Efficiency studies

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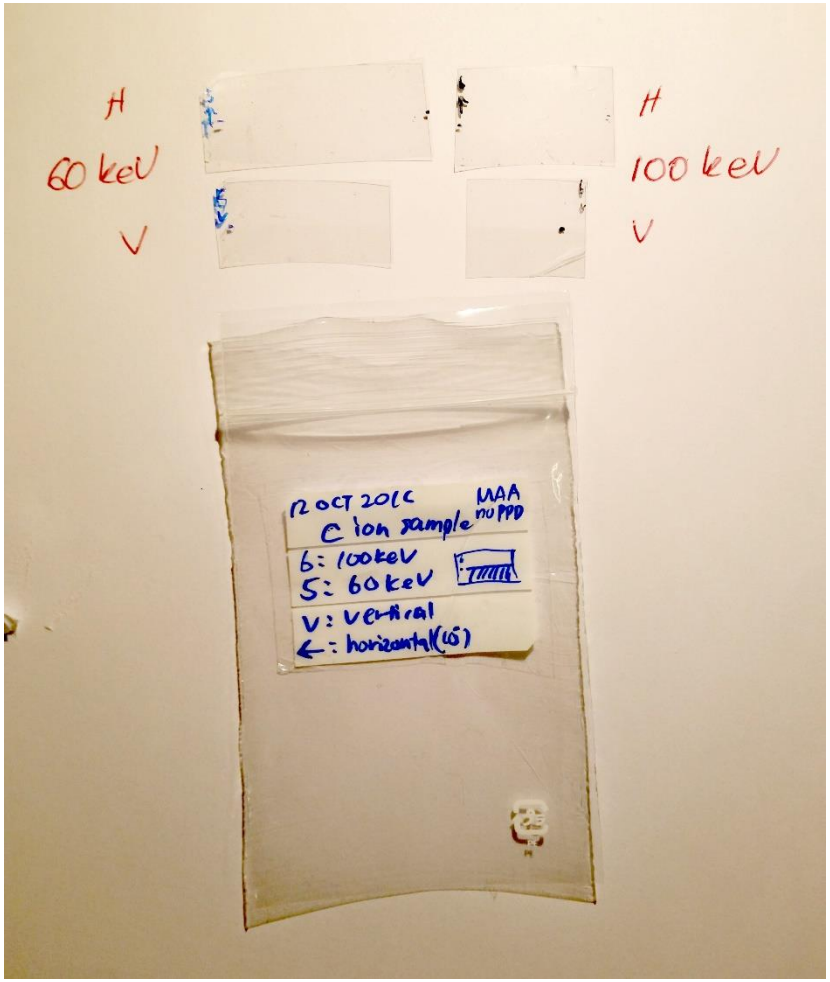
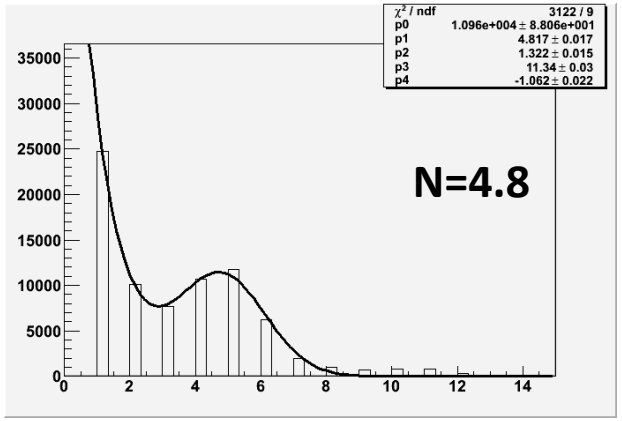
Carbon Ion Samples

