Mott Analysis Update

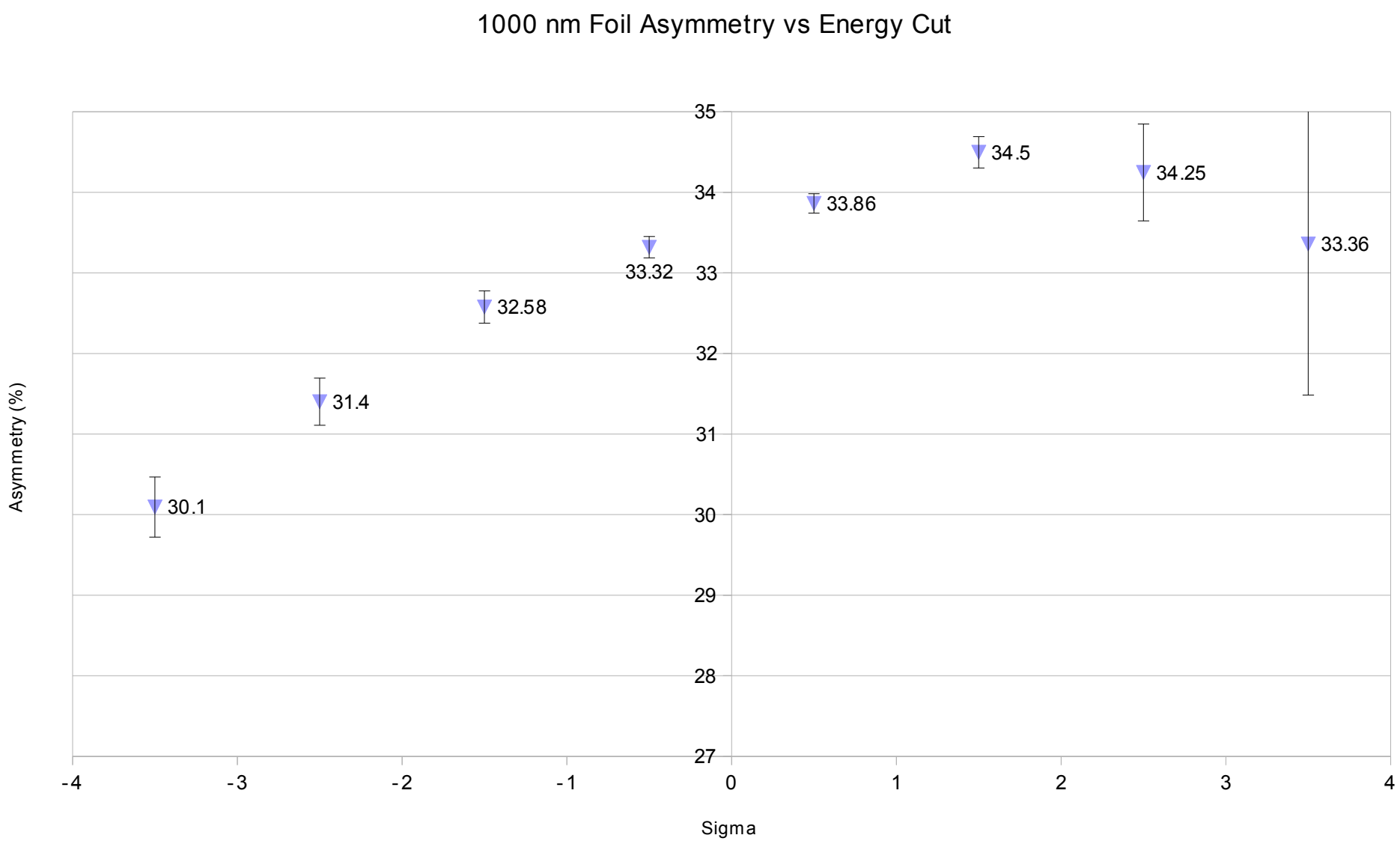
- Asymmetry in one-sigma slices
- Time-of-Flight Sensitivity to Foil Thickness
- Detector Rates vs Thickness

