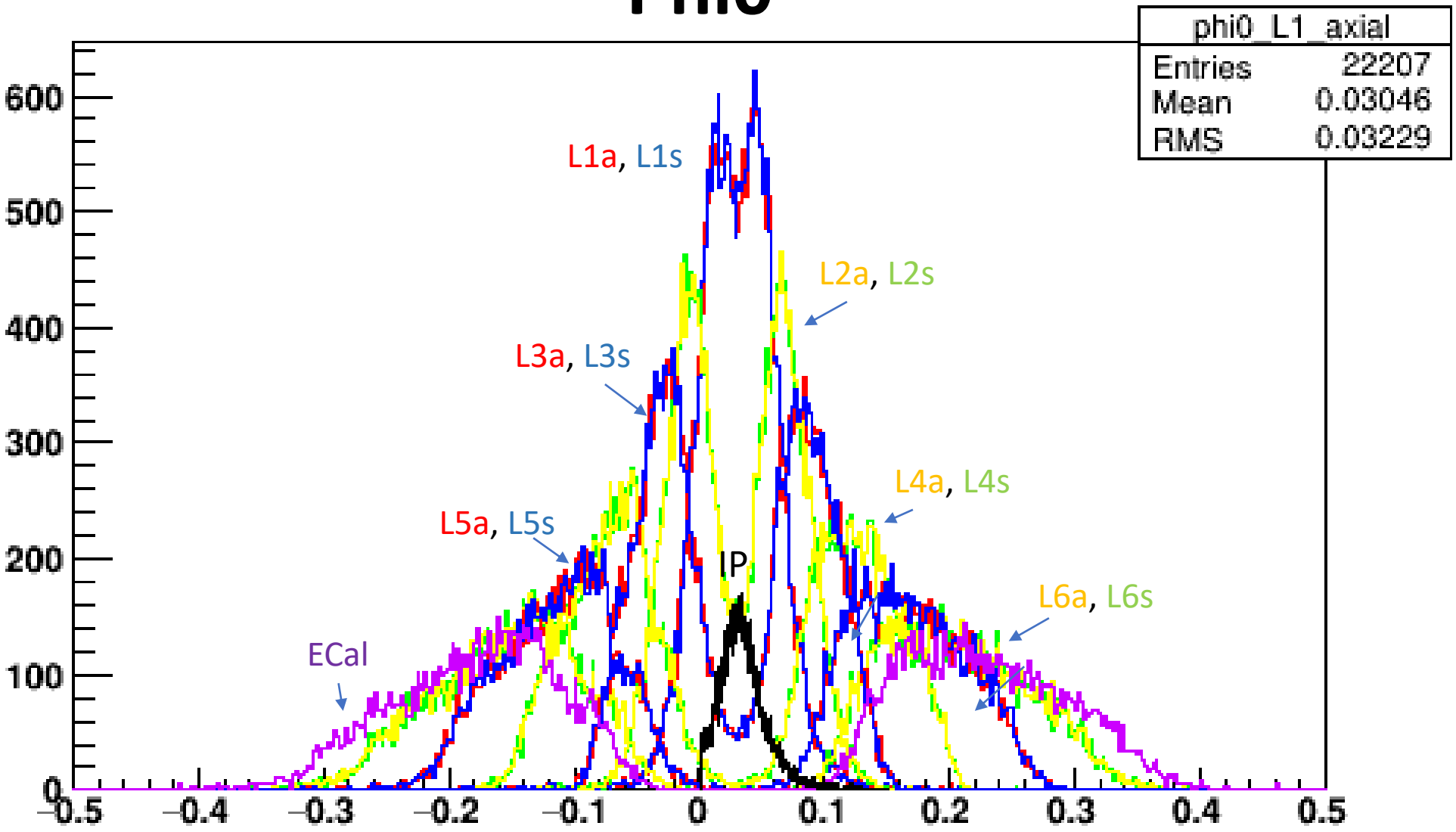
D0


L1a, L1s
L2a, L2s
L3a, L3s
L4a, L4s
L5a, L5s
L6a, L6s
10000
8000
6000
4000
2000
0
0
100
200
300
400
500
600
700
800
×10³
D0_L1_axial
D0_L2_axial
Entries 22207
Mean 4.034e+004
RMS 4769
top
bottom
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
450
460
470
480
490
500
510
520
530
540
×10³

