Track length determination after reconstruction

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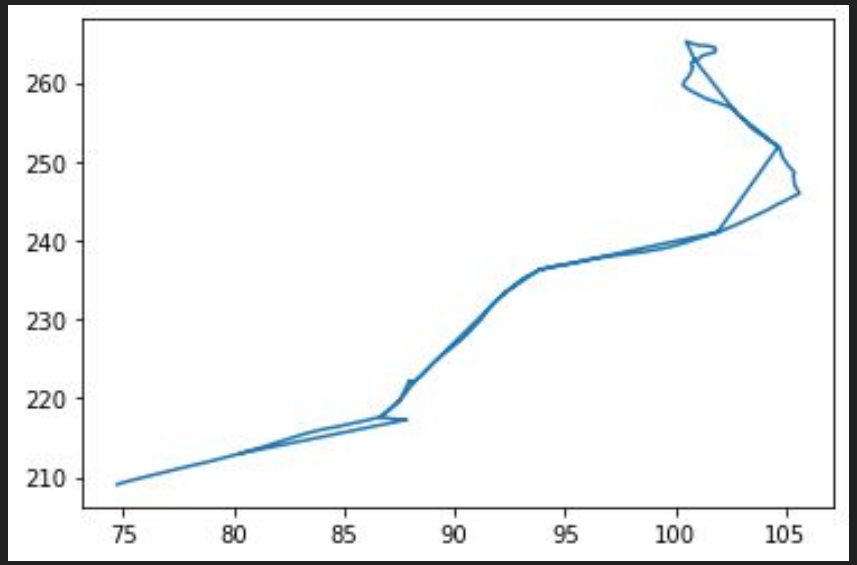
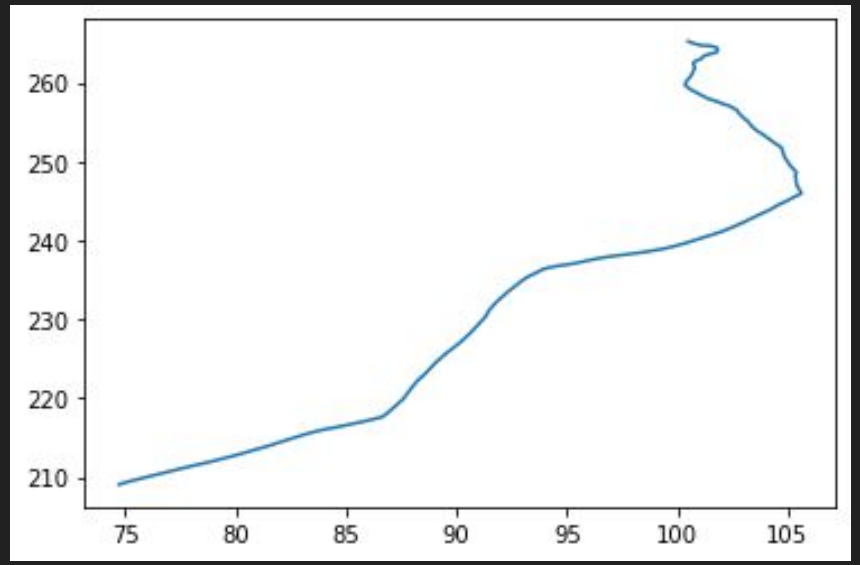
Problem with Pythagorean distance formula





