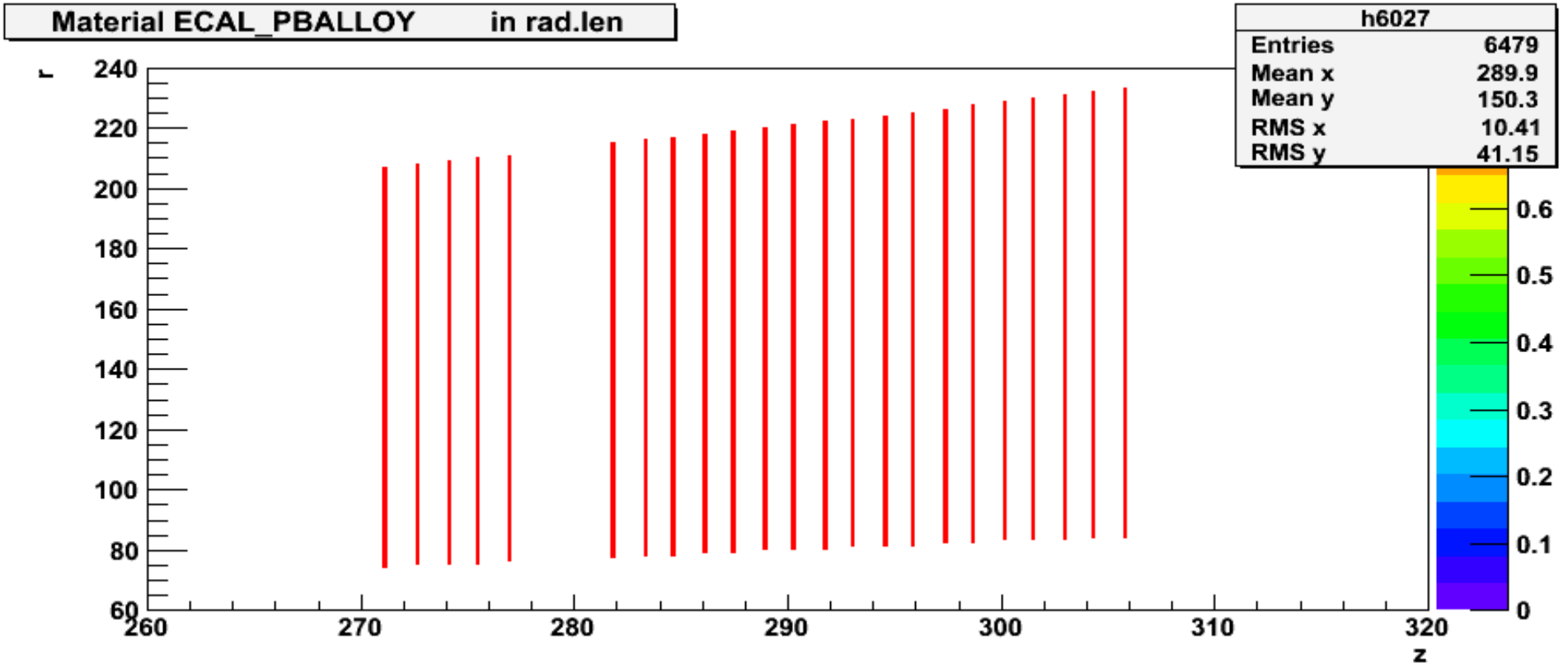
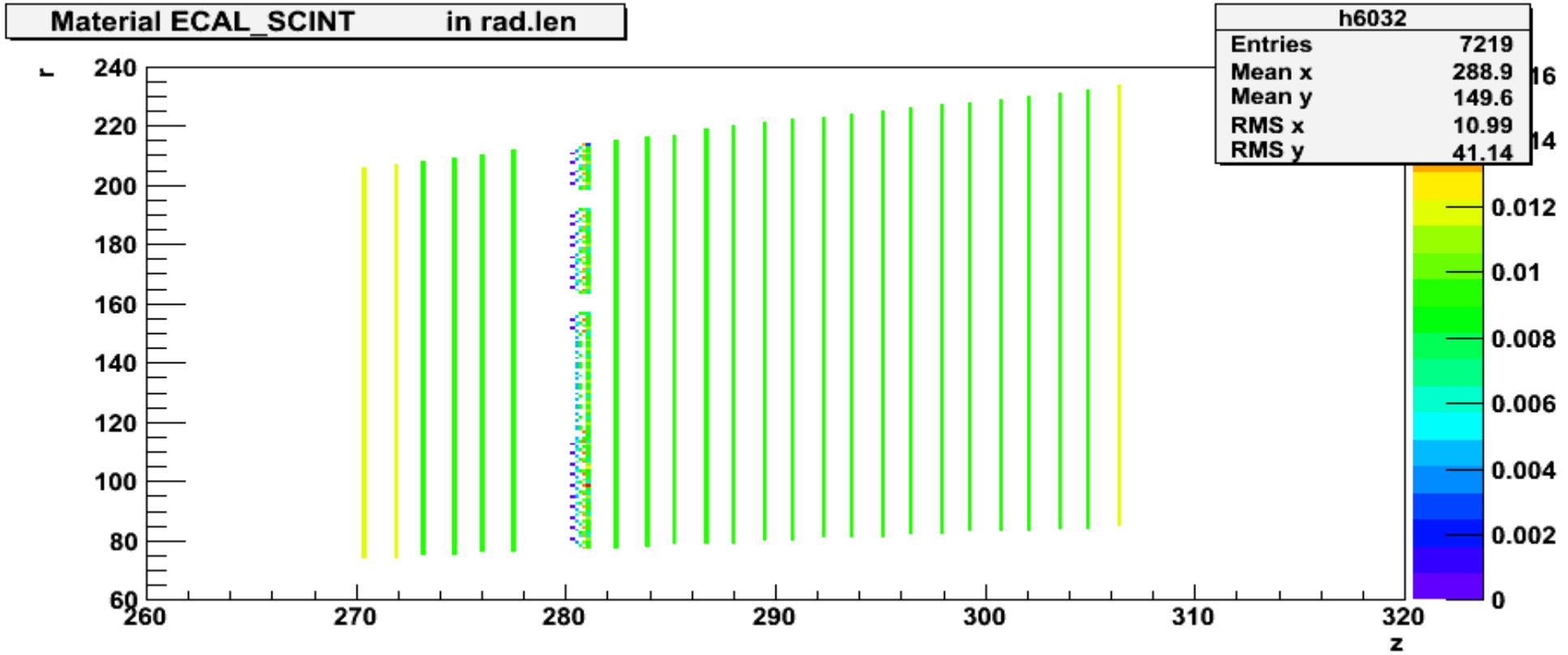
## Nine materials present in ecalgeo.g21