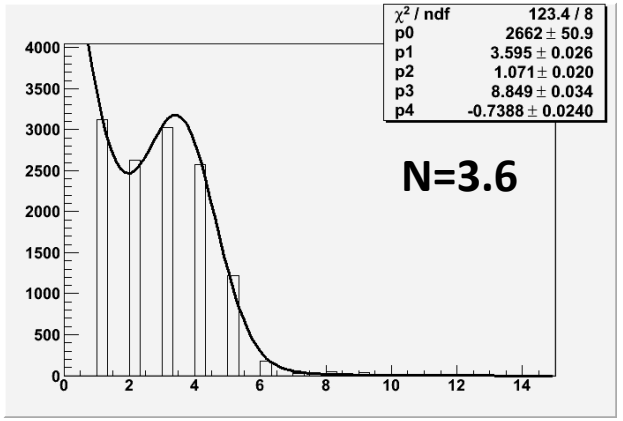


- 60 and 100 keV
- Horizontal exposure

Effective Grain Length Check

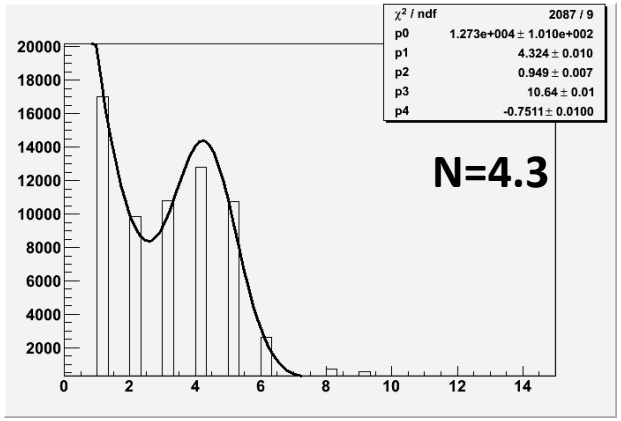
100 keV exposed

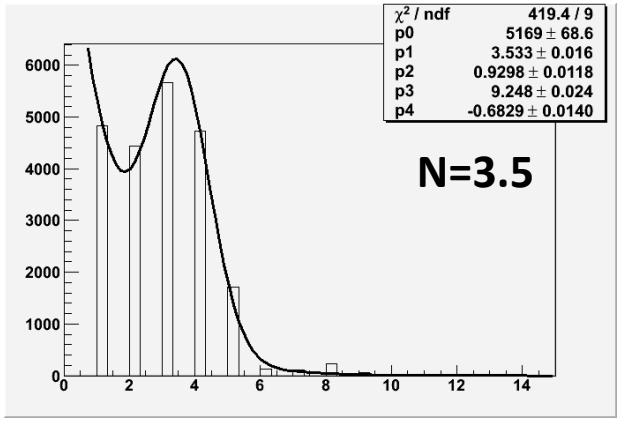




100 keV unexposed

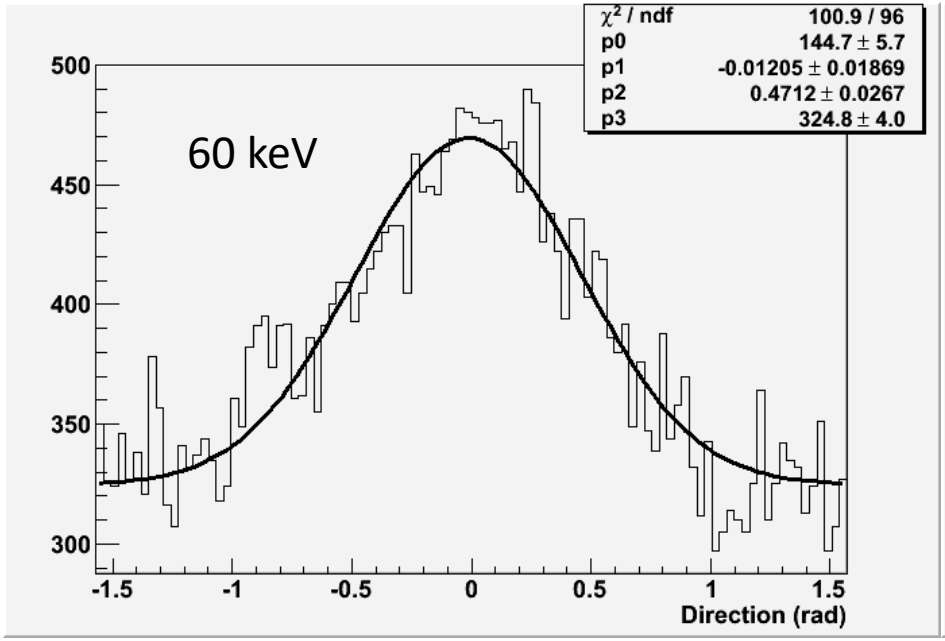
