ALPHA reflection LIME

01/10/2024

About reflection

Hypothesis: Alpha reflection are due to reflection on window and then GEM

Validation:

- Measure the distance between the original signal and the reflected one **on the picture**
- using only the original image: compute the expected position of the shadow

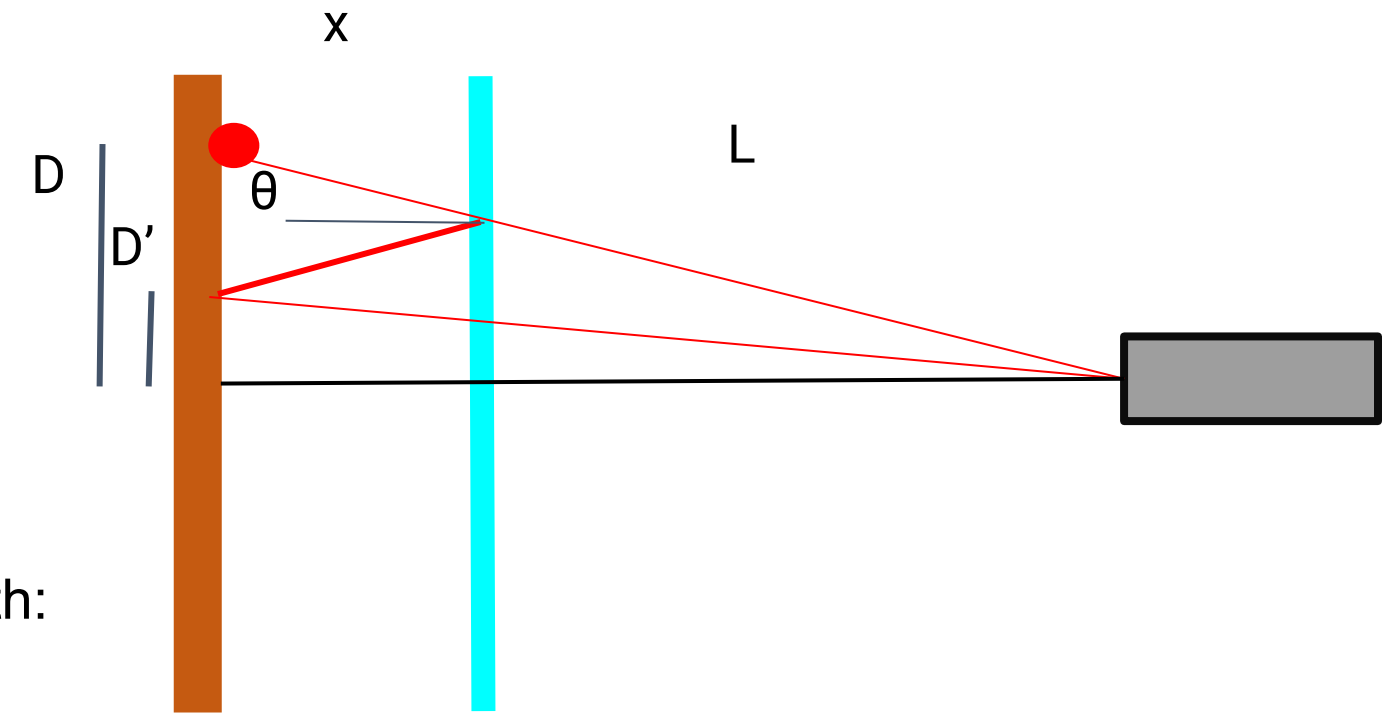
If they match we prove the hypothesis!