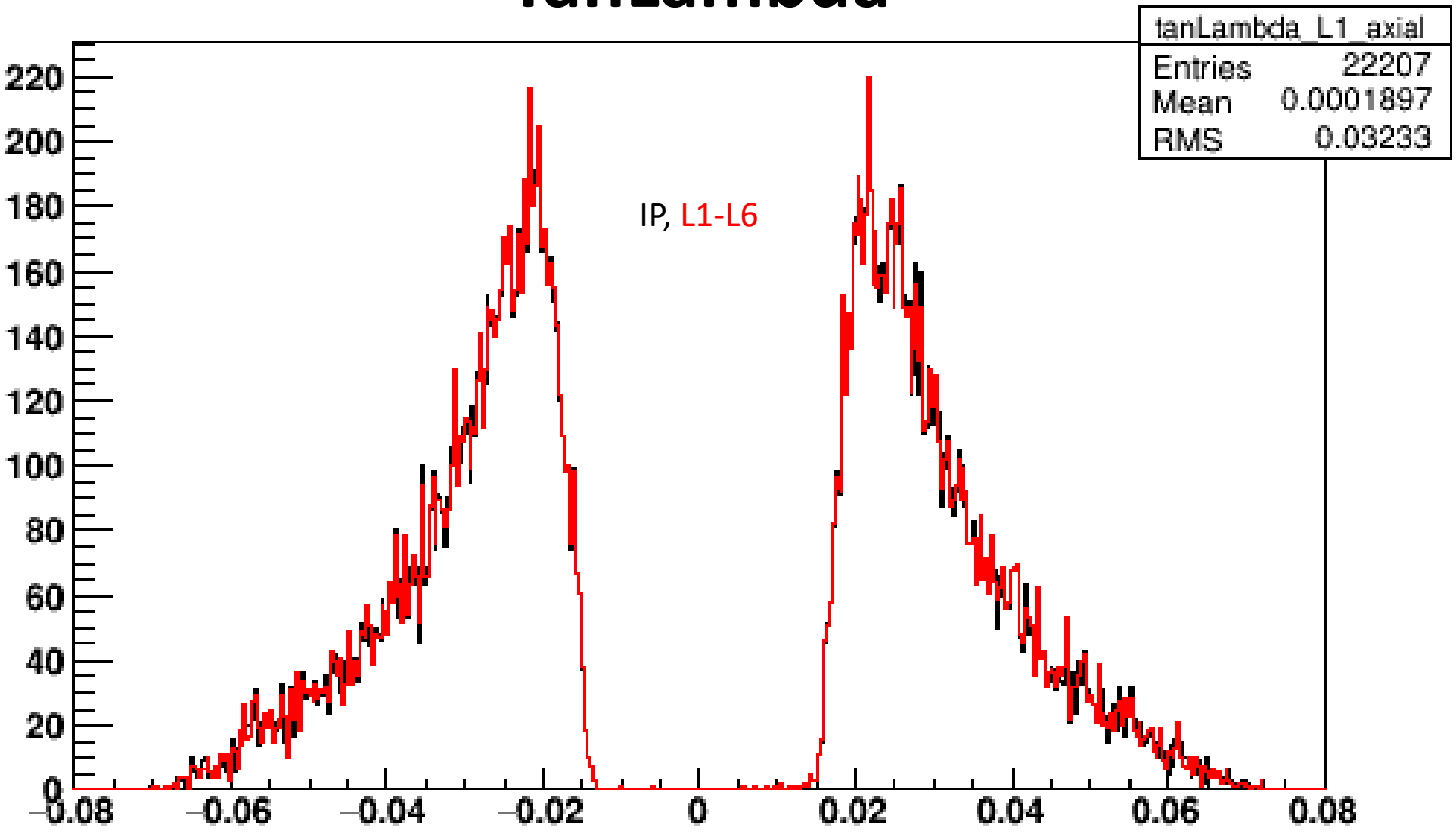
Z0


z0_L1_axial
Entries 22207
Mean −0.3274
RMS 3.338
1200
1000
800
600
400
200
0
−50
−40
−30
−20
−10
0
10
20
30
40
50
L1a, L1s
L2a, L2s
L3a, L3s
L4a, L4s
L5a, L5s
L6a, L6s
IP
ECal