60 keV exposed



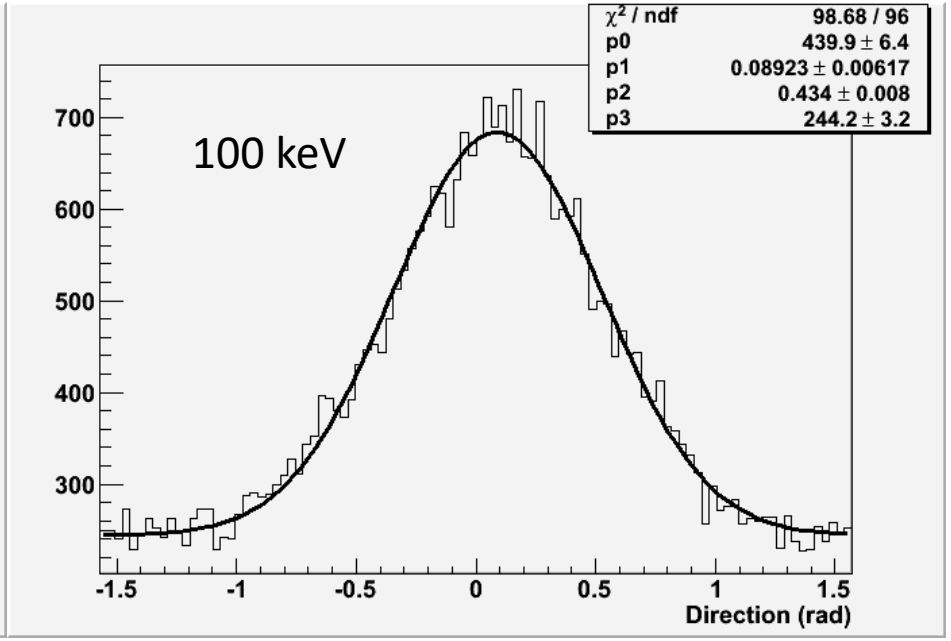


60 keV unexposed

Angular resolution



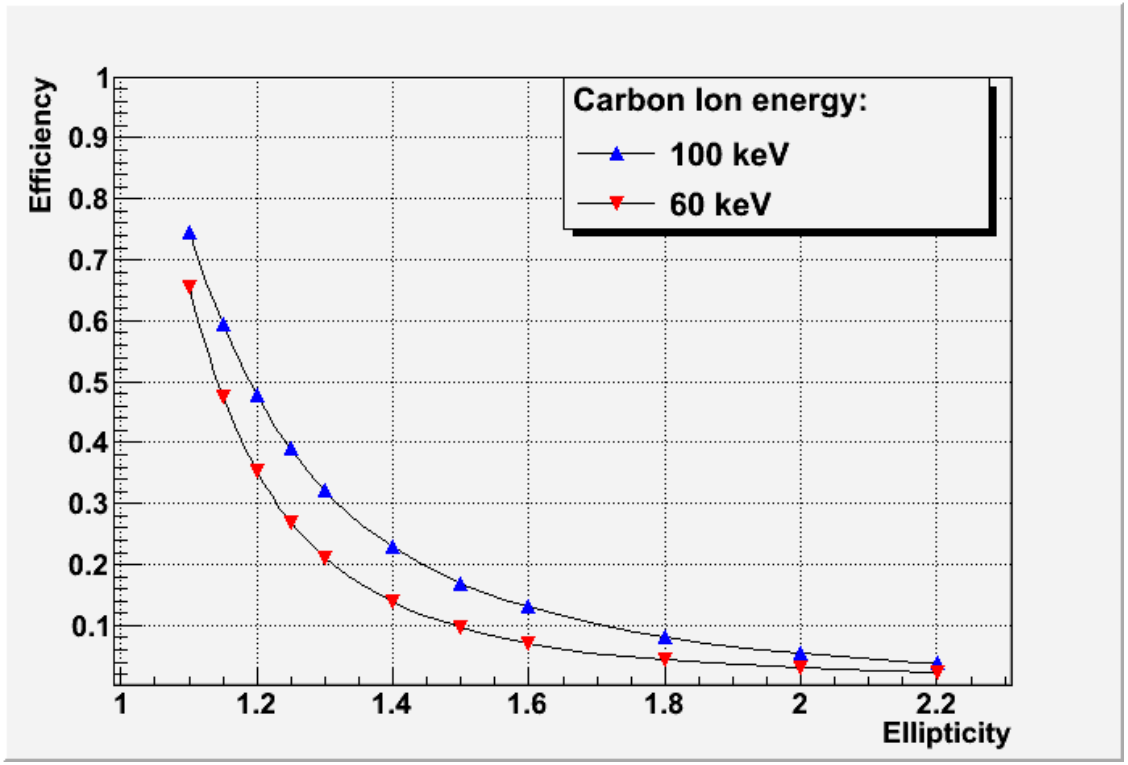
Angular resolution = 471 mrad
(no ellipticity cut applied)



Angular resolution = 434 mrad
(no ellipticity cut applied)

