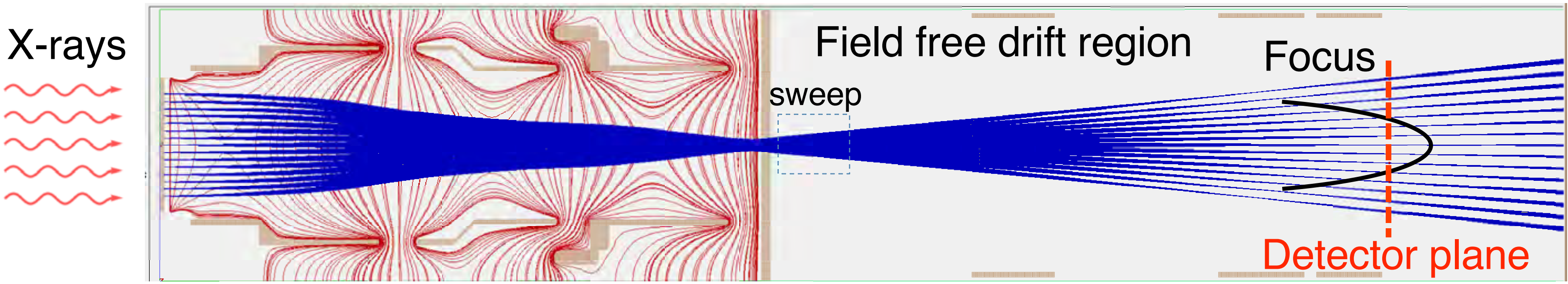
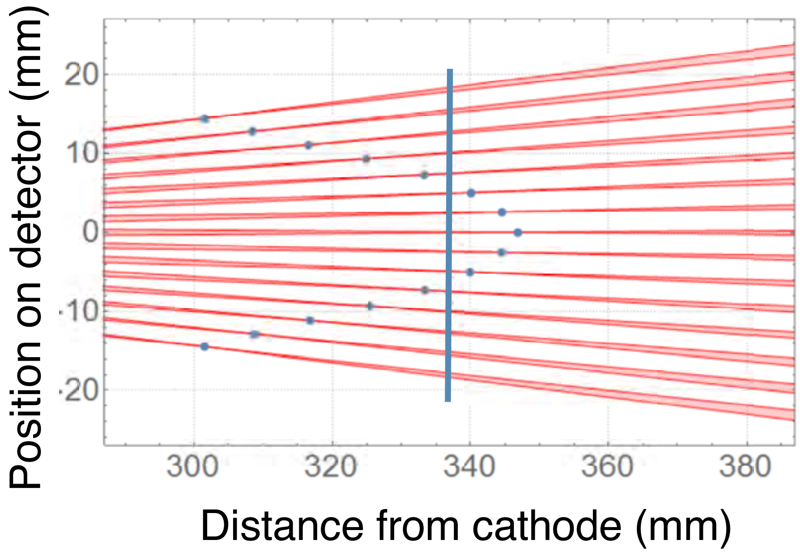
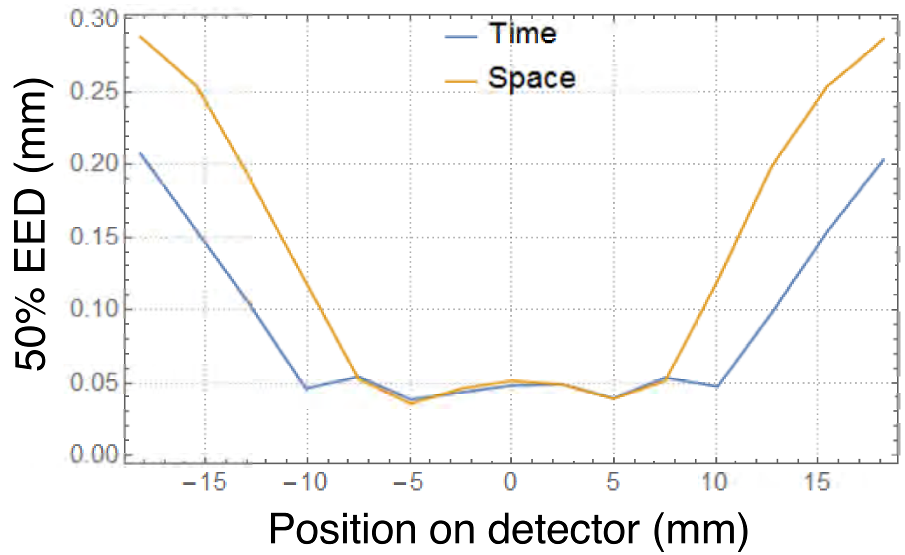



where $\nu_i$ is $V_i / V_k$ at each equipotential surface (red lines) from surface i to k, and * denotes the outbound side of the surface