Energy Cuts – One Sigma Slices

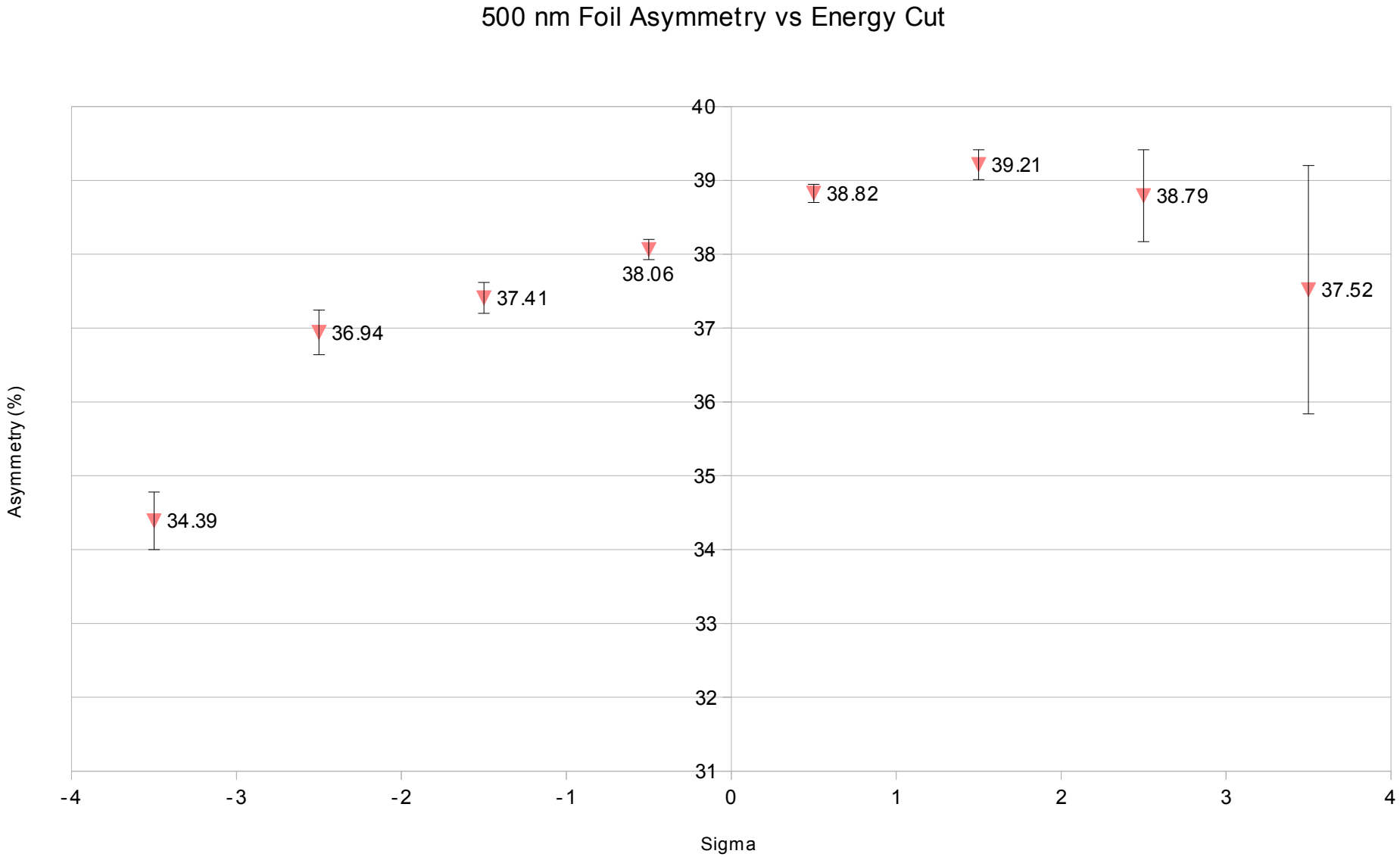
- Gaussian fit of energy spectra
- -4sigma to -3sigma, -3sigma to -2sigma .... +3sigma to +4sigma
- In graphs to follow -- -4sigma to -3sigma shown at -3.5

  -1sigma to mean at -0.5 etc...