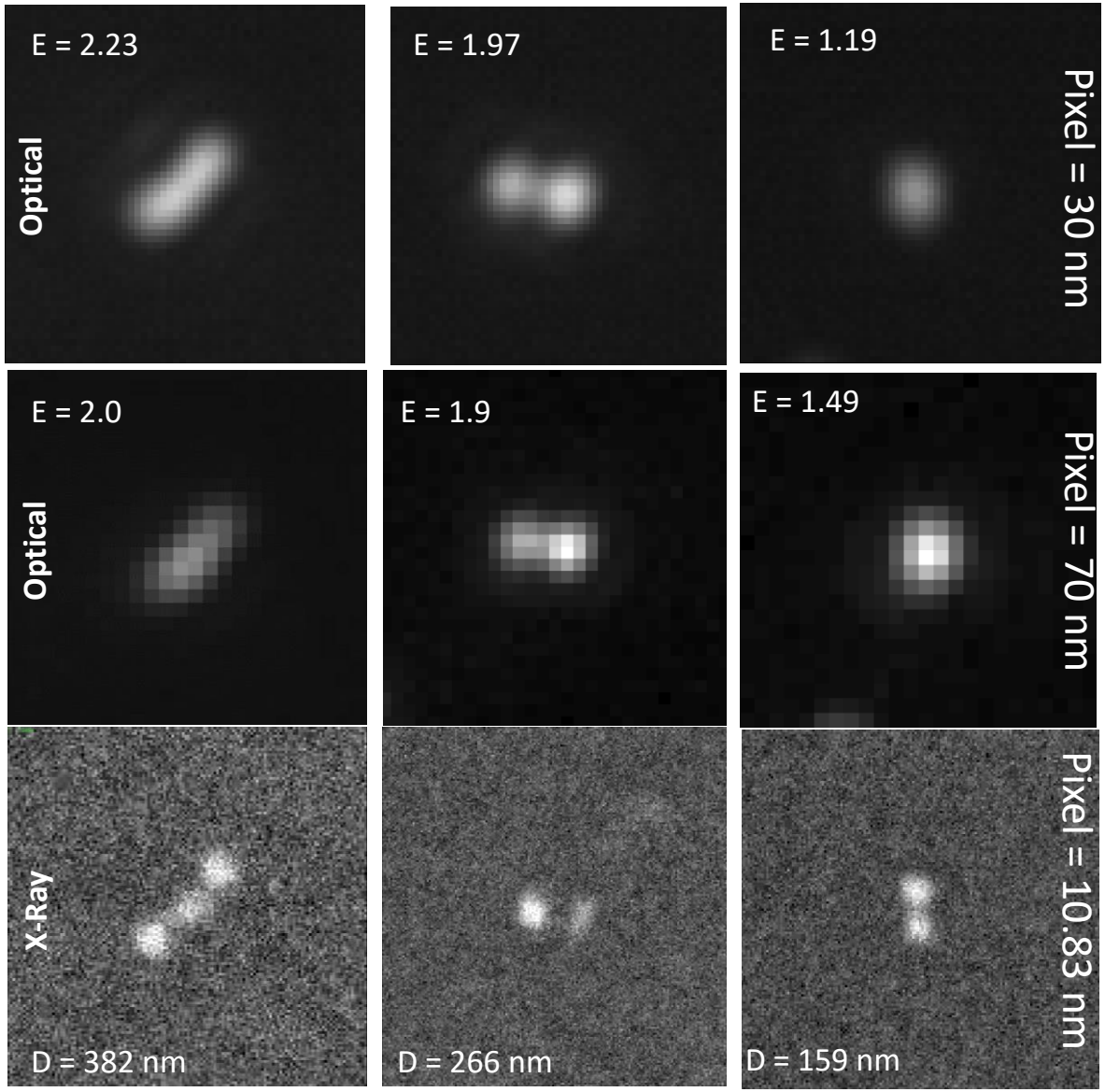
Ellipticity cut efficiency

$$Eff = \frac{N_{exposed}^{after\ cut} - N_{unexposed}^{after\ cut}}{N_{exposed}^{before\ cut} - N_{unexposed}^{before\ cut}}$$

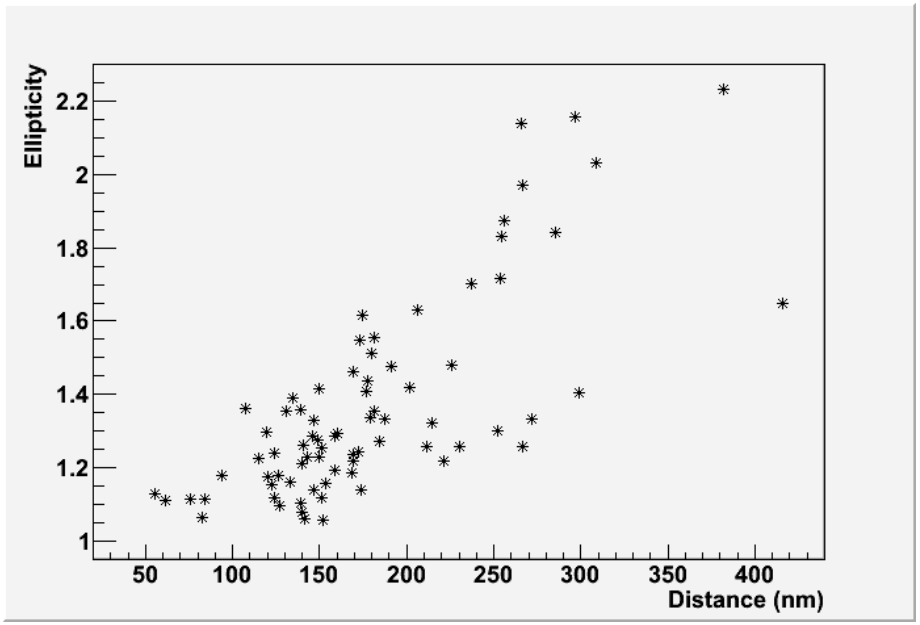


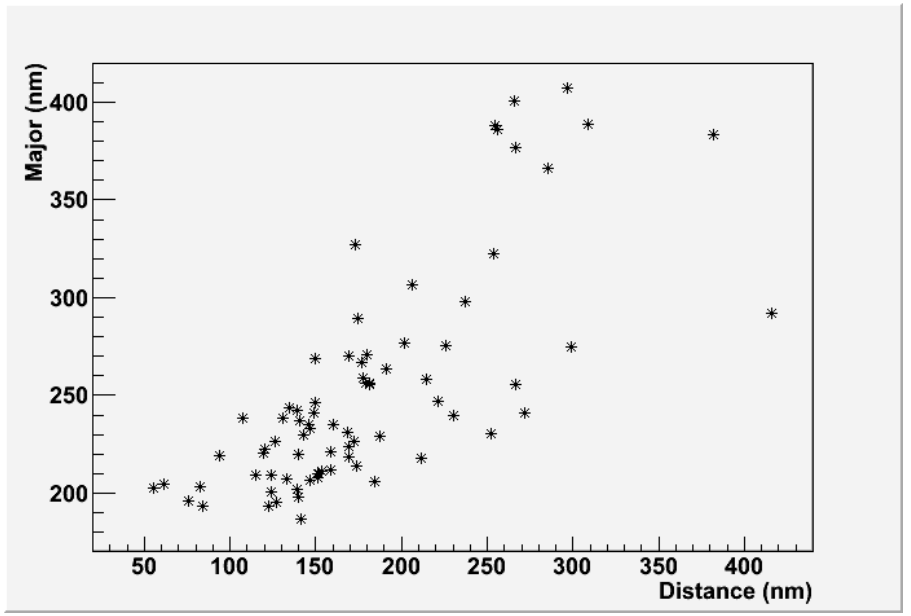
Efficiency cross-check with X-Ray microscope