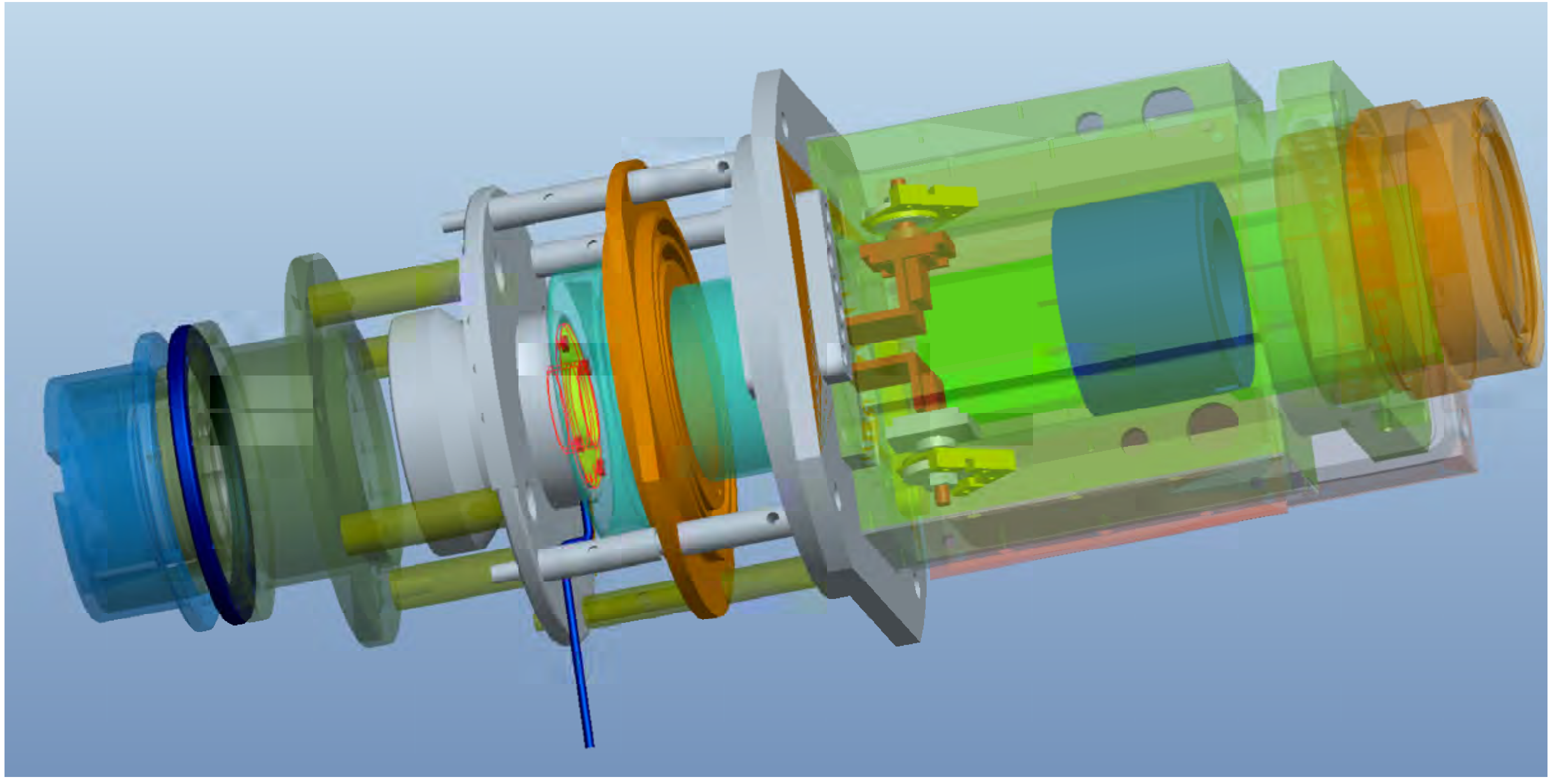
$$\frac{1}{r_p} = N_k \sum_{i=1}^{k} \left( \frac{1}{\sqrt{\nu_i^*}} - \frac{1}{\sqrt{\nu_i}} \right) \cdot \frac{1}{r_i}$$