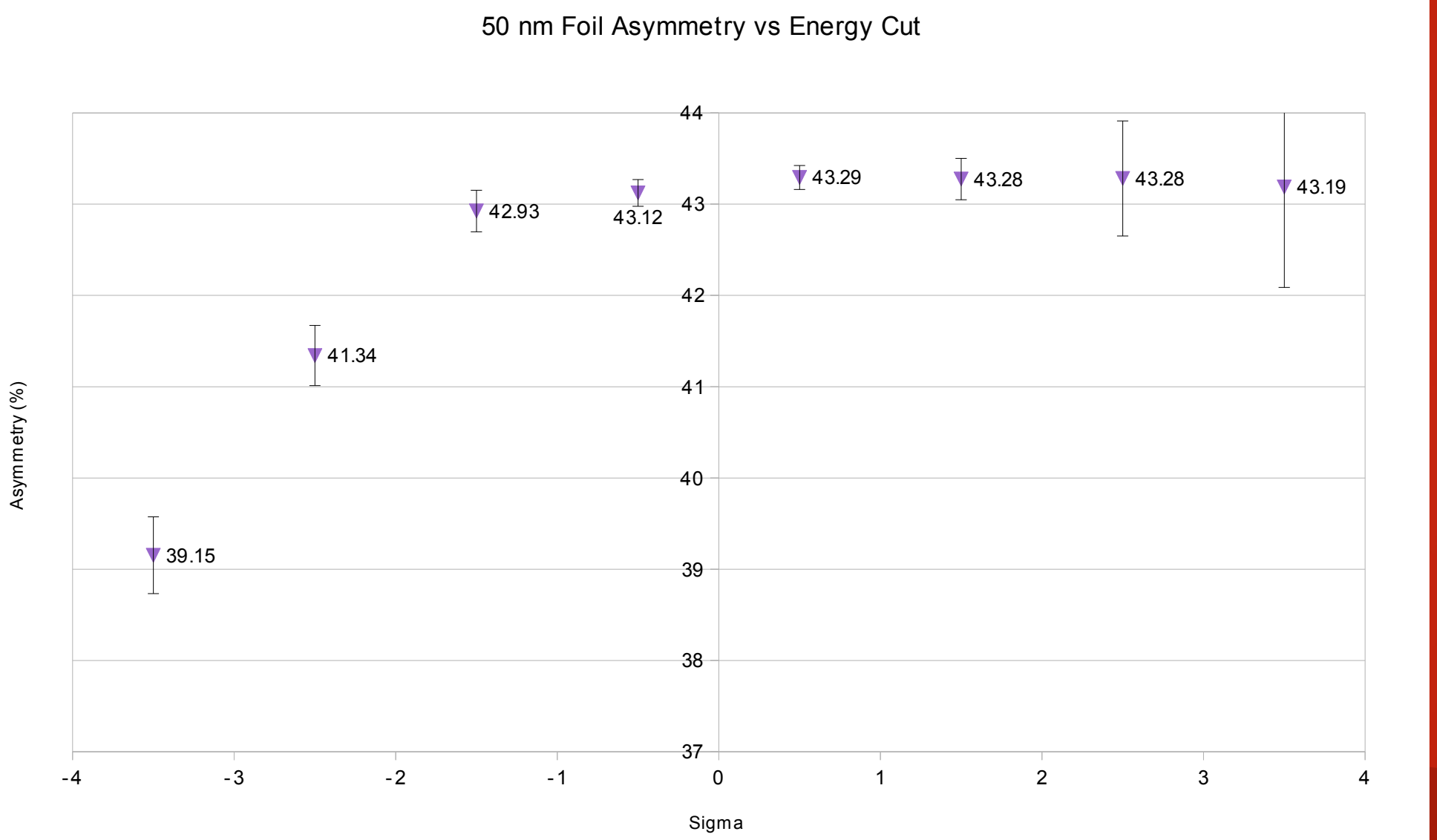
Thick Foil


1000 nm Foil Asymmetry vs Energy Cut
Asymmetry (%)
Sigma
35
34
33
32
31
30
29
28
27
-4
-3
-2
-1
0
1
2
3
4
30.1
31.4
32.58
33.32
33.86
34.5
34.25
33.36