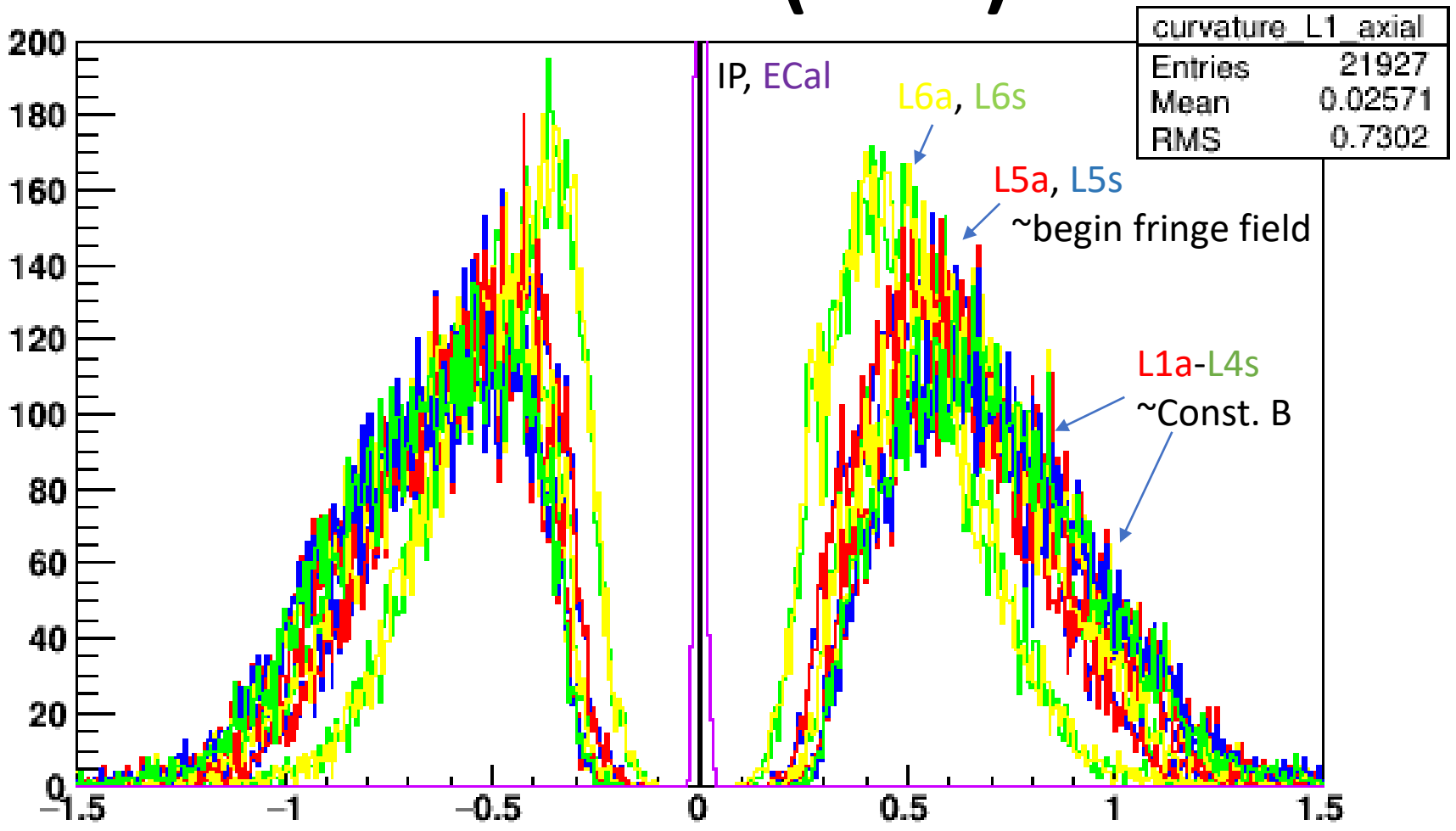
Phi0


phi0_L1_axial
Entries 22207
Mean 0.03046
RMS 0.03229
L1a, L1s
L2a, L2s
L3a, L3s
L4a, L4s
L5a, L5s
IP
L6a, L6s
ECal
600
500
400
300
200
100
0
−0.5
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
0.5