$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

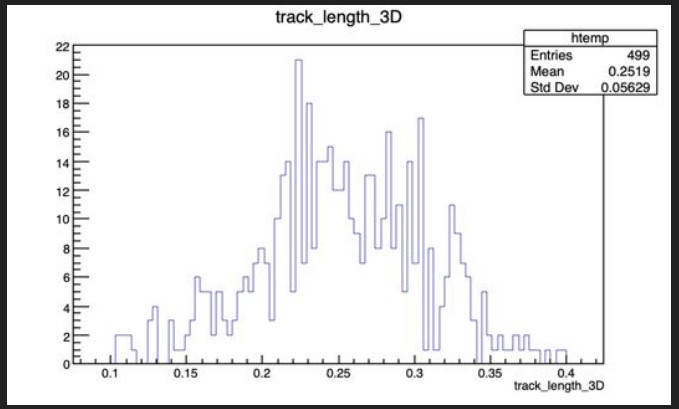
d = distance

(x_1, y_1) = coordinates of the first point

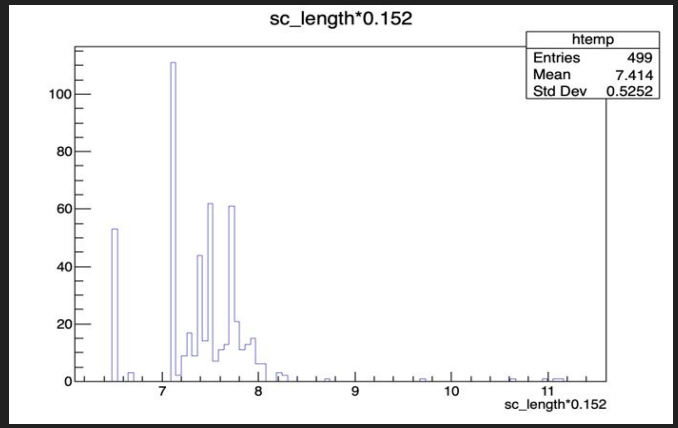
(x_2, y_2) = coordinates of the second point