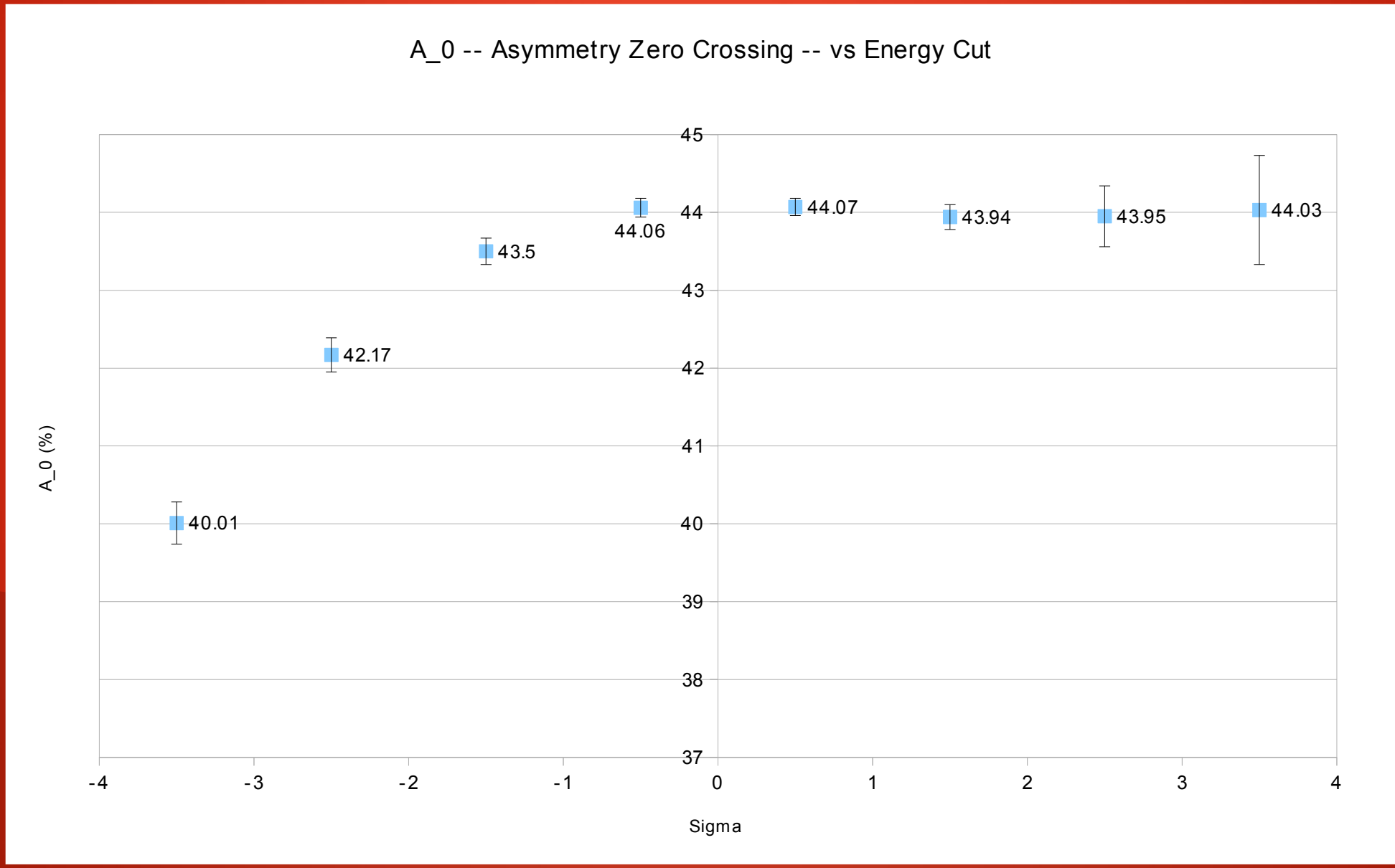
Medium Foil


500 nm Foil Asymmetry vs Energy Cut
Asymmetry (%)
Sigma
40
39
38
37
36
35
34
33
32
31
-4
-3
-2
-1
0
1
2
3
4
34.39
36.94
37.41
38.06
38.82
39.21
38.79
37.52