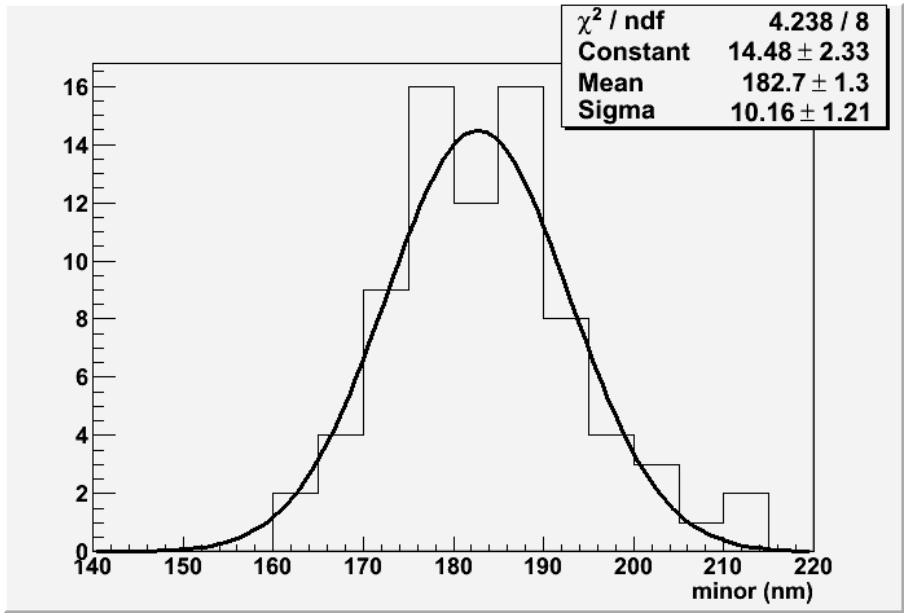
Shape Analysis

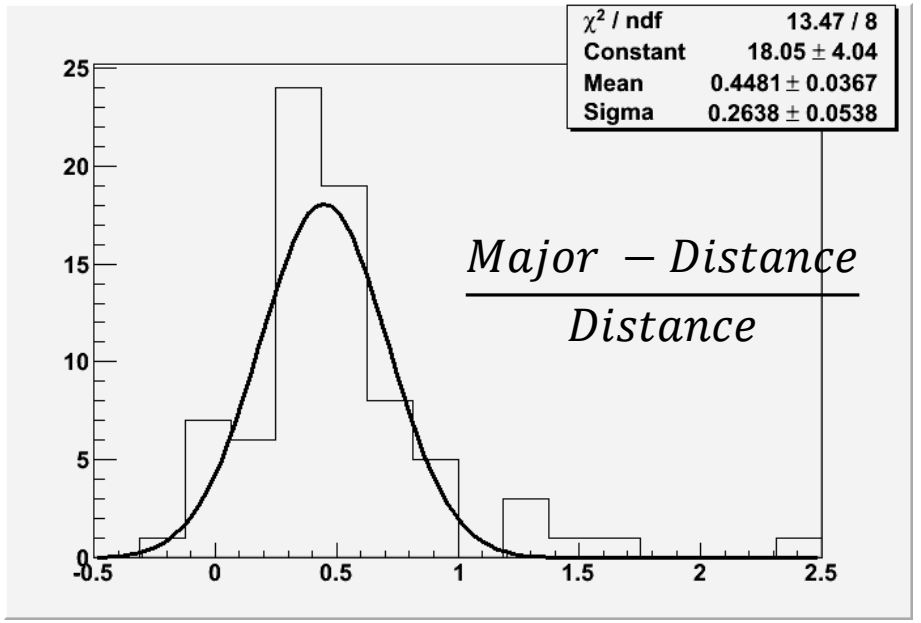


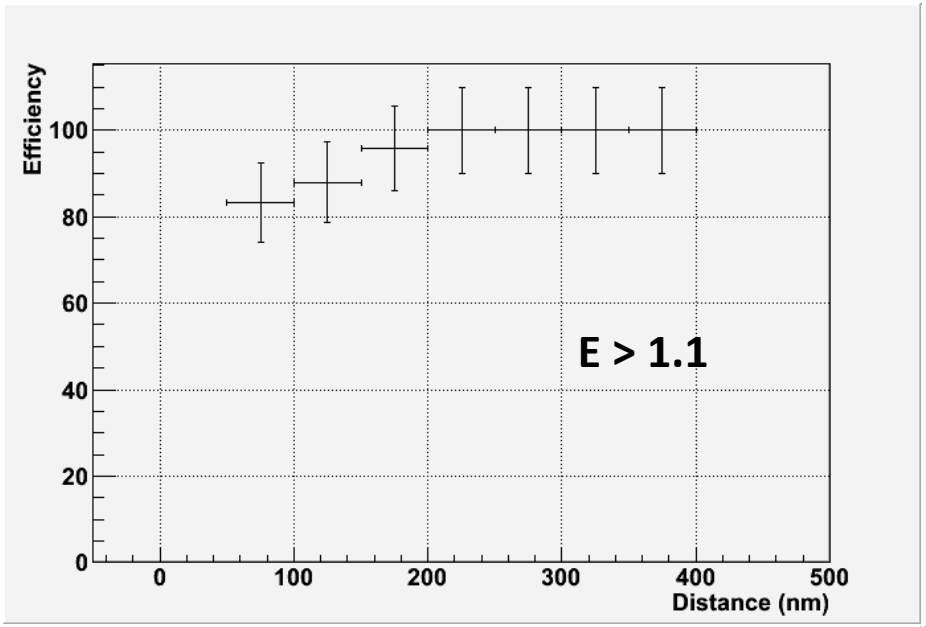
- 121 views scanned with X-Ray mic.
- 22 views analysed with optical mic.