h5009 N geantinos ALUMINIUM
h5015 N geantinos AIR
h5022 N geantinos POLYSTYREN
h5026 N geantinos ECAL_PVC
h5027 N geantinos ECAL_PBALLOY
h5028 N geantinos ECAL_STEEL
h5032 N geantinos ECAL_SCINT
h5033 N geantinos ECAL_EBLS
h5034 N geantinos ECAL_EFLS

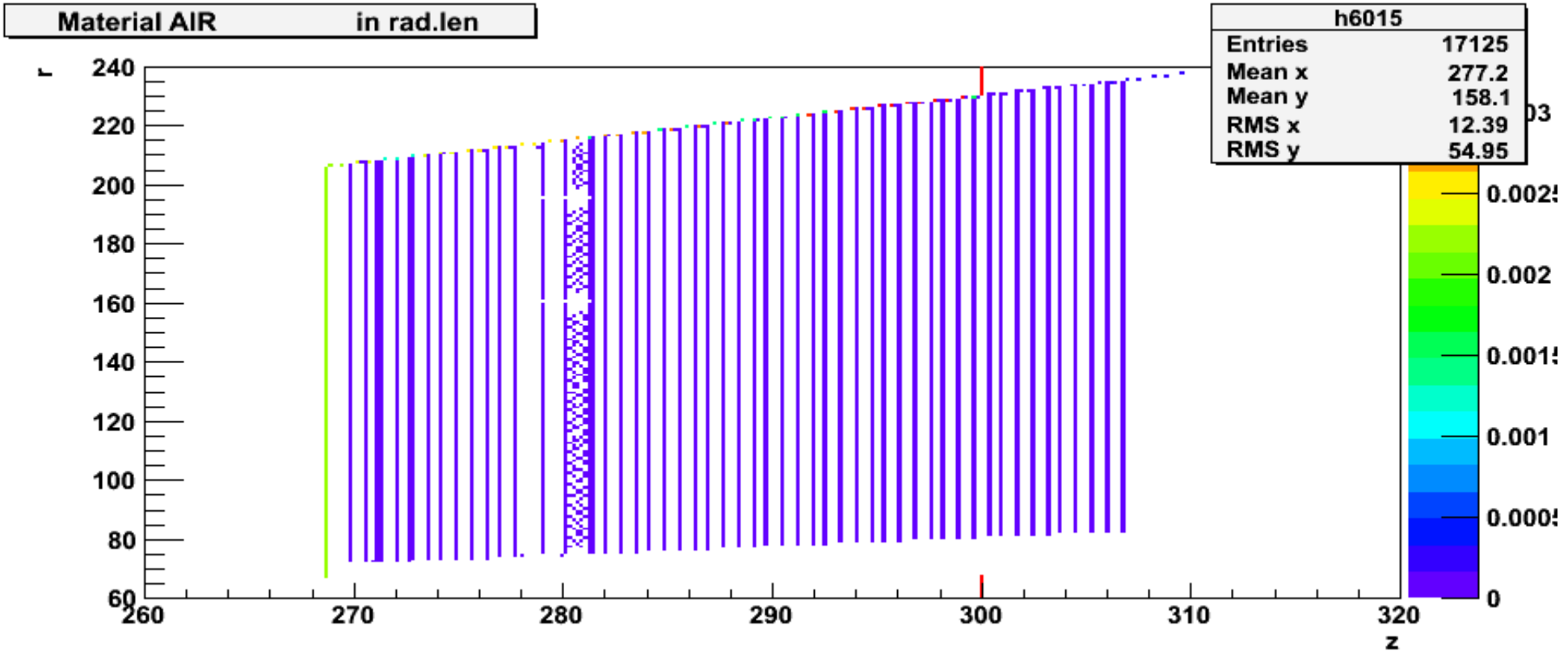
Method:
1) Throw geantinos normal to front face of the EEMC
2) phi = 105 degrees (boundary between sector 12 and sector 11)
3) Step vertex from r = 0.5 to r = 249.5 in 1cm steps
4) Determine number of radiation lengths of material in each track step
5) Store number of radiation lengths in a 2D histogram, at given r,z
6) Store number of geantinos crossing, etc...



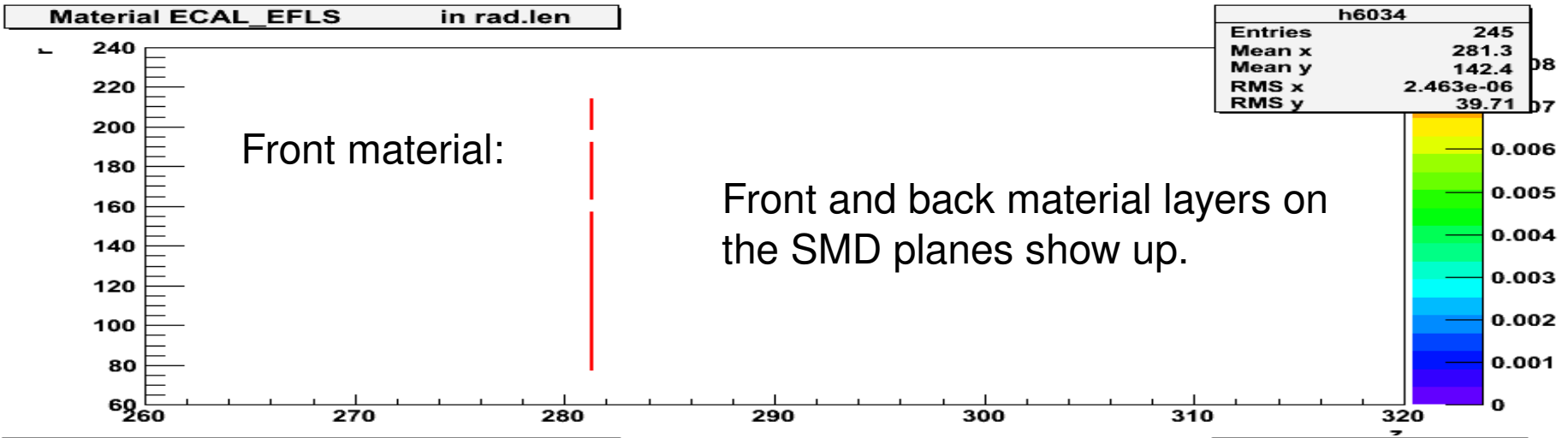

1) All 23 lead radiators show up.
2) Expect 0.8 radiation lengths
3) See 0.8 radiation lengths for each radiator