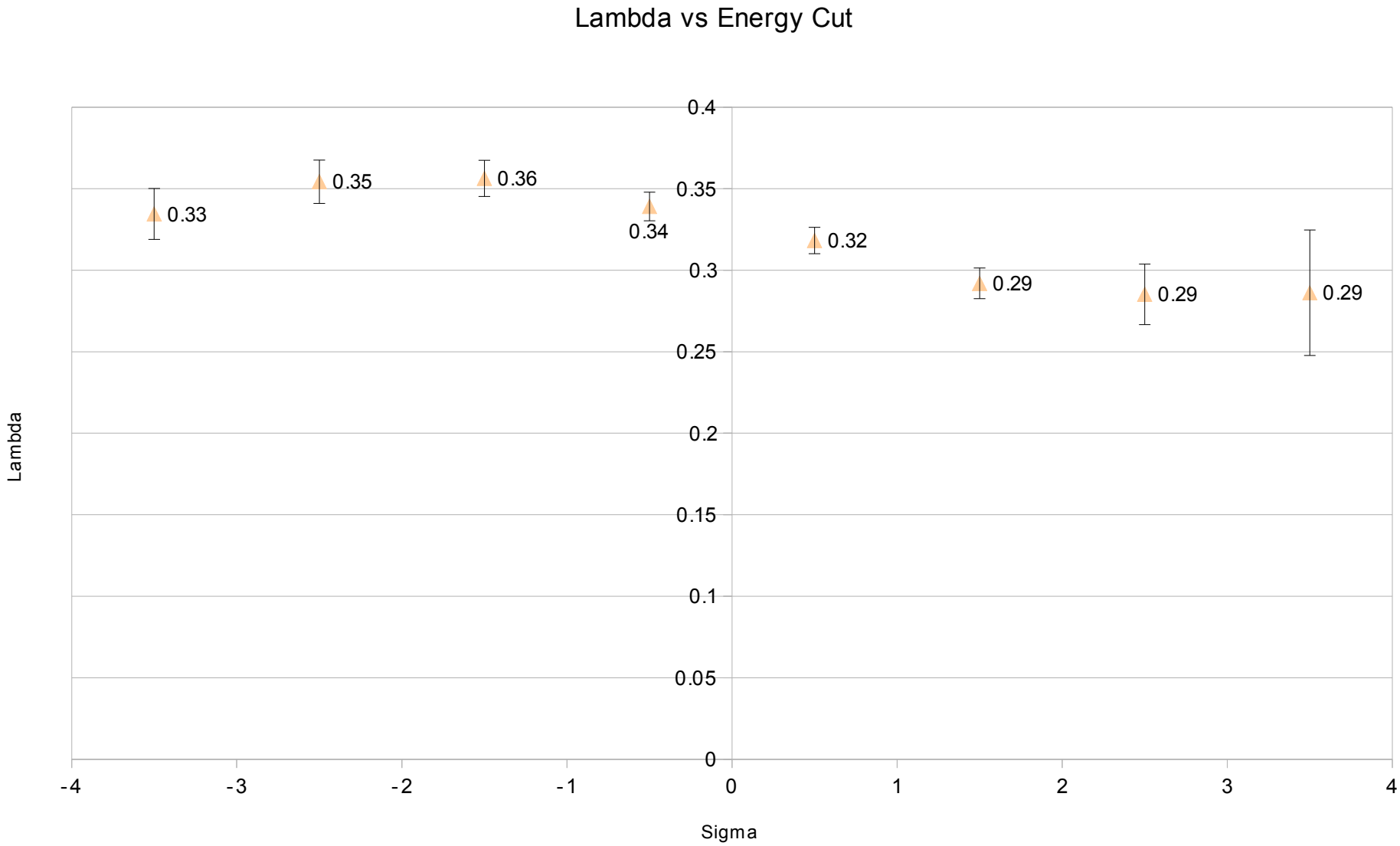
Thin Foil


50 nm Foil Asymmetry vs Energy Cut
Asymmetry (%)
Sigma
44
43
42
41
40
39
38
37
-4
-3
-2
-1
0
1
2
3
4
39.15
41.34
42.93
43.12
43.29
43.28
43.28
43.19