- 2 views are found damaged
- 77 tracks selected
- 2D Gaussian fit was applied to every selected cluster

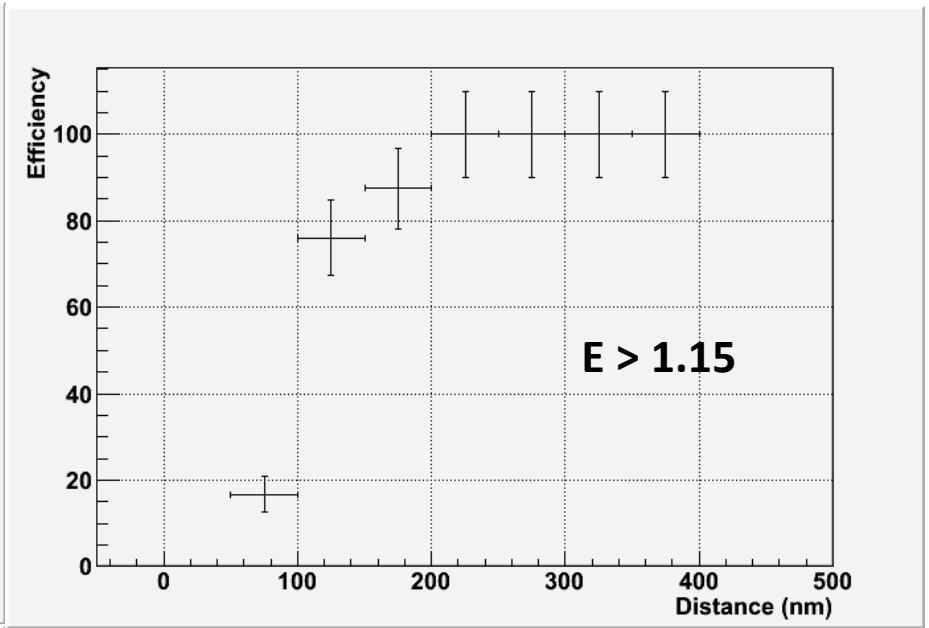

Ellipticity
Distance (nm)

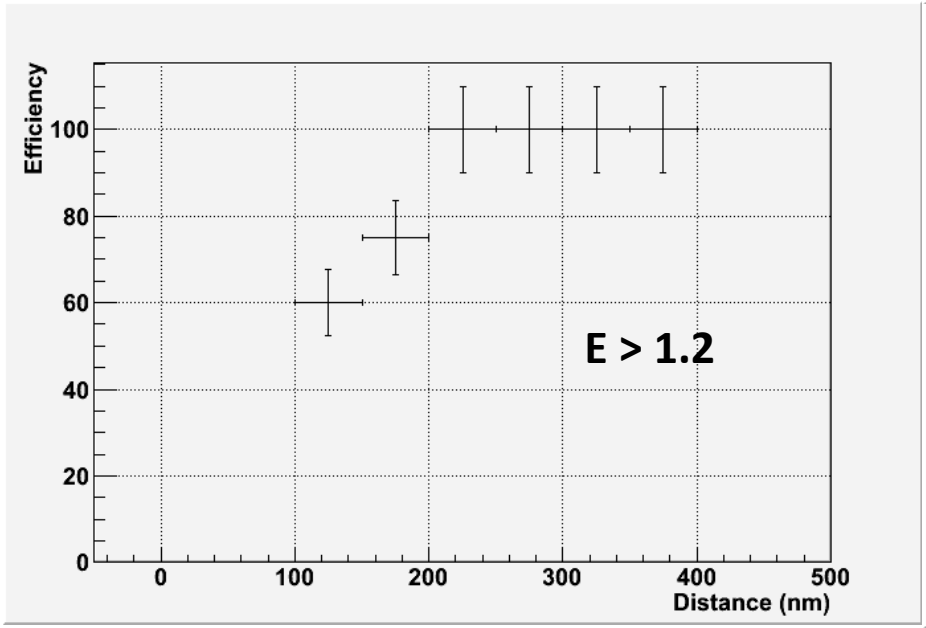

Major (nm)
Distance (nm)