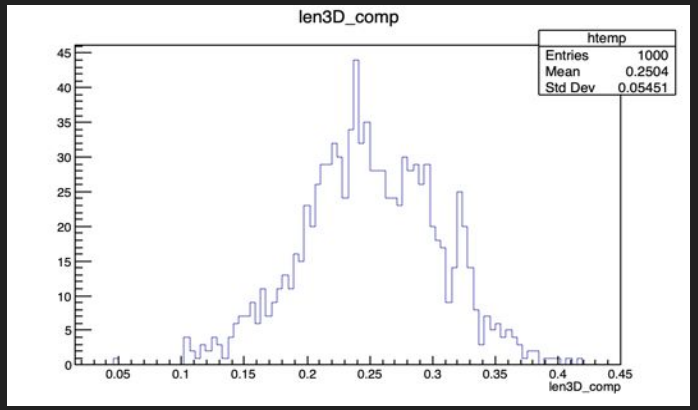
10 keV NR

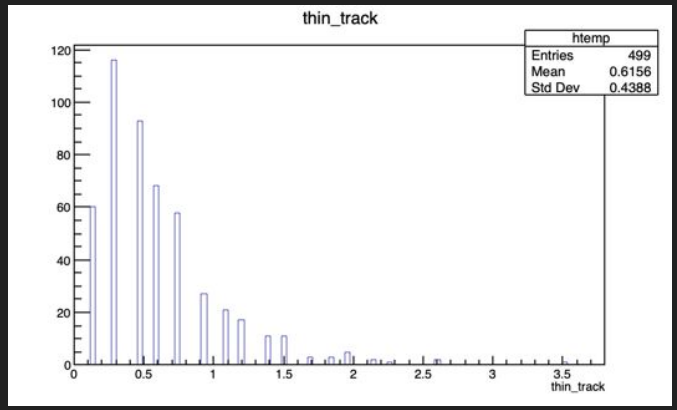
a) MC track length



b) Reconstructed length





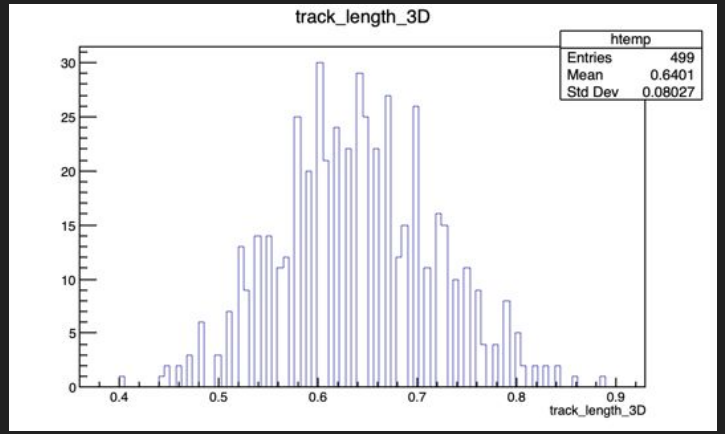


c) Using 3 point distance formula

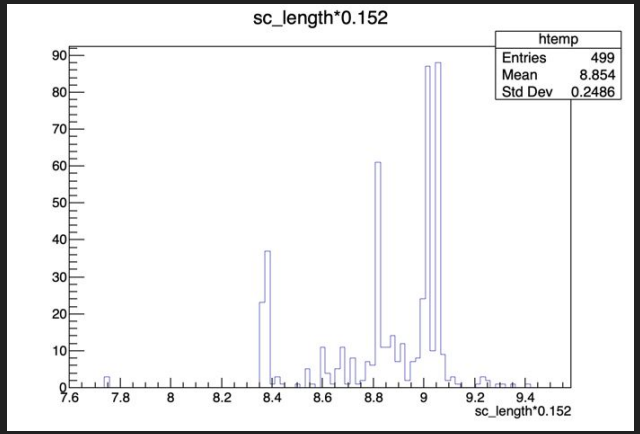
d) Using thinning length

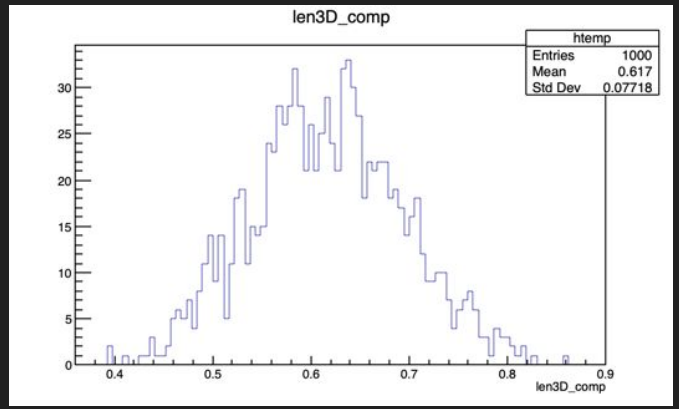
30 keV NR

a) MC track length