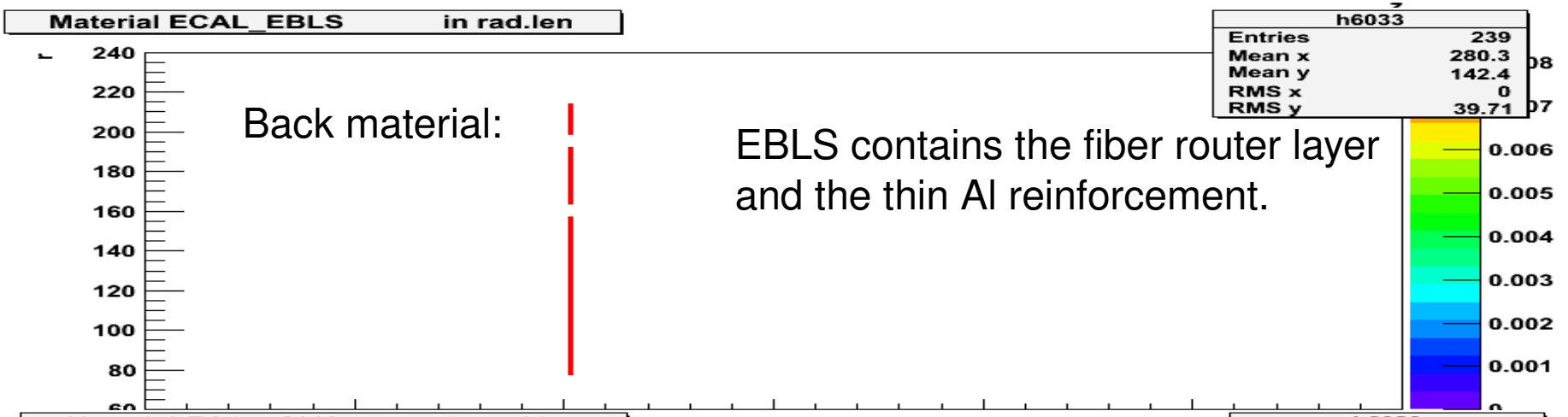


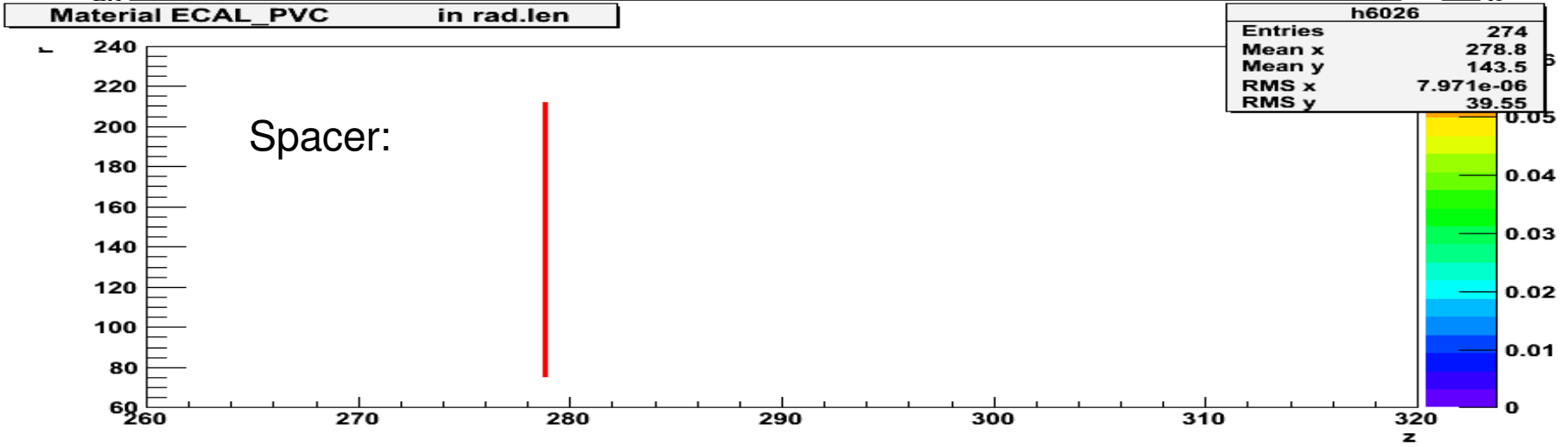

1) See all 24 megatiles with ECAL_SCINT as material
2) See one SMD planes, EXPECT 2
   (at least we see the notches)
3) See correct ratio between preshower and normal tiles
4) Expect and see 0.012 radiation lengths for preshower tiles. Expect 7/5 larger for geantinos passing through 0.7 cm apex-to-base in SMD. Peak rad. len. is about 1.68 as expected.