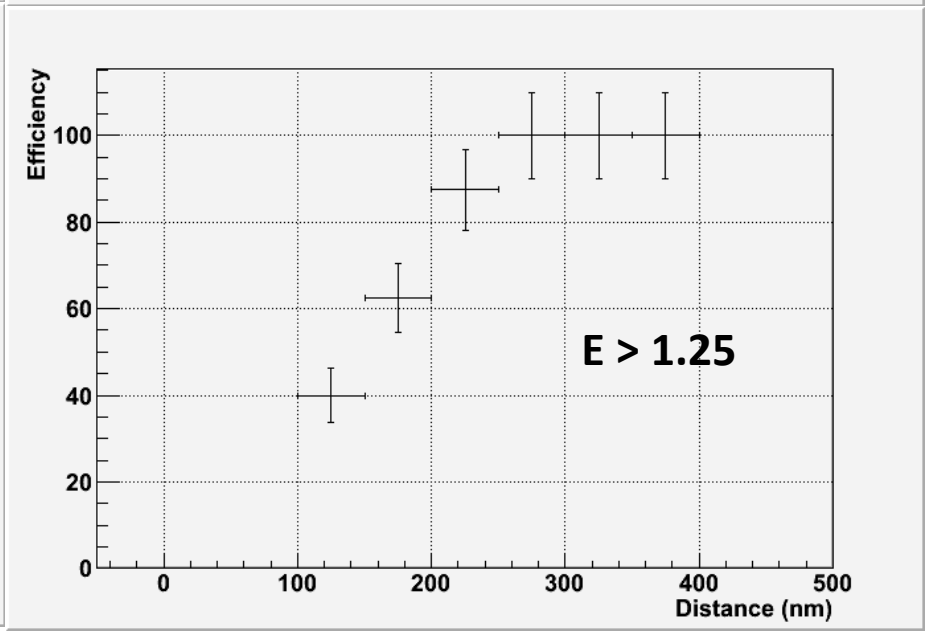

χ² / ndf 4.238 / 8
Constant 14.48 ± 2.33
Mean 182.7 ± 1.3
Sigma 10.16 ± 1.21
minor (nm)


χ² / ndf 13.47 / 8
Constant 18.05 ± 4.04
Mean 0.4481 ± 0.0367
Sigma 0.2638 ± 0.0538
Major − Distance / Distance