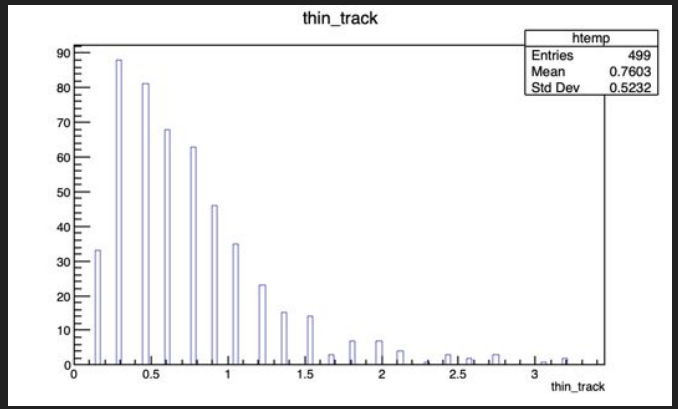


b) Reconstructed length



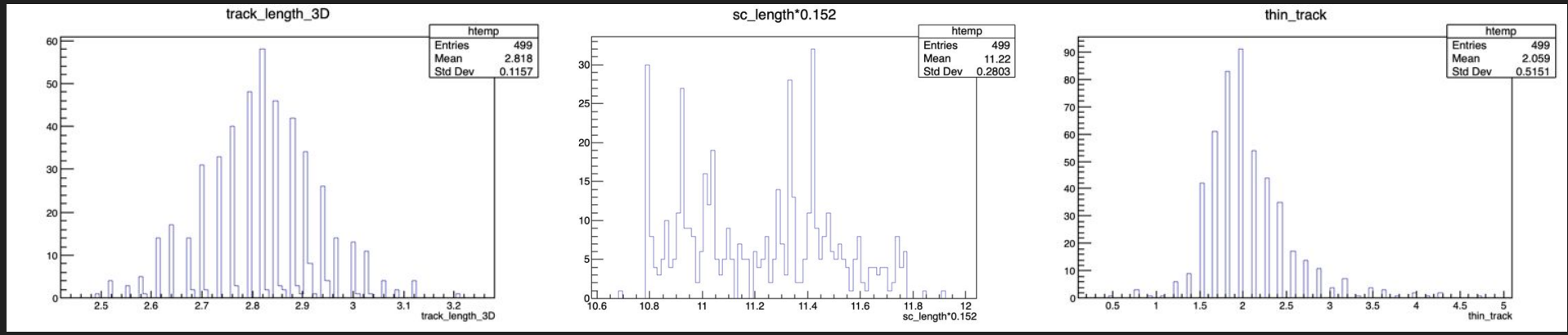


c) Using 3 point distance formula



d) Using thinning length

300 keV NR



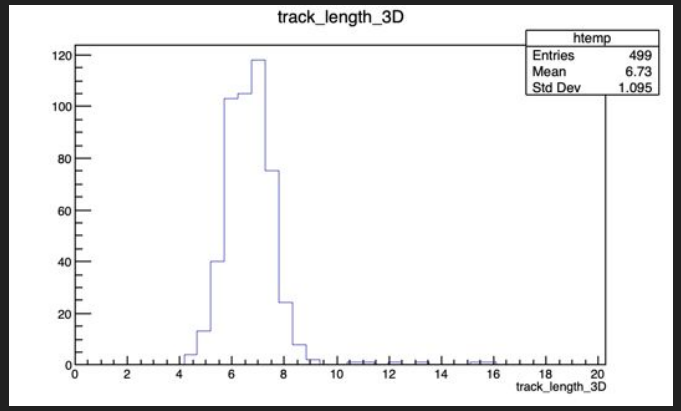
a) MC track length

b) Reconstructed length

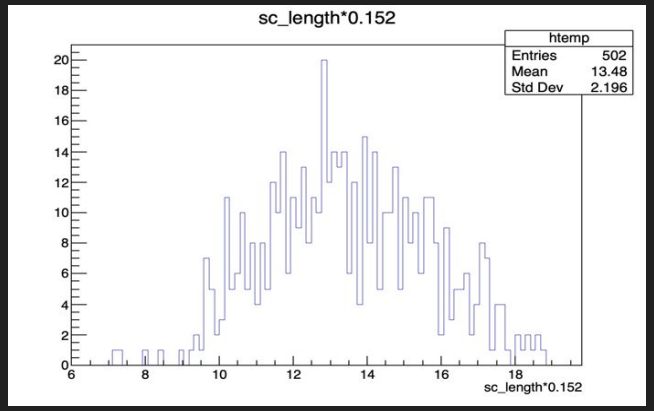
c) Track length with thinning

30 keV ER

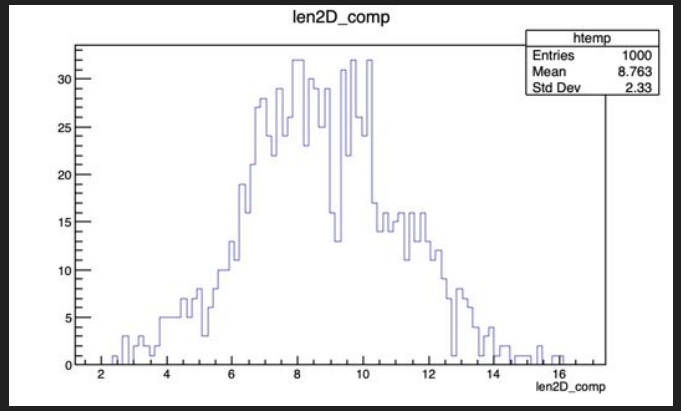