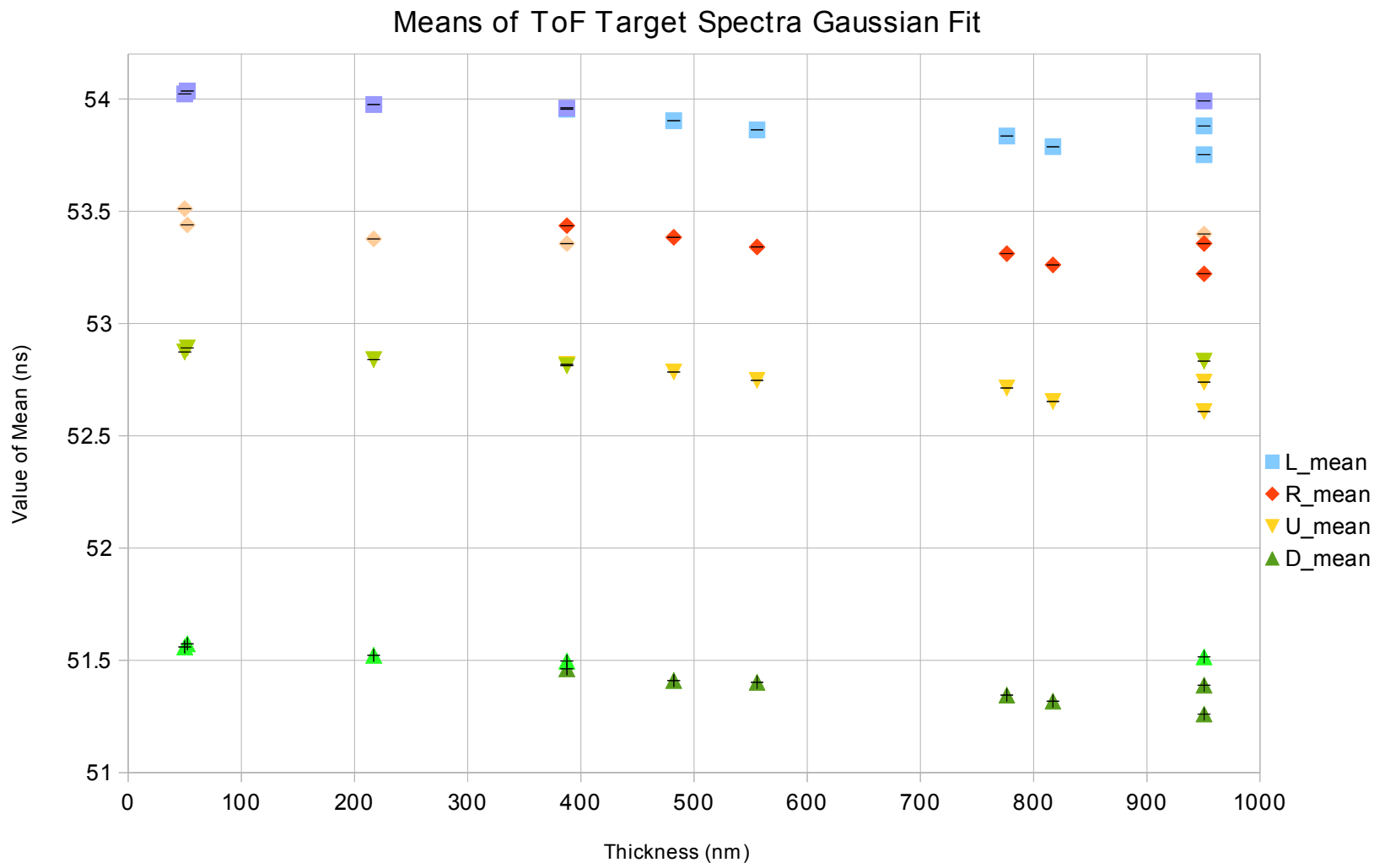
A_0 from A(x) = A_0 / (1 + lambda * x)



