CPM1

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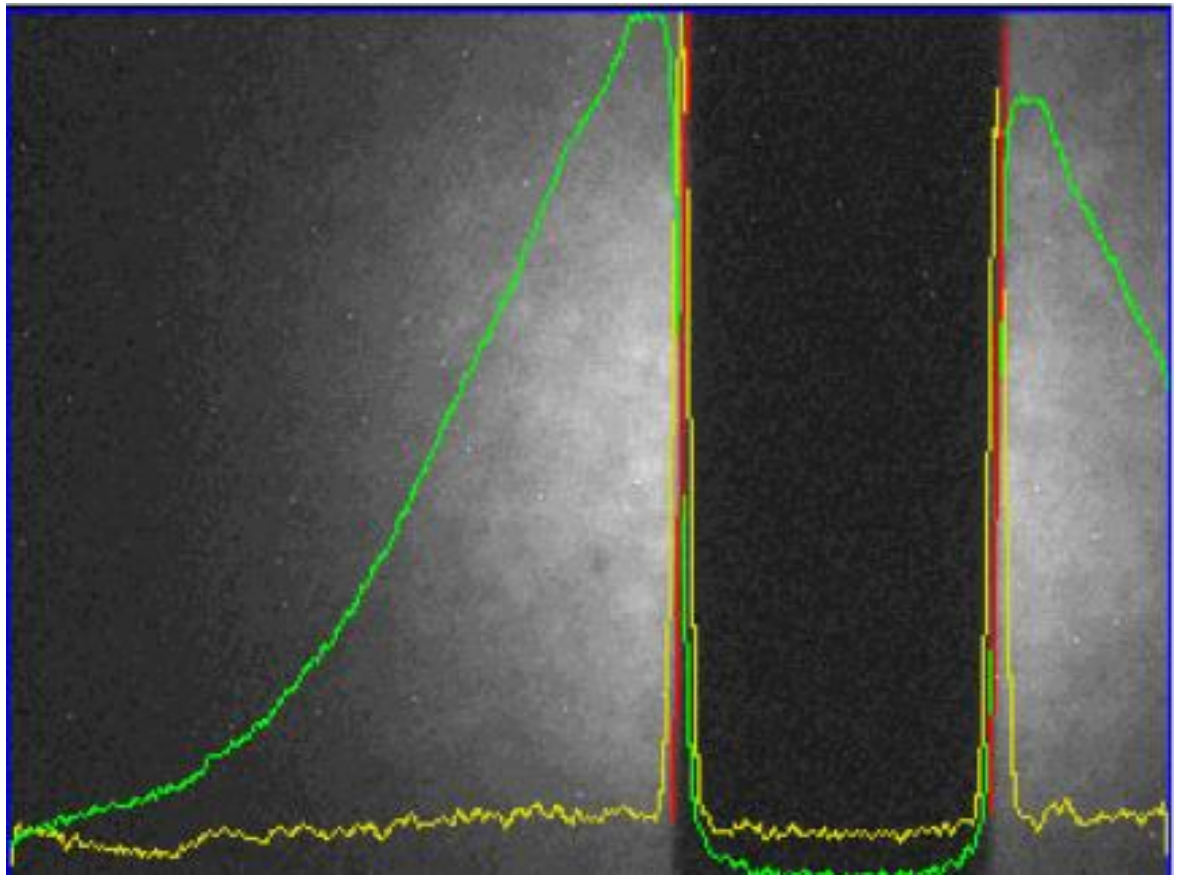