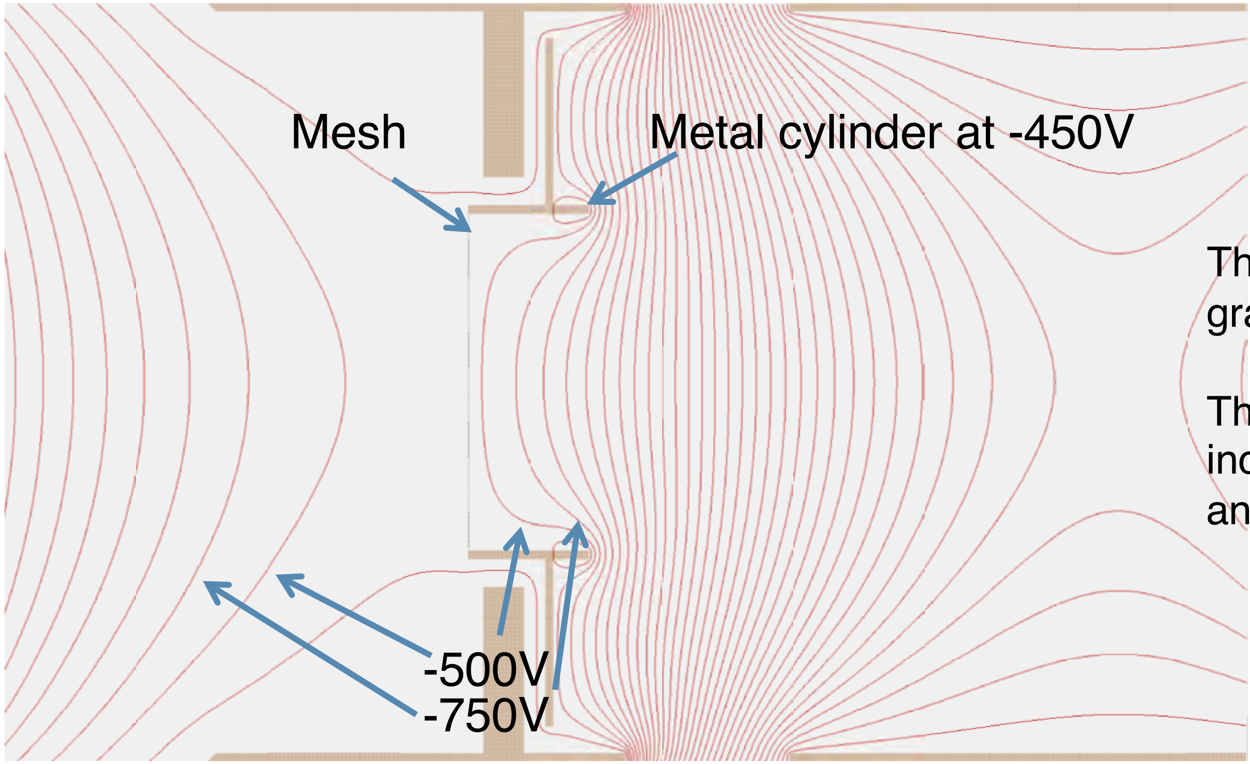
#O.Klemperer, W.D. Wright, Proc. Phys. Soc. **51** 296 (1936)
V. K. Zworykin, G.A. Morton, J.Opt.Soc.Am **26**, 189 (1936)



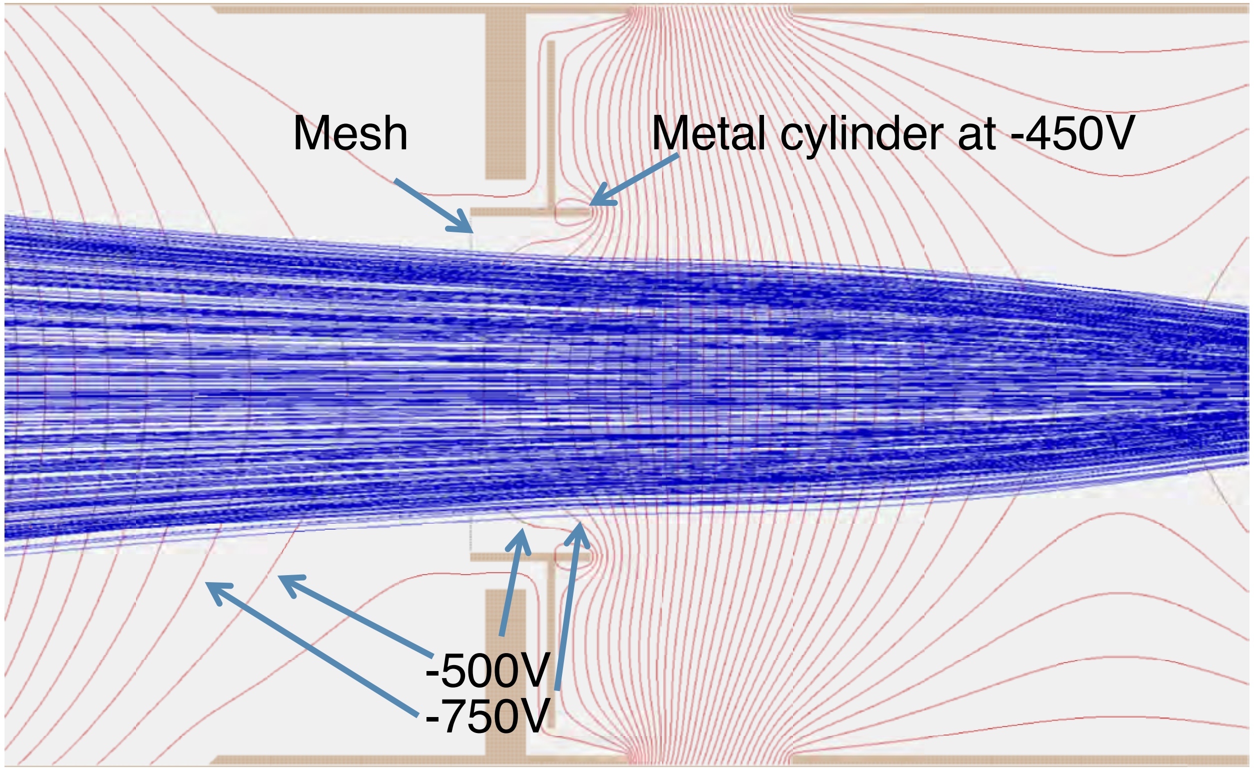

EED = Enclosed Energy Diameter






The mesh further relaxes the gradient closer to the axis

The effective focal length increases with off axis distance and hence flattens the focus