a) MC track length



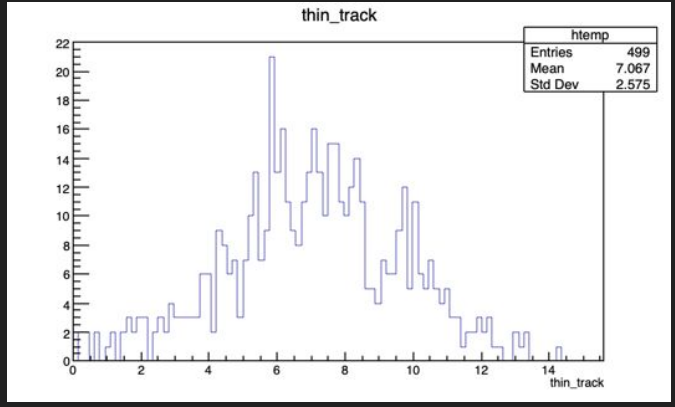
b) Reconstructed length



c) Using 3 point distance formula

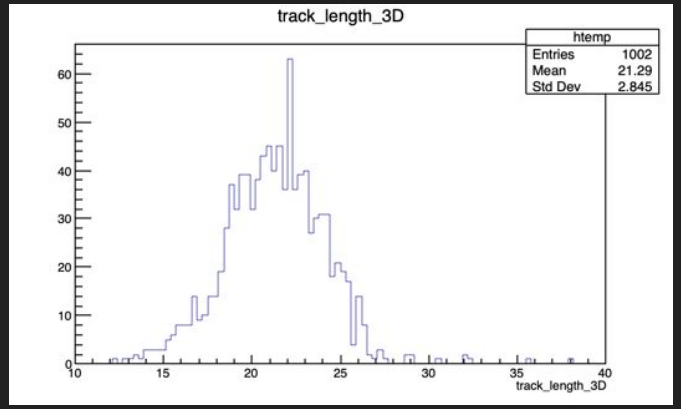


d) Using thinning length

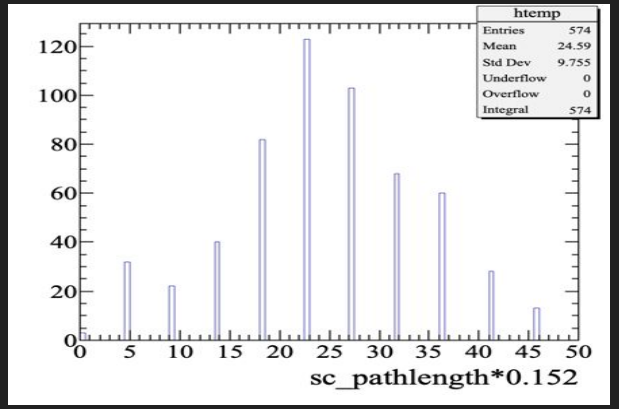


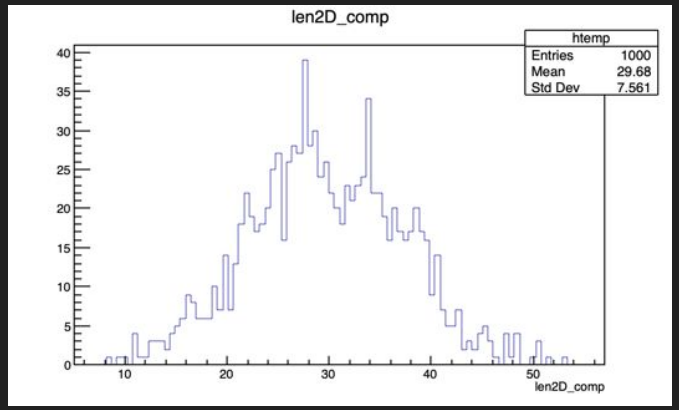
60 keV ER

a) MC track length

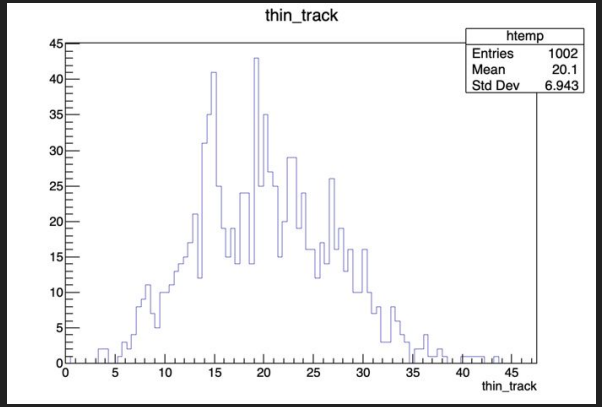


b) Reconstructed length