5) Postshower shows correct number of radiation lengths.

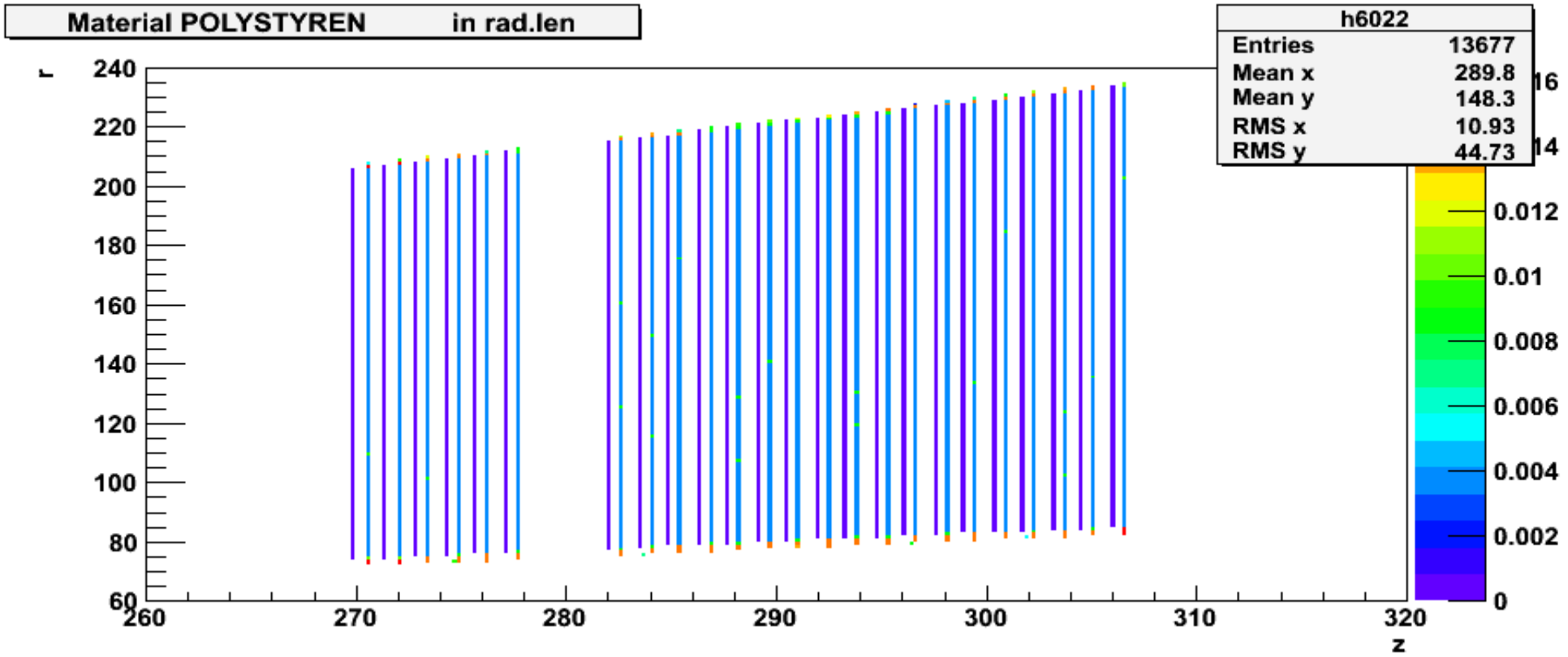



1) Air is air
2) Air is missing from the spacer layer
3) Looks like there are small airgaps between each SMD strip. Also may be some air in places where front/back plastic should be in the SMD plane... Not clear why, because....