$$D = (x + L)tg\theta$$

$$D - D' = 2xtg\theta$$

$$\Delta_{co} = \frac{2x}{cos\theta}$$

Difference in optical path:
how unfocused it is



About reflection

LIME

D = 1073 px = 166 mm
x = 50 mm
L = 623 mm

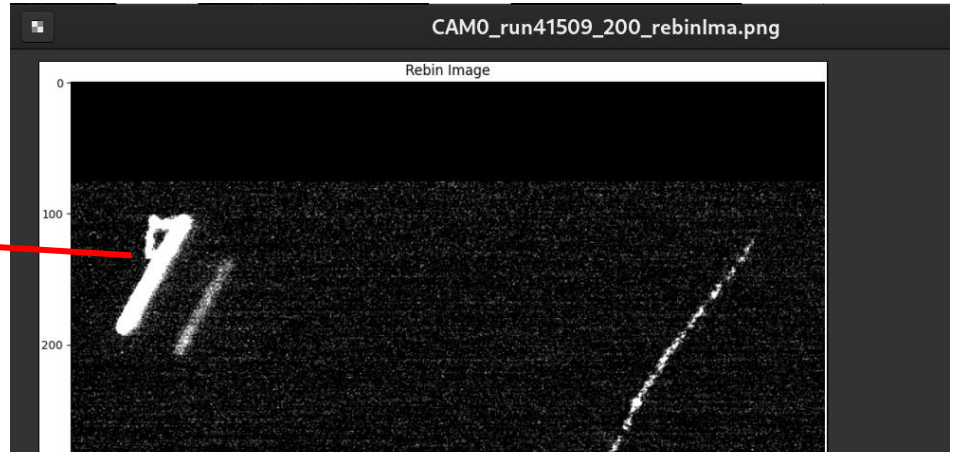
D' estimated = 141 mm

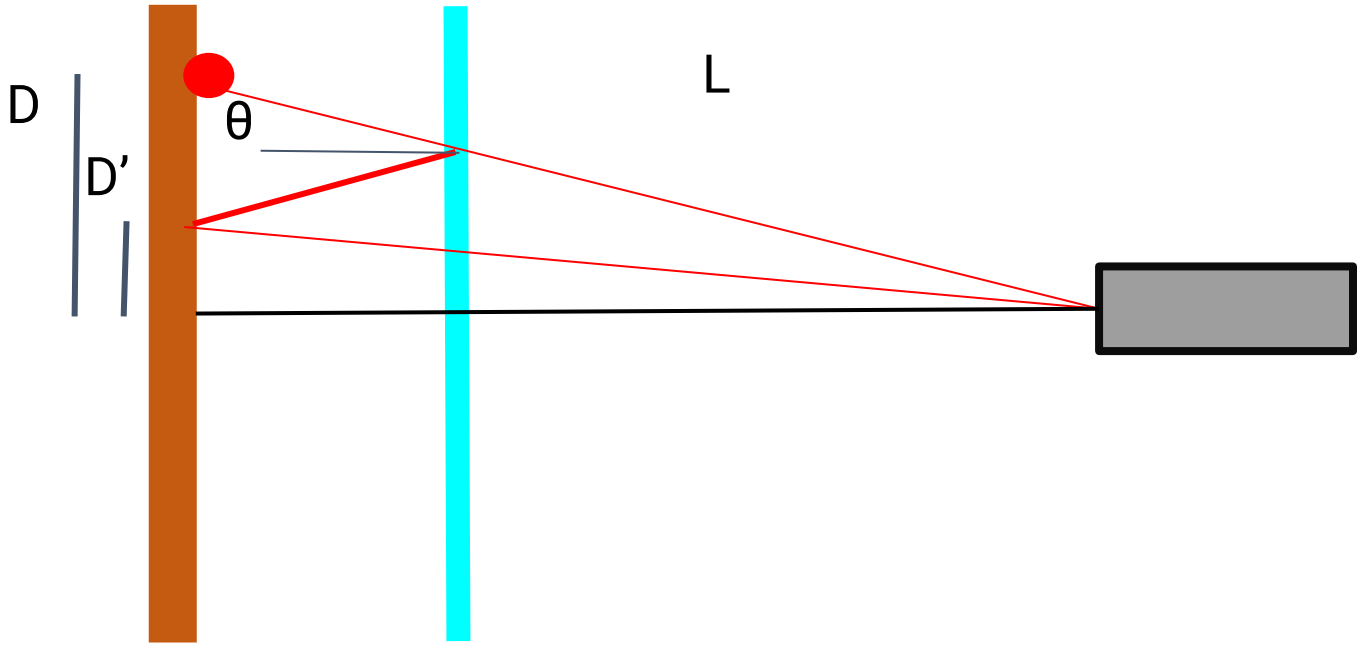
D' measured= 884 px = 137 mm

COMPATIBBILE

$\Delta_{co} =$ 93 mm

Quite unfocused





Visible on GIN?