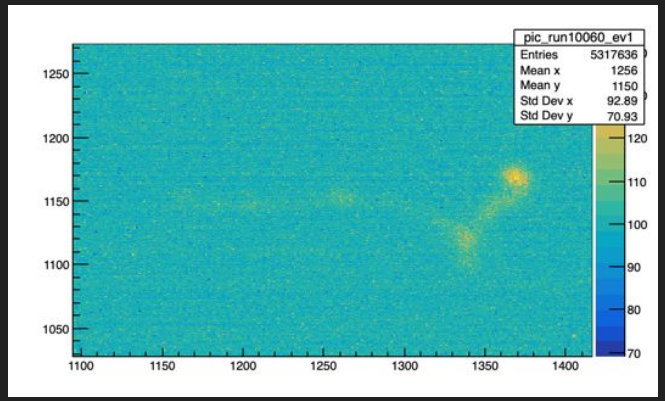


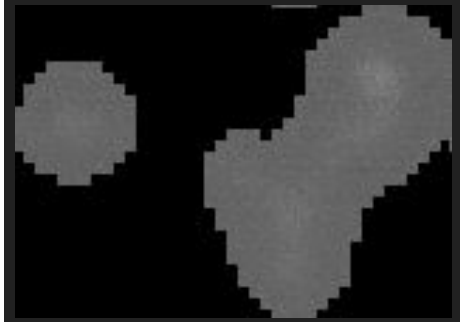
c) Using 3 point distance formula



d) Using thinning length

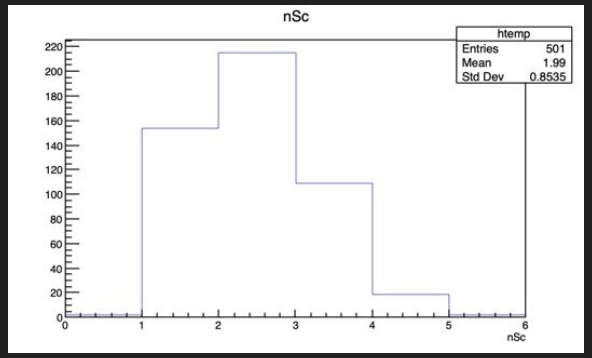
60 keV ER

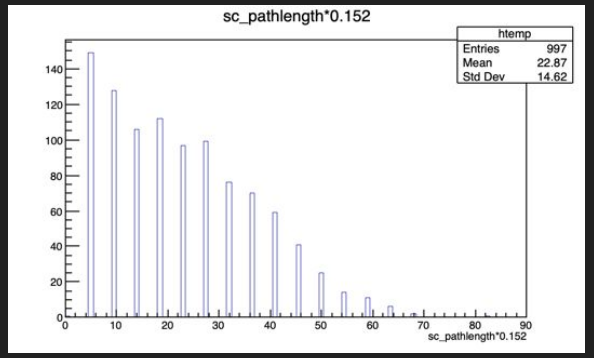


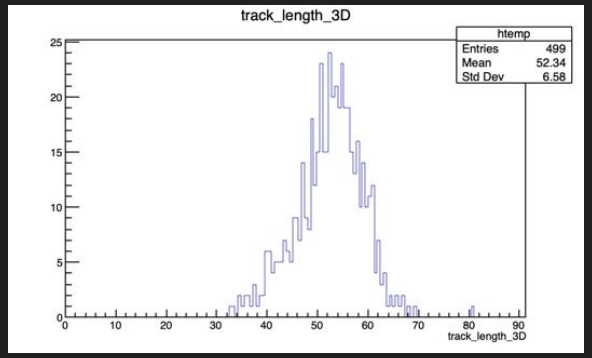


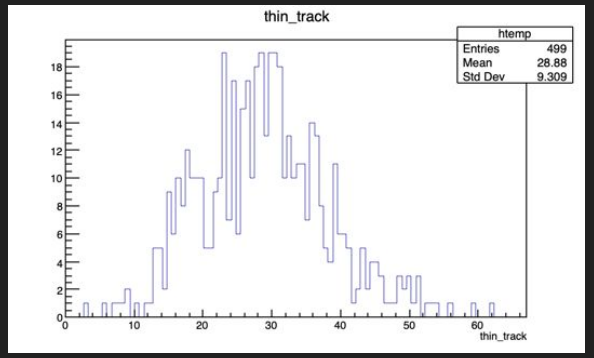
a) Original b) SC found c) Thresholded track d) Skeleton