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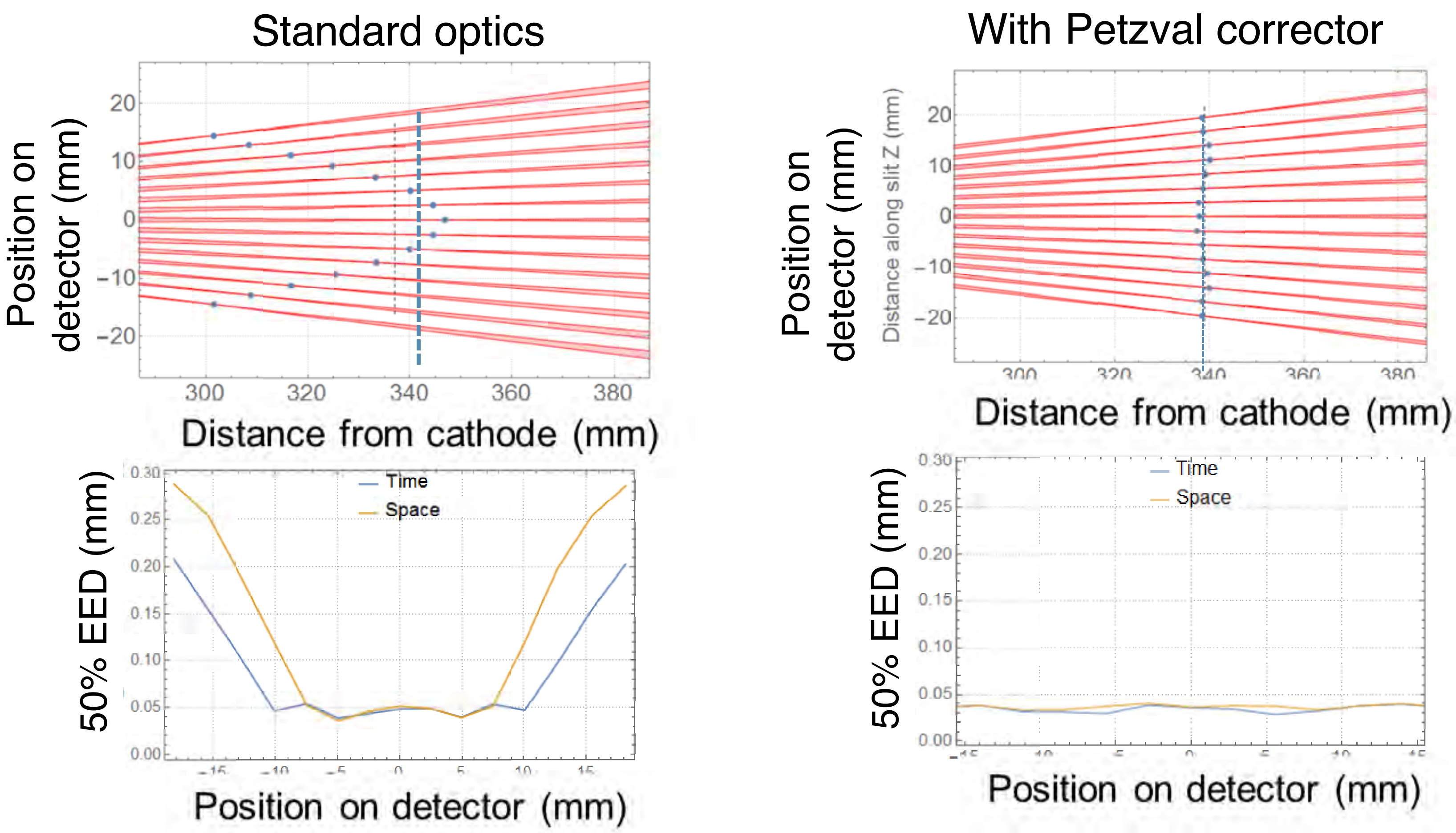
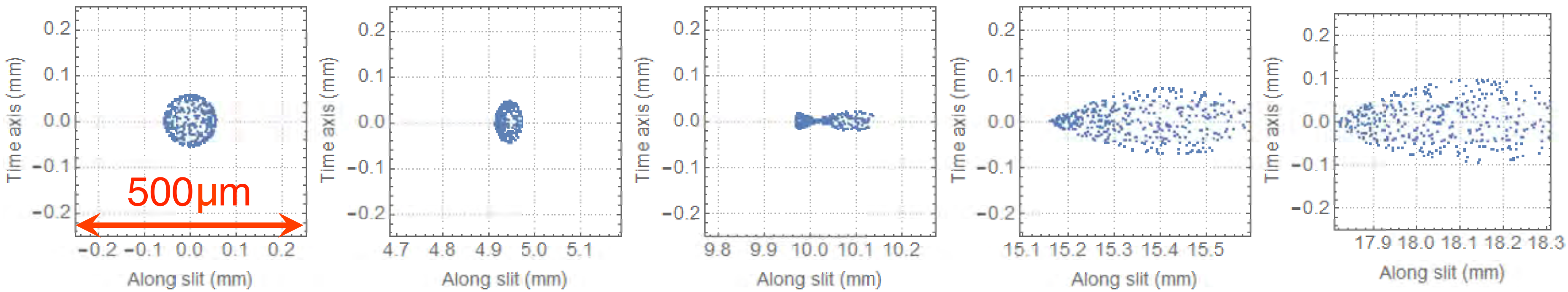
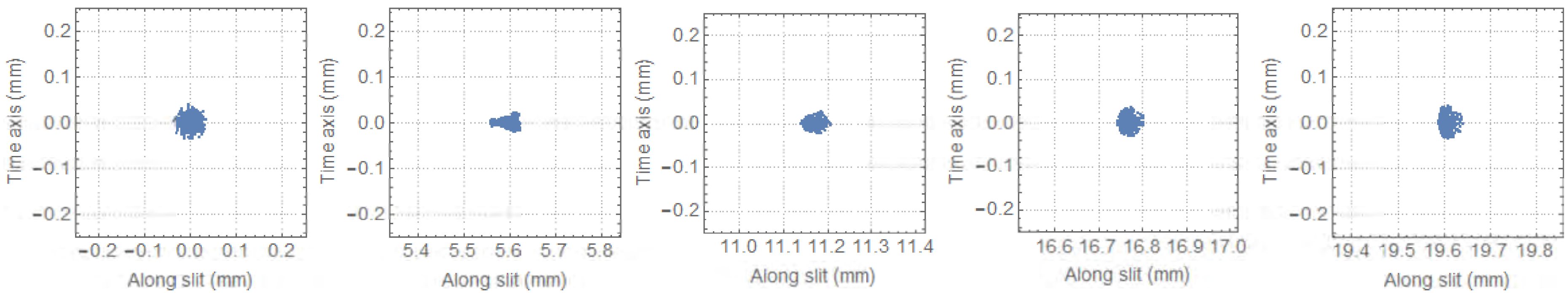