Lambda

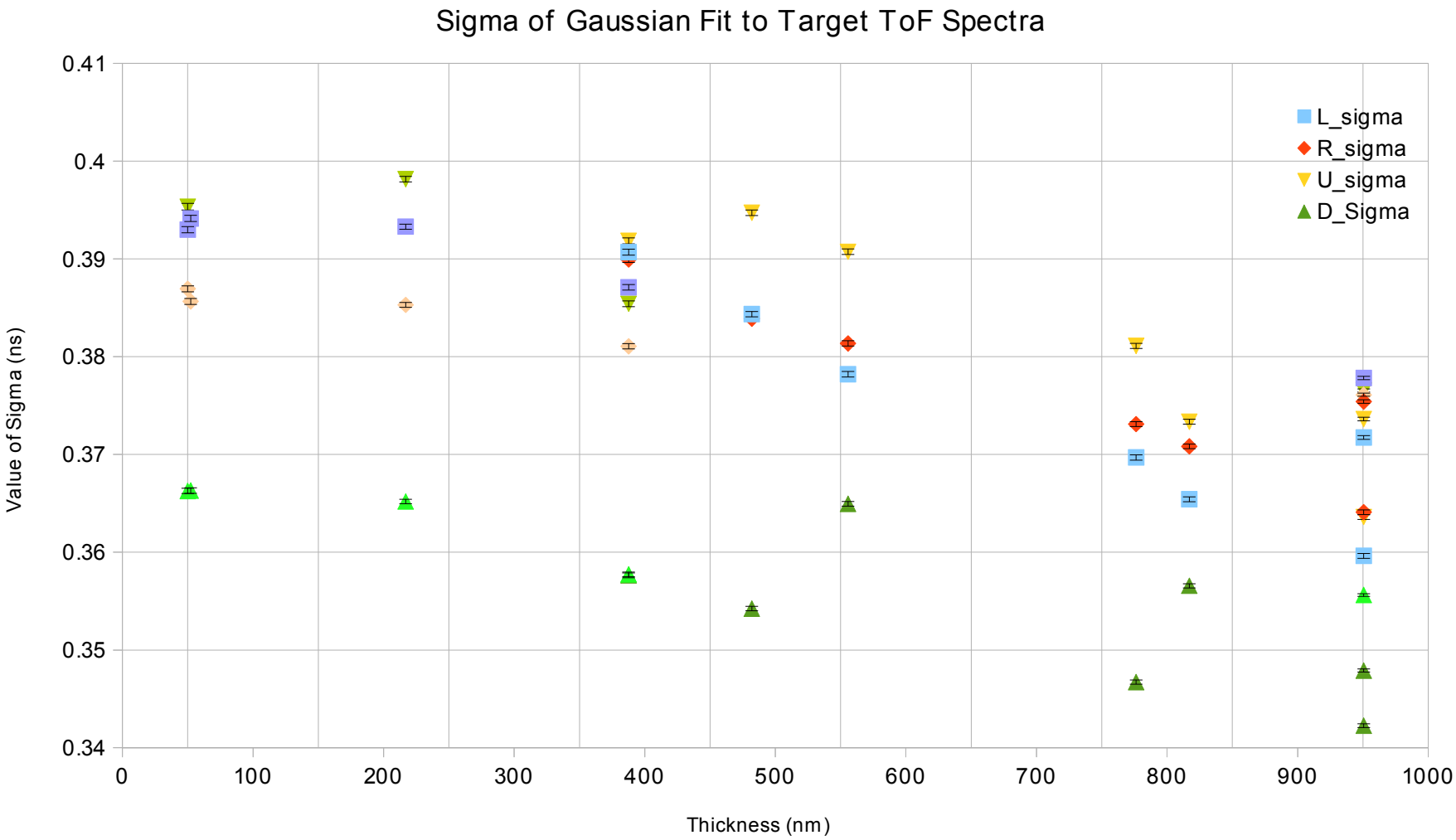

Lambda vs Energy Cut
Lambda
Sigma
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-4
-3
-2
-1
0
1
2
3
4
0.33
0.35
0.36
0.34
0.32
0.29
0.29
0.29