100 keV ER



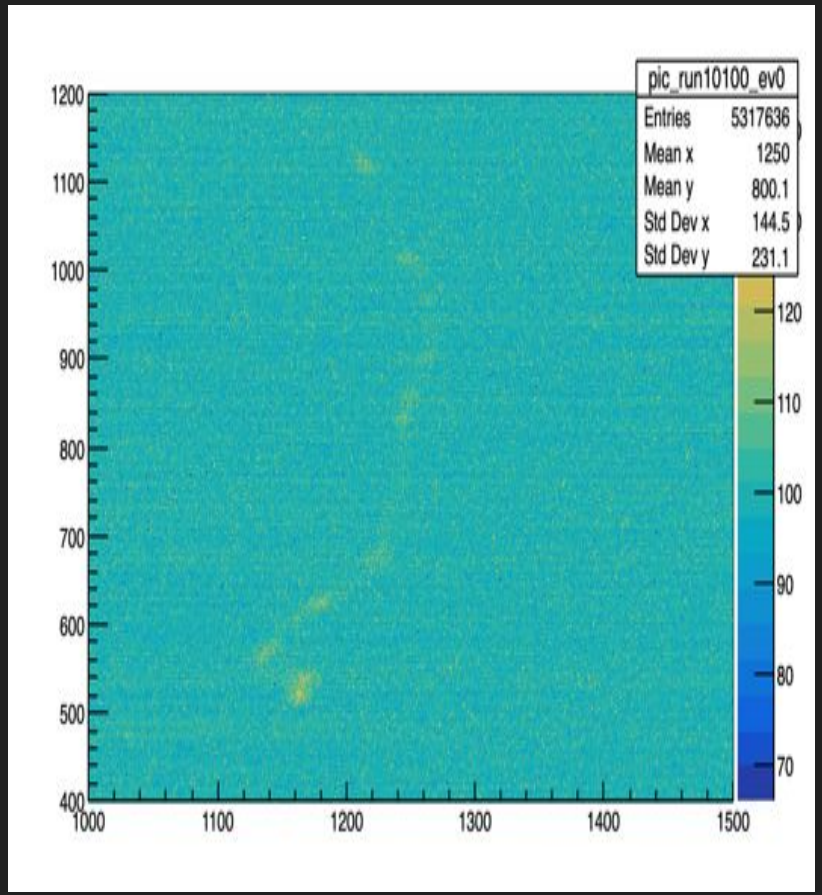






a) No. of Supercluster b) SC pathlength c) MC length d) Skeleton length

100 keV ER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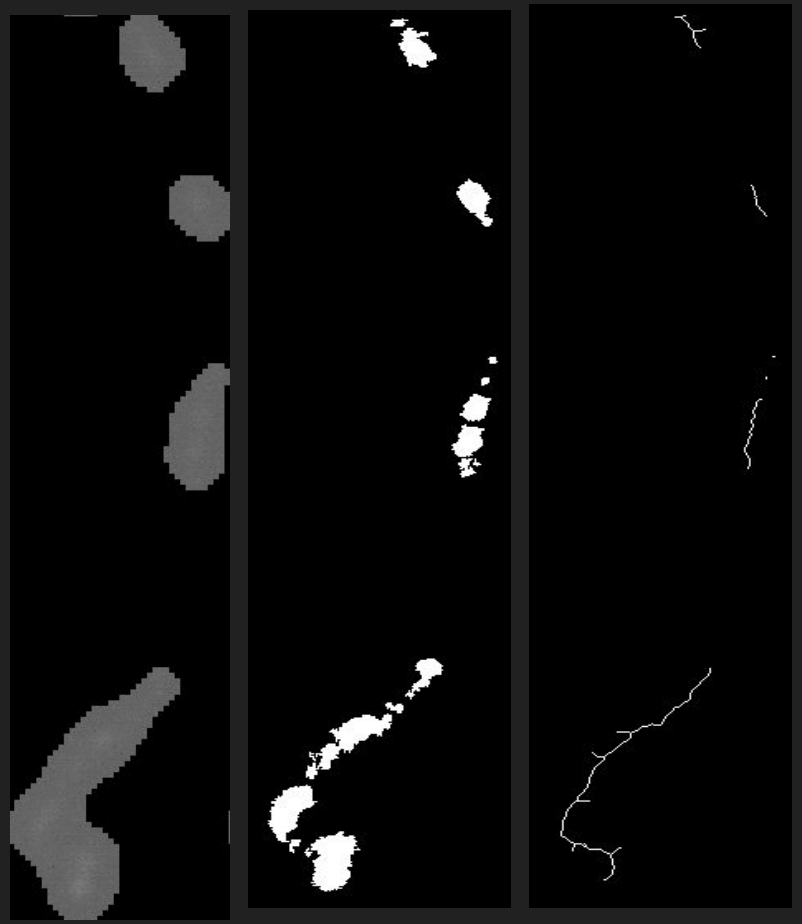
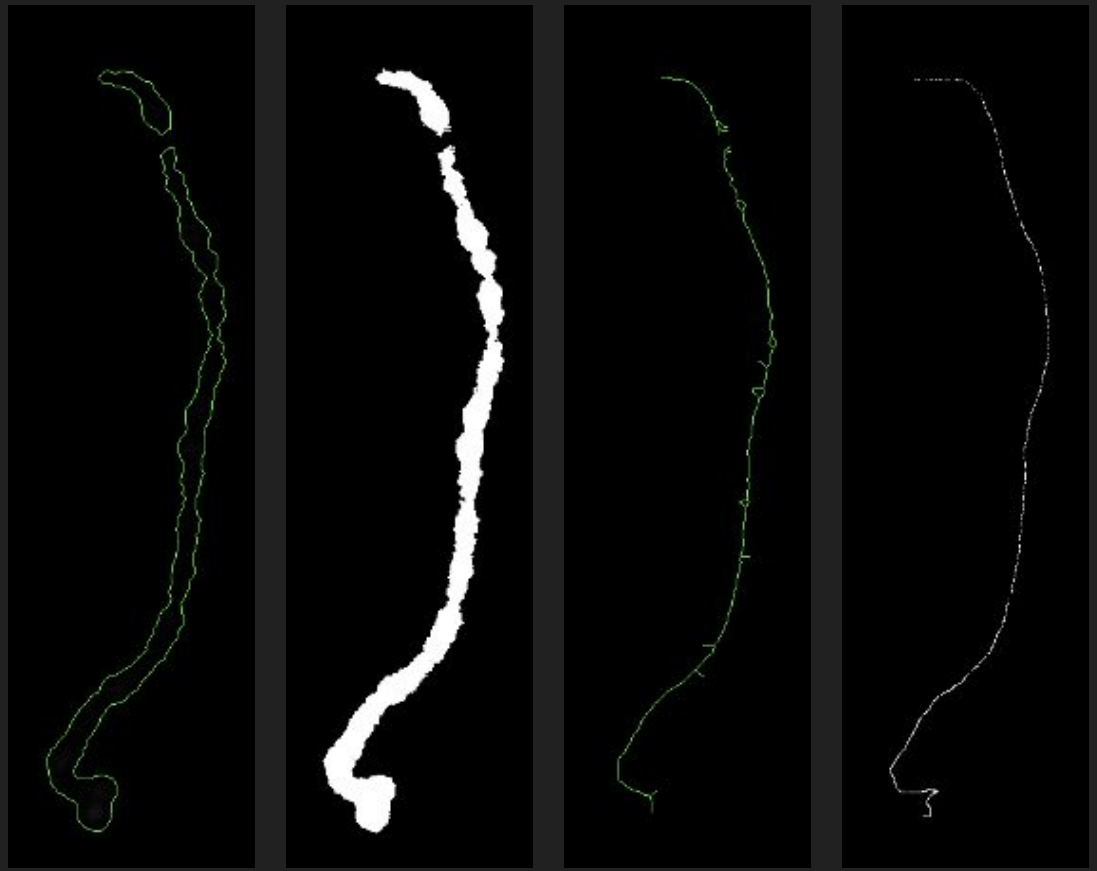
Entries 5317636
Mean x 1250
Mean y 800.1
Std Dev x 144.5
Std Dev y 231.1
1200
1100
1000
900
800
700
600
500
400
1000
1100
1200
1300
1400
1500
120
110
100
90
80
70



100 keV ER



Method	Tracklength [mm]
Undiffused track (2D)	87.7
Skeleton (w/o noise)	117
Skeleton (After SC Rec)	51.53
3D length MC	55.96
Projected 2D (distance form.)	118
3D length (distance form.)	126

Length Comparison

	MC Length	Distance formula 2D	Skeleton (After Recon.)	Reconstructed length
10 keV NR	0.25	0.25	0.61	7.4
30 keV NR	0.6	0.6	0.76	8.8
300 keV NR	2.8	2.35	2.05	11.22
30 keV ER	6.68	8.76	7.07	13.48
60 keV ER	21.43	29.53	20.1	24.5
100 keV ER	53.14	71.19	28.88	22.8

ER and NR Discrimination using length