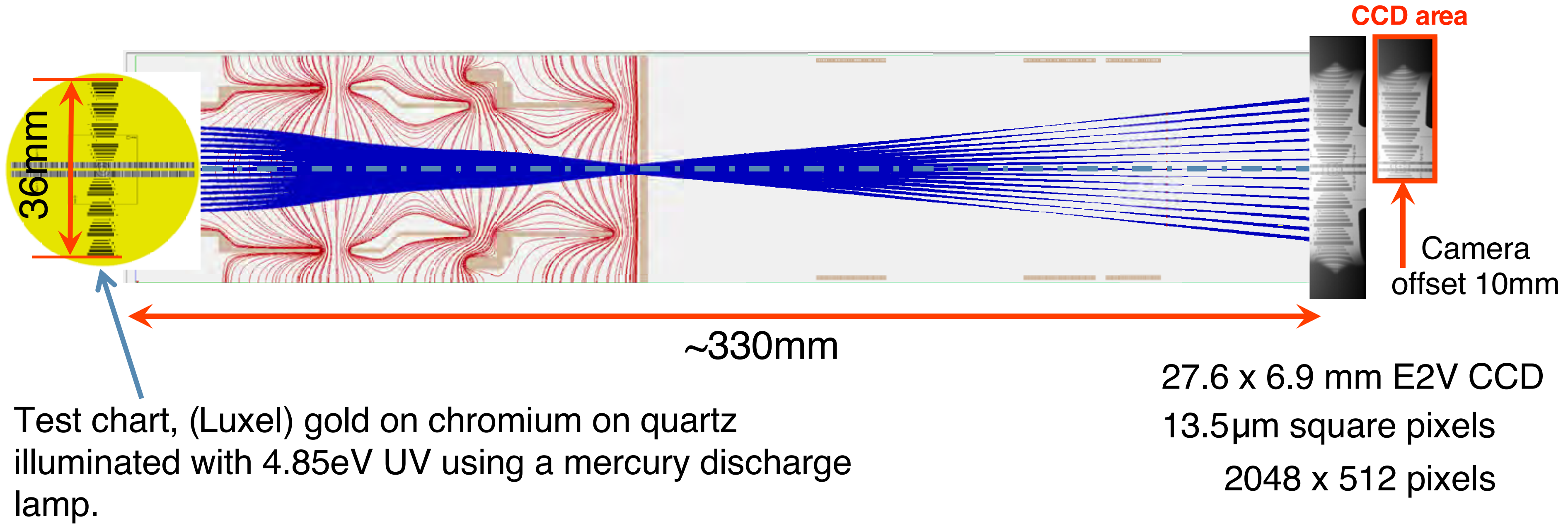

EED = Enclosed Energy Diameter



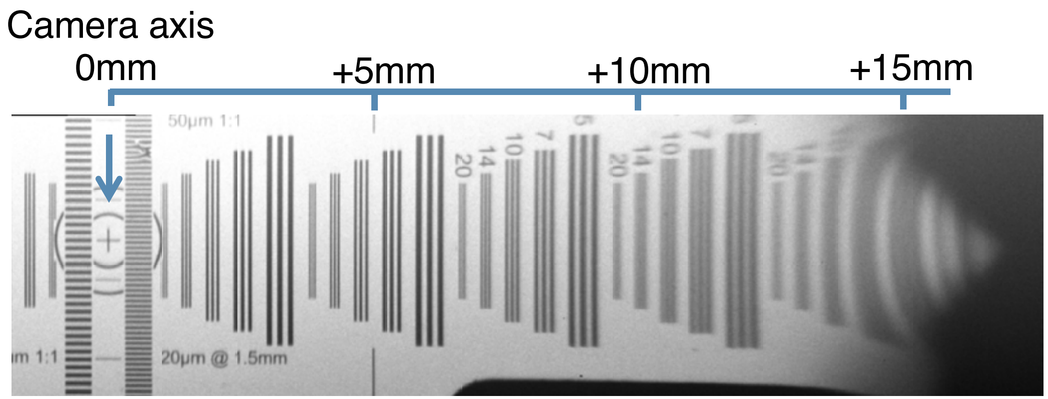

With Petzval corrector

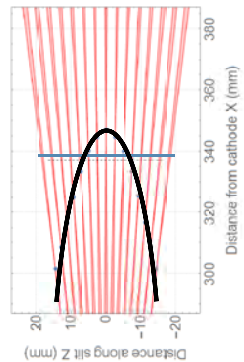


So what does this look like in reality?


CCD area
36mm
Camera
offset 10mm
~330mm
27.6 x 6.9 mm E2V CCD
13.5μm square pixels
2048 x 512 pixels
Test chart, (Luxel) gold on chromium on quartz
illuminated with 4.85eV UV using a mercury discharge
lamp.