GIN

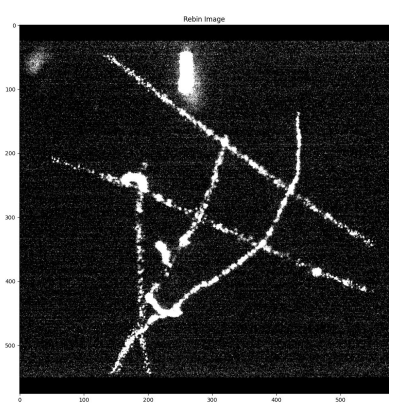
Dmax = 70 mm (corner GEM)
x =35 mm
L = 155mm

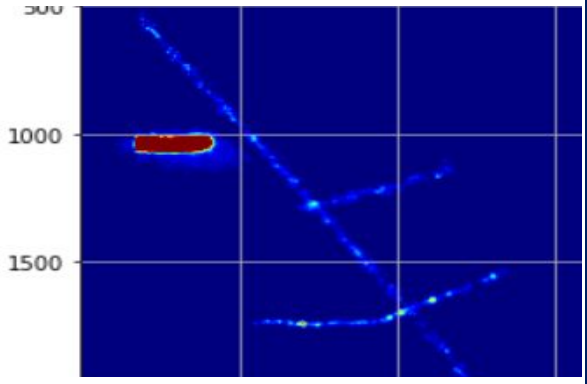
Estimated D-D' (max)

25.8 mm = 515 px

$\Delta_{co} =$ 75 mm (blurry)

Should be Visible





They are: But blurred:
Is it different material of window?

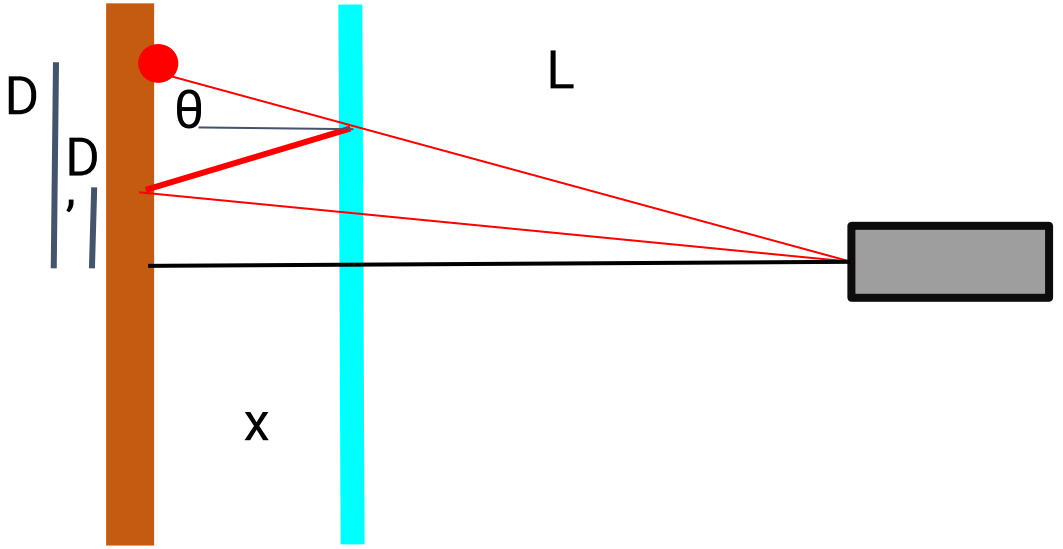
LIME max (for comparison)

Dmax = 240 mm (corner GEM)
x =50 mm
L = 623 mm

Estimated D-D' (max)

35.6 mm = 230 px

$\Delta_{co} =$ 107mm (blurry)