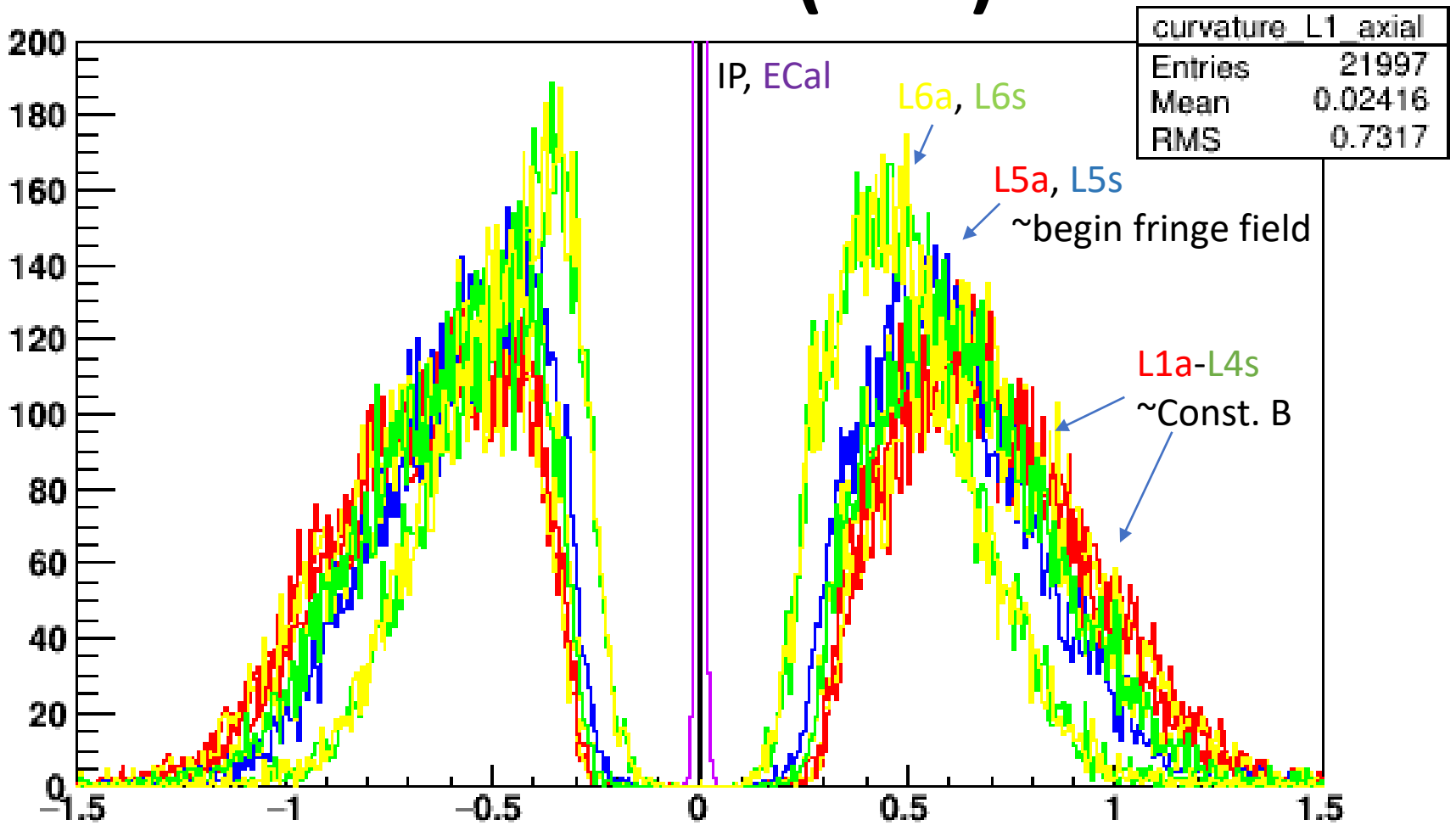
TanLambda


tanLambda_L1_axial
Entries 22207
Mean 0.0001897
RMS 0.03233
IP, L1-L6
220
200
180
160
140
120
100
80
60
40
20
0
−0.08
−0.06
−0.04
−0.02
0
0.02
0.04
0.06
0.08

Curvature (seed)



Curvature (GBL)



Next

- GBL currently uses a constant field to find the intersection of a HelicalTrackFit to a plane, and gets the parameters there.
- The GBL fit could instead make its strip data using these parameters at the sensor nearest the extrapolation point, since obtained with the fieldmap.
- These states are also just good to have, for residuals and random studies
- Other ideas?