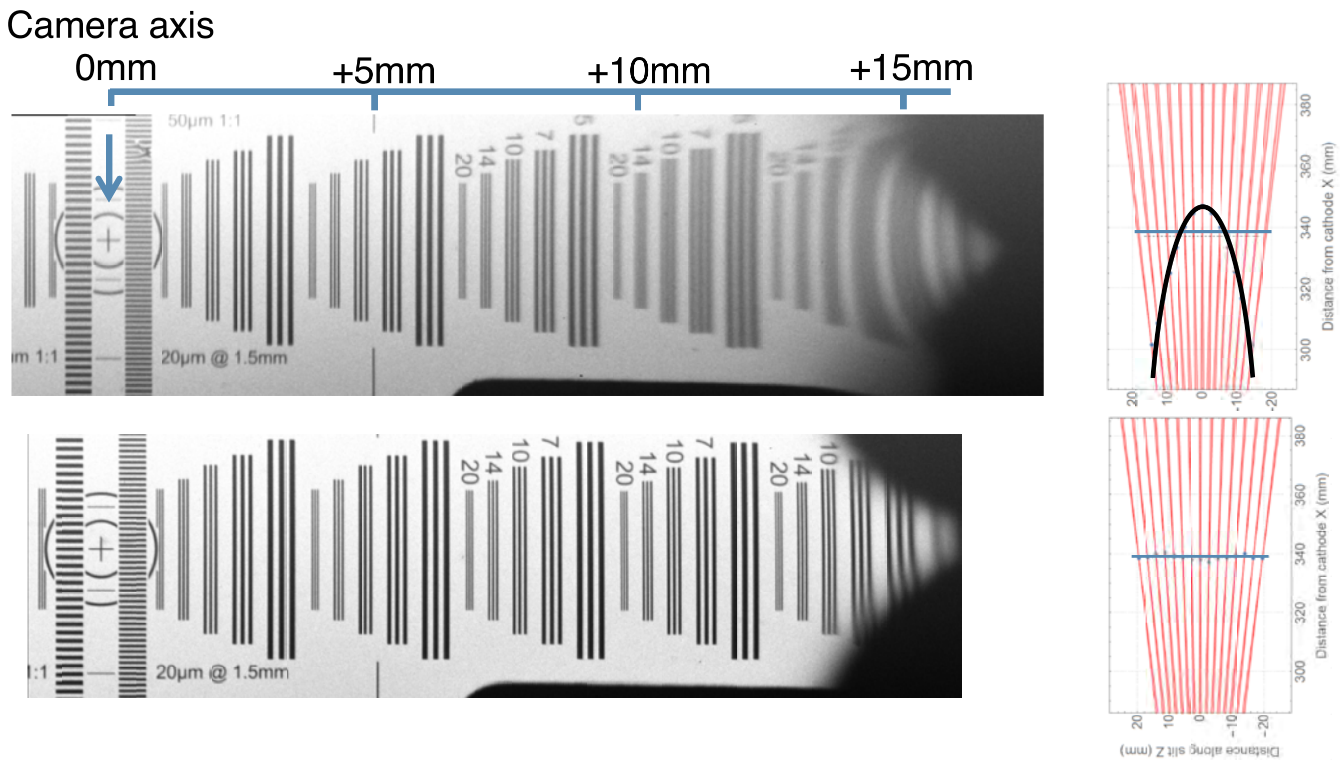
**Standard optics**

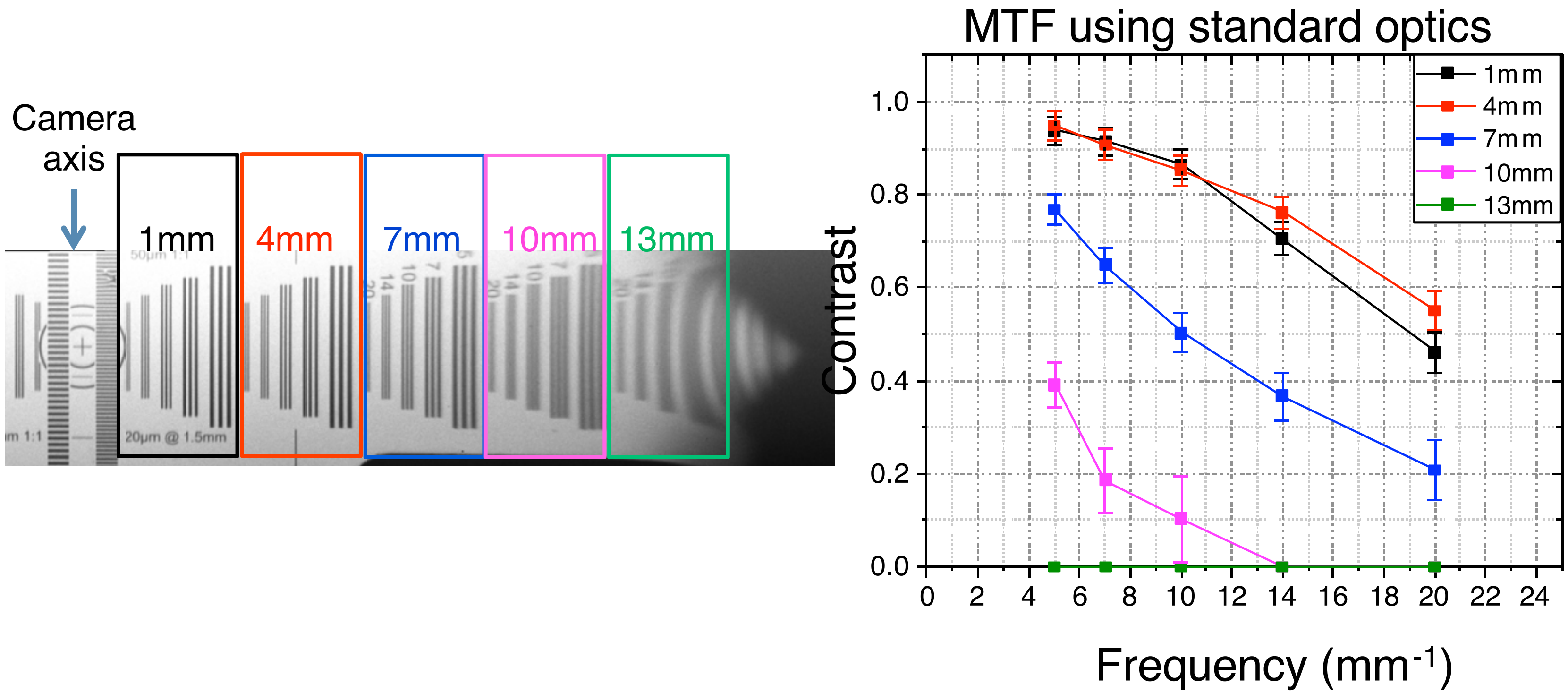


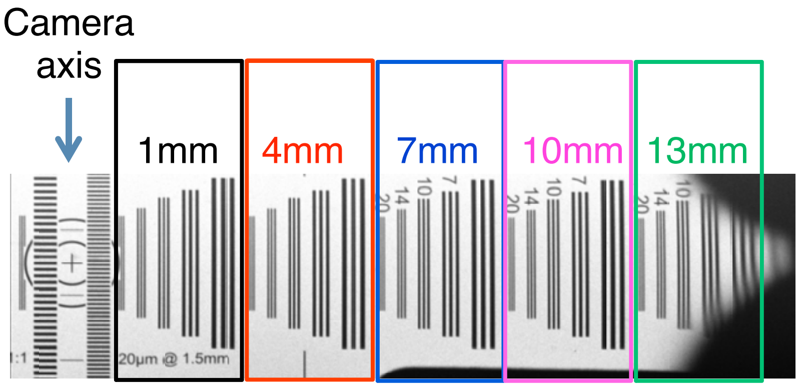



**Standard optics**

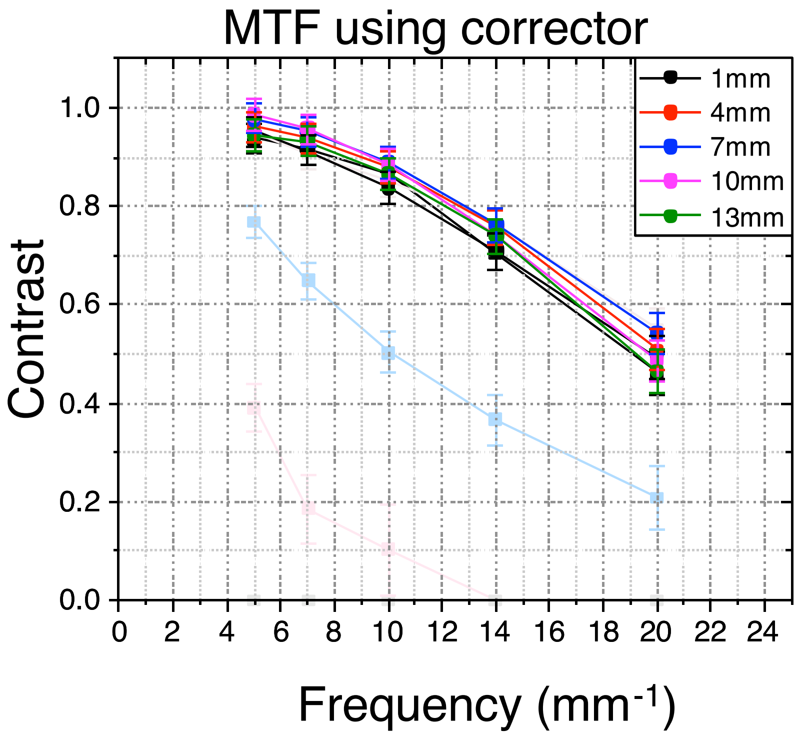
**With Petzval correction**



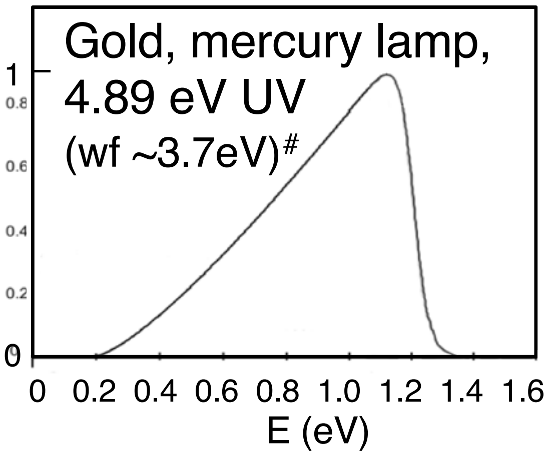

Camera axis
1mm
4mm
7mm
10mm