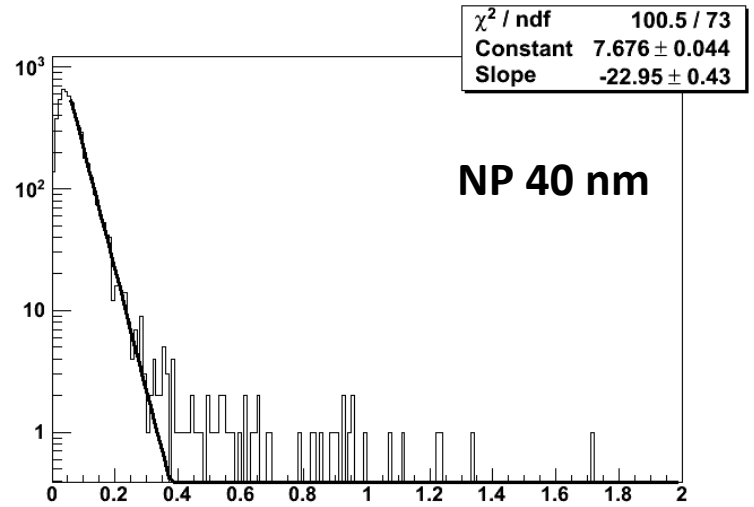

Efficiency
100
80
60
40
20
0
0
100
200
300
400
500
Distance (nm)
E > 1.1

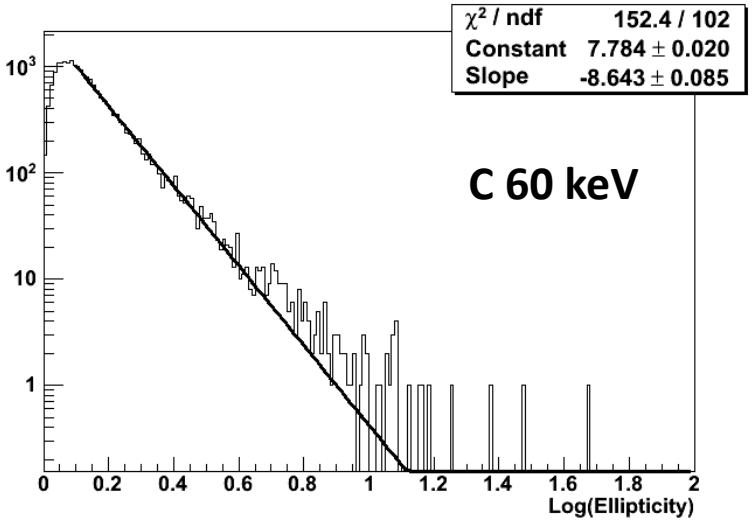

Efficiency
100
80
60
40
20
0
0
100
200
300
400
500
Distance (nm)
E > 1.15

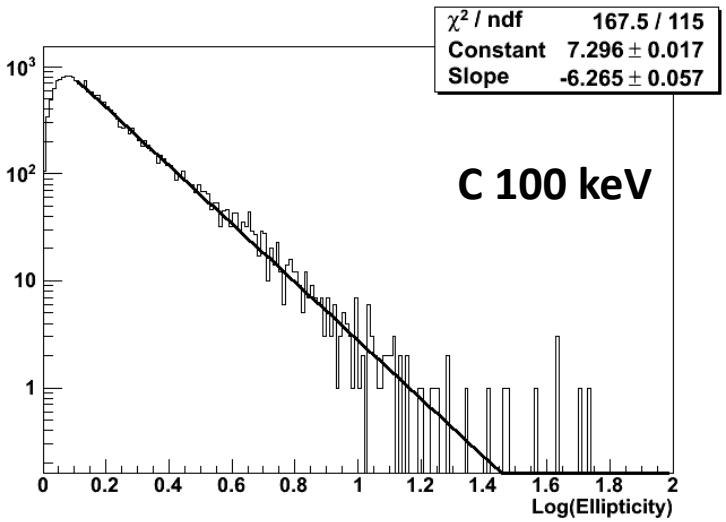

Efficiency
100
80
60
40
20
0
0
100
200
300
400
500
Distance (nm)
E > 1.2


Efficiency
100
80
60
40
20
0
0
100
200
300
400
500
Distance (nm)
E > 1.25

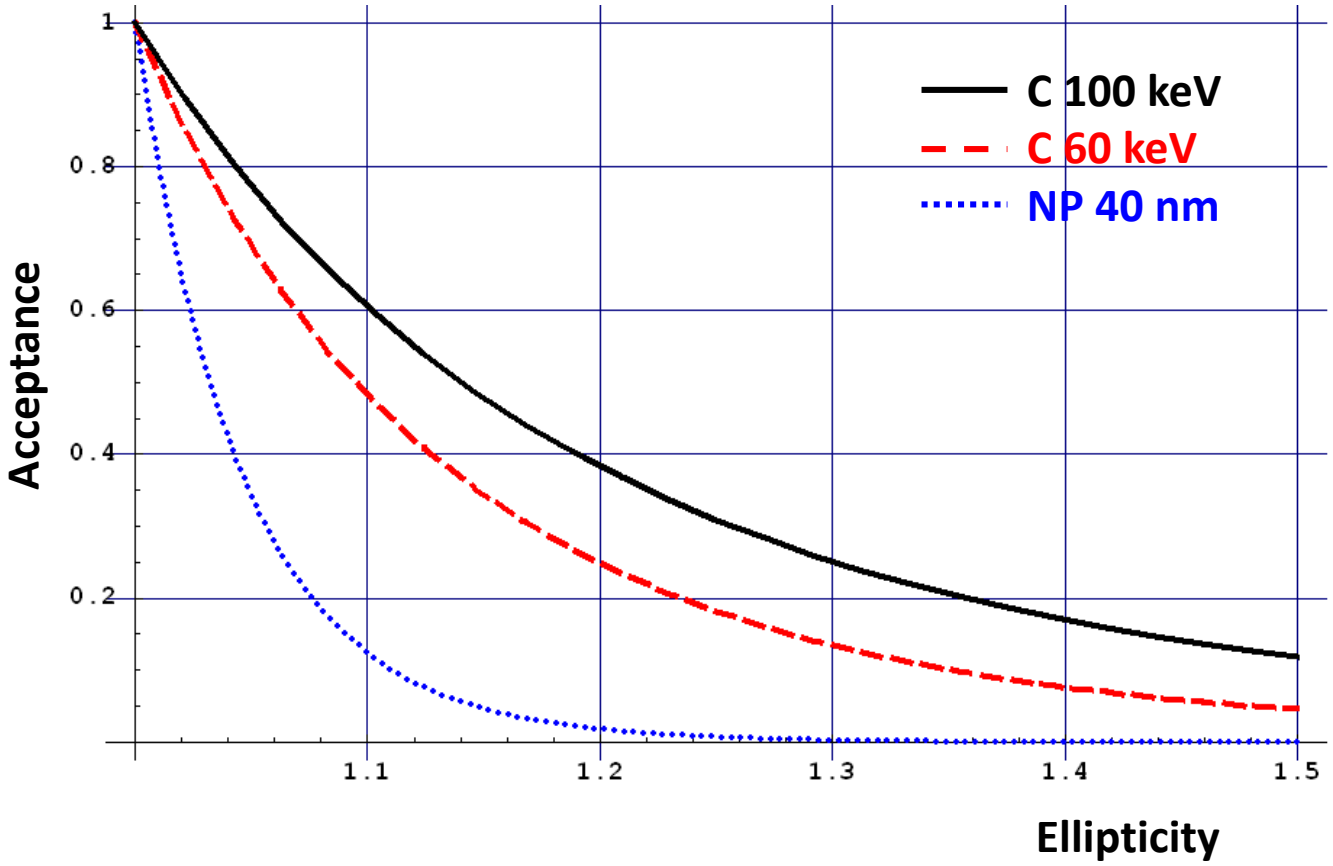
Fit of ellipticity distributions







Acceptance


C 100 keV
C 60 keV
NP 40 nm
Acceptance
1
0.8
0.6
0.4
0.2
1.1
1.2
1.3
1.4
1.5
Ellipticity