Time-of-Flight Sensitivity to Foil Thickness



Off colors indicate HIGH threshold, regular colors LOW threshold

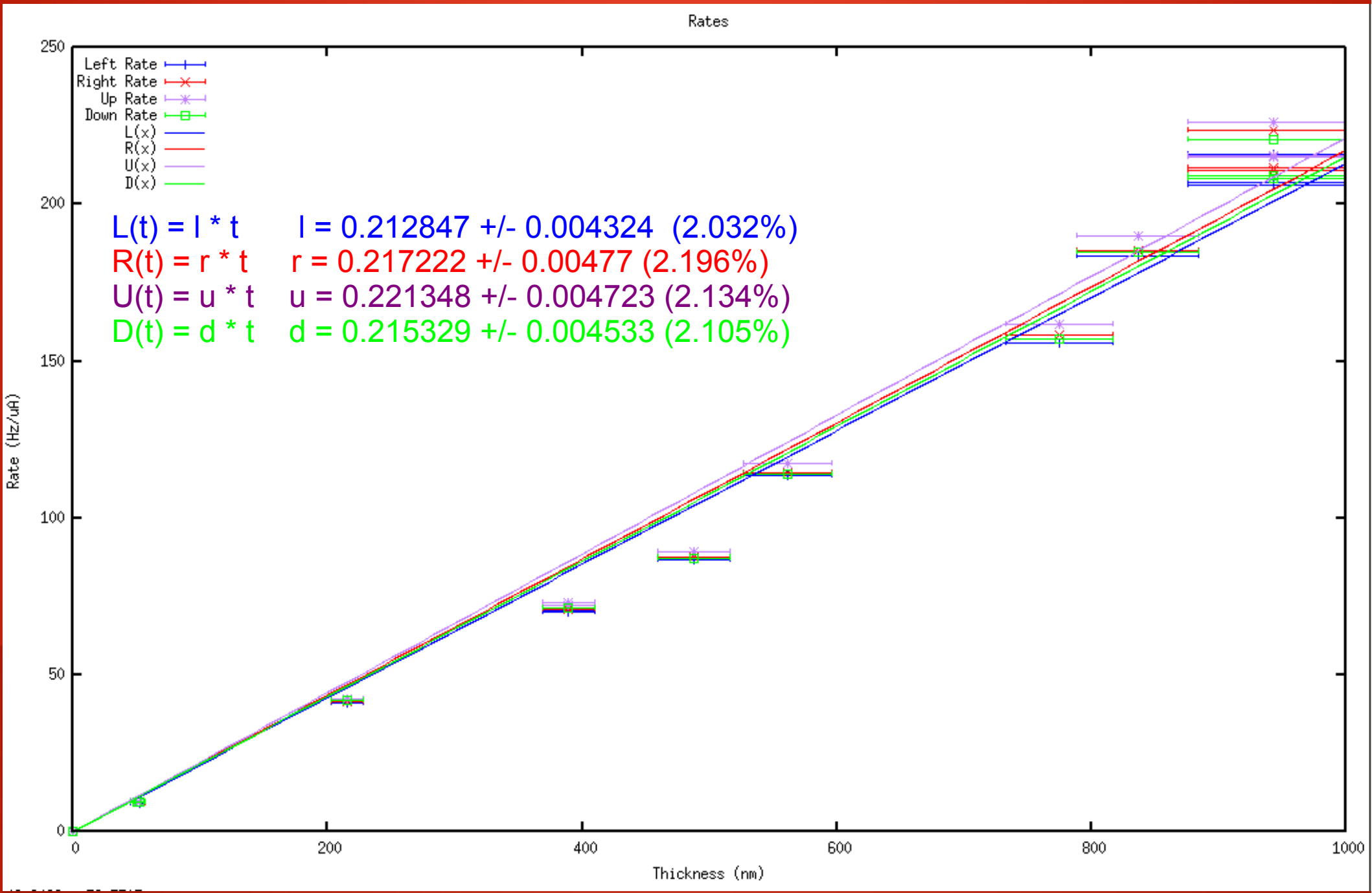
Time-of-Flight Sensitivity to Foil Thickness



Off colors indicate HIGH threshold, regular colors LOW threshold

Detector Rates vs Thickness

- Calculated from scalers and good physics events – target events
- Detector dependent
- $R = (N / (t * I)) * (1 / (N_{accepted} / N_{triggers}))$


Rates
Left Rate
Right Rate
Up Rate
Down Rate
L(x)
R(x)
U(x)
D(x)
L(t) = l * t l = 0.212847 +/- 0.004324 (2.032%)
R(t) = r * t r = 0.217222 +/- 0.00477 (2.196%)
U(t) = u * t u = 0.221348 +/- 0.004723 (2.134%)
D(t) = d * t d = 0.215329 +/- 0.004533 (2.105%)
Rate (Hz/uA)
Thickness (nm)
0
50
100
150
200
250
0
200
400
600
800
1000

{L,R,U,D} Detector Rates vs Thickness

Nominal T	T	dT	LEFT	RIGHT	UP	DOWN	Threshold
1000	943.71	67.41	206.286	210.986	215.164	208.475	lo
870	836.76	47.91	183.567	185.334	190.042	184.798	lo
750	774.57	41.98	155.786	158.314	161.902	156.909	lo
625	561.18	34.84	113.415	114.325	117.241	113.923	lo
500	487.58	28.33	86.543	87.671	89.311	87.268	lo
350	389.44	20.94	70.496	71.526	72.806	71.208	lo
350	389.44	20.94	69.976	70.805	72.148	71.254	hi
225	215.17	12.55	40.880	41.264	42.074	41.652	hi
50	52.03	3.97	9.028	9.199	9.300	9.285	hi
50	50	5	9.236	9.406	9.520	9.500	hi
1000	943.71	67.41	216.017	223.774	226.192	220.893	hi
1000	943.71	67.41	207.149	211.672	215.429	209.196	lo