13mm
MTF using standard optics
Contrast
Frequency (mm-1)
0.0
0.2
0.4
0.6
0.8
1.0
0
2
4
6
8
10
12
14
16
18
20
22
24
1mm
4mm
7mm
10mm
13mm

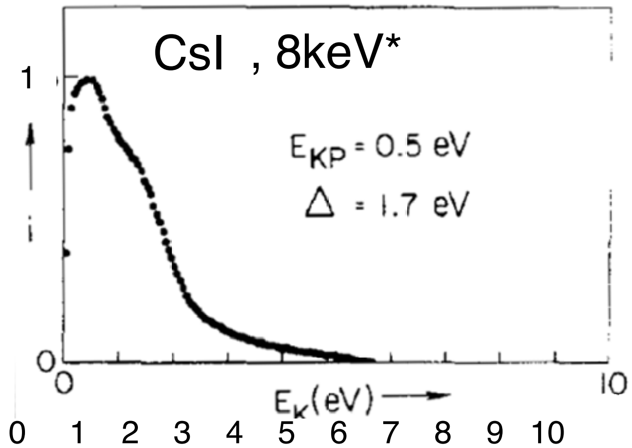


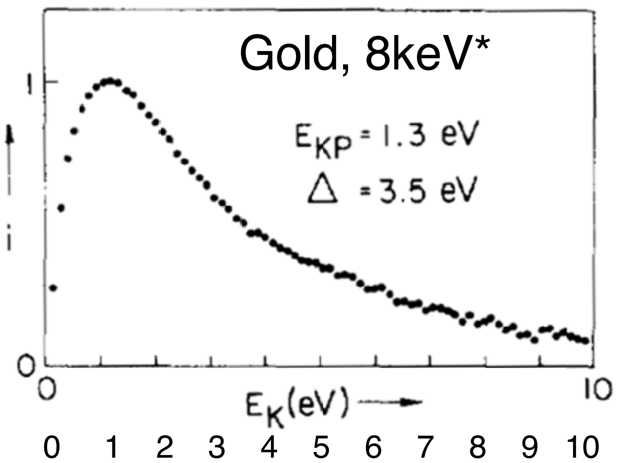

These improvements are in
both the space and time axes



How relevant are these results for X-rays?


Gold, mercury lamp,
4.89 eV UV
(wf ~3.7eV)#
1
0.8
0.6
0.4
0.2
0
0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6
E (eV)


CsI , 8keV*
$E_{KP}$ = 0.5 eV
Δ = 1.7 eV
1
0
i
0
10
$E_K$(eV)
0 1 2 3 4 5 6 7 8 9 10


Gold, 8keV*
$E_{KP}$ = 1.3 eV
Δ = 3.5 eV
1
0
i
0
10
$E_K$(eV)
0 1 2 3 4 5 6 7 8 9 10