Minimise it

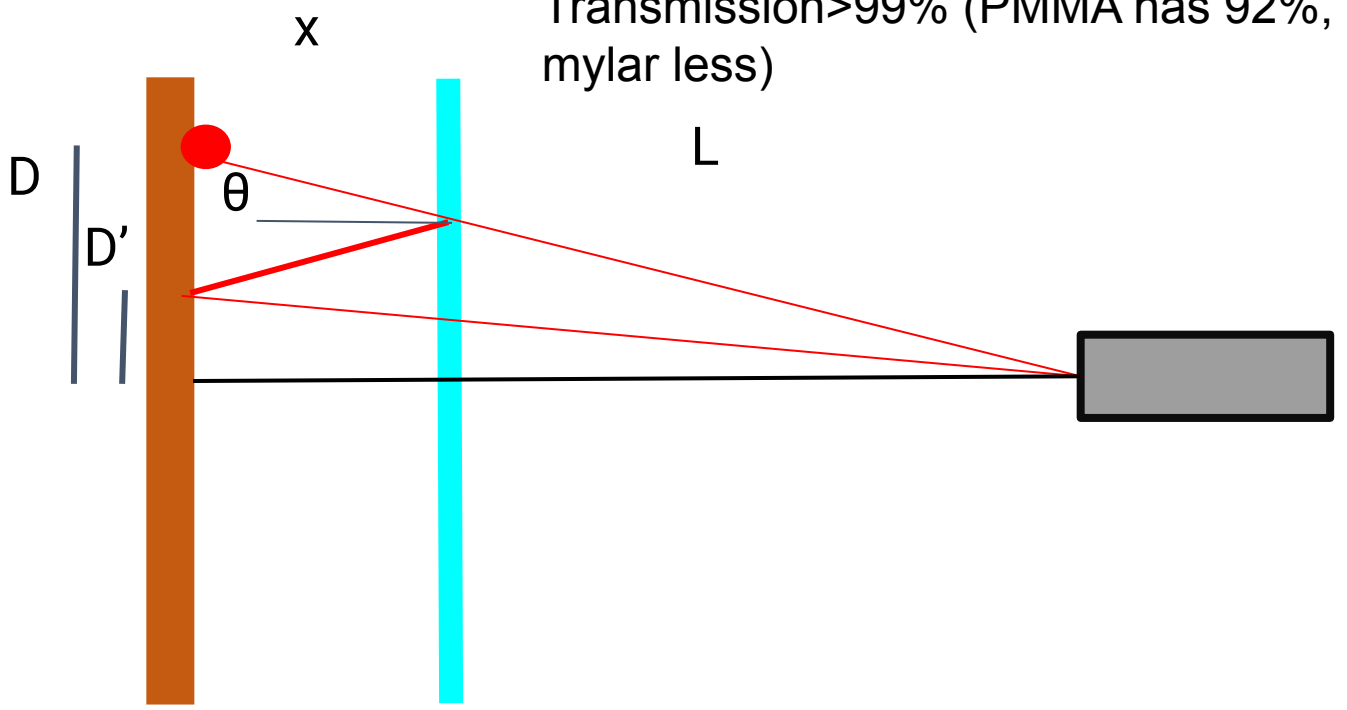
- Avoid reflections: opaque GEMs, non-reflective optical windows
- Play with

$$D - D' = \frac{2xD}{x + L}$$

$$\Delta_{co} = \frac{2x}{cos\theta}$$

SCHOTT optical glasses (fused silica, glass etc.)

Transmission>99% (PMMA has 92%, mylar less)



Another hypotesis

Hypothesis: Alpha reflection are due to refraction al riflession on the window

Validation:

- Measure the distance between the original signal and the refracted+reflected one **on the picture**
- using only the original image: compute the expected position of the shadow

$$D - D' = 3dtg\theta_2$$

n1=1
n2=1.49

$$n_2 = n_1 \frac{tg\theta_1}{tg\theta_2}$$

D' measured = 884 px = 137 mm
D' estimated = 164.5 mm

NOT COMPATIBBILE