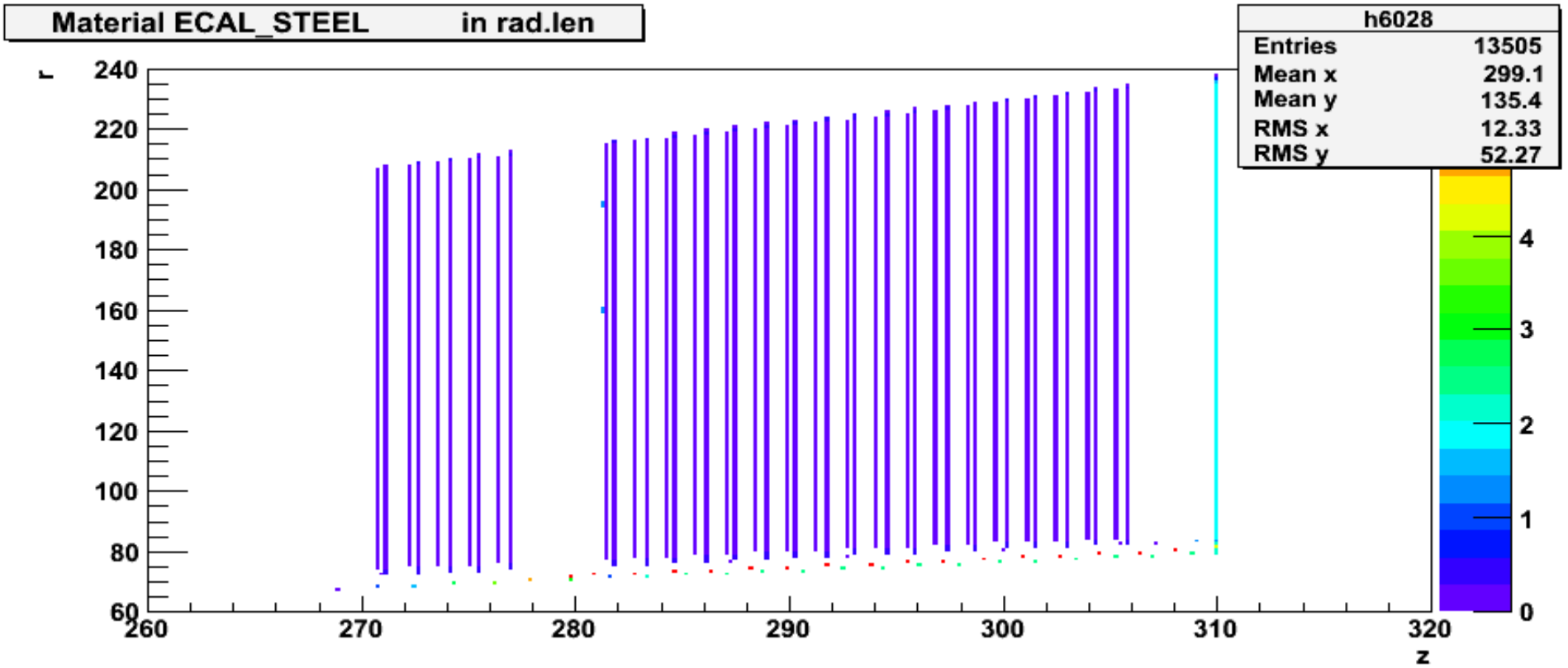

Material ECAL_EFLS in rad.len
h6034
Entries 245
Mean x 281.3
Mean y 142.4
RMS x 2.463e-06
RMS y 39.71
Front material:
Front and back material layers on the SMD planes show up.


Material ECAL_EBLS in rad.len
h6033
Entries 239
Mean x 280.3
Mean y 142.4
RMS x 0
RMS y 39.71
Back material:
EBLS contains the fiber router layer and the thin Al reinforcement.

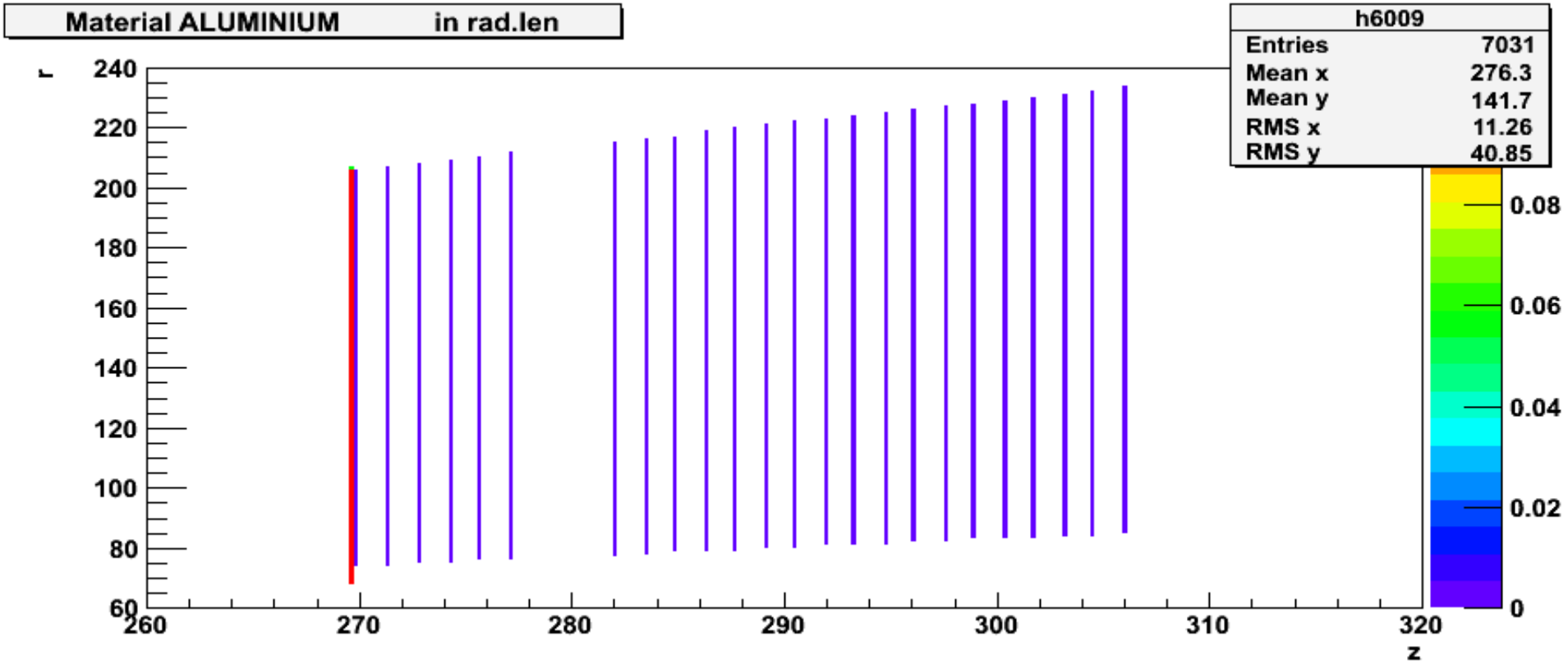

Material ECAL_PVC in rad.len
h6026
Entries 274
Mean x 278.8
Mean y 143.5
RMS x 7.971e-06
RMS y 39.55
Spacer:
z




1) Polystyrene layers (i.e. fiber router in each megatile)
2) Should be uniform layer to layer.
3) Non uniformity due to fraction-of-1-mm shifts to align megatiles and radiators with as-built values.




1) Steel cladding shows up around each radiator (23 pairs)
2) Scale is misleading here... zooming in on the histogram shows cladding is ~0.03 radiation lengths, in line with value expected for 0.5mm of steel
3) Back plate shows up, expect and see 1.8 radiation lengths for 3.175 cm of Aluminum (aluminium if you prefer...)


Material ALUMINIUM in rad.len
h6009
Entries 7031
Mean x 276.3
Mean y 141.7
RMS x 11.26
RMS y 40.85
r
240
220
200
180
160
140
120
100
80
60
260
270
280
290
300
310
320
z
0.08
0.06
0.04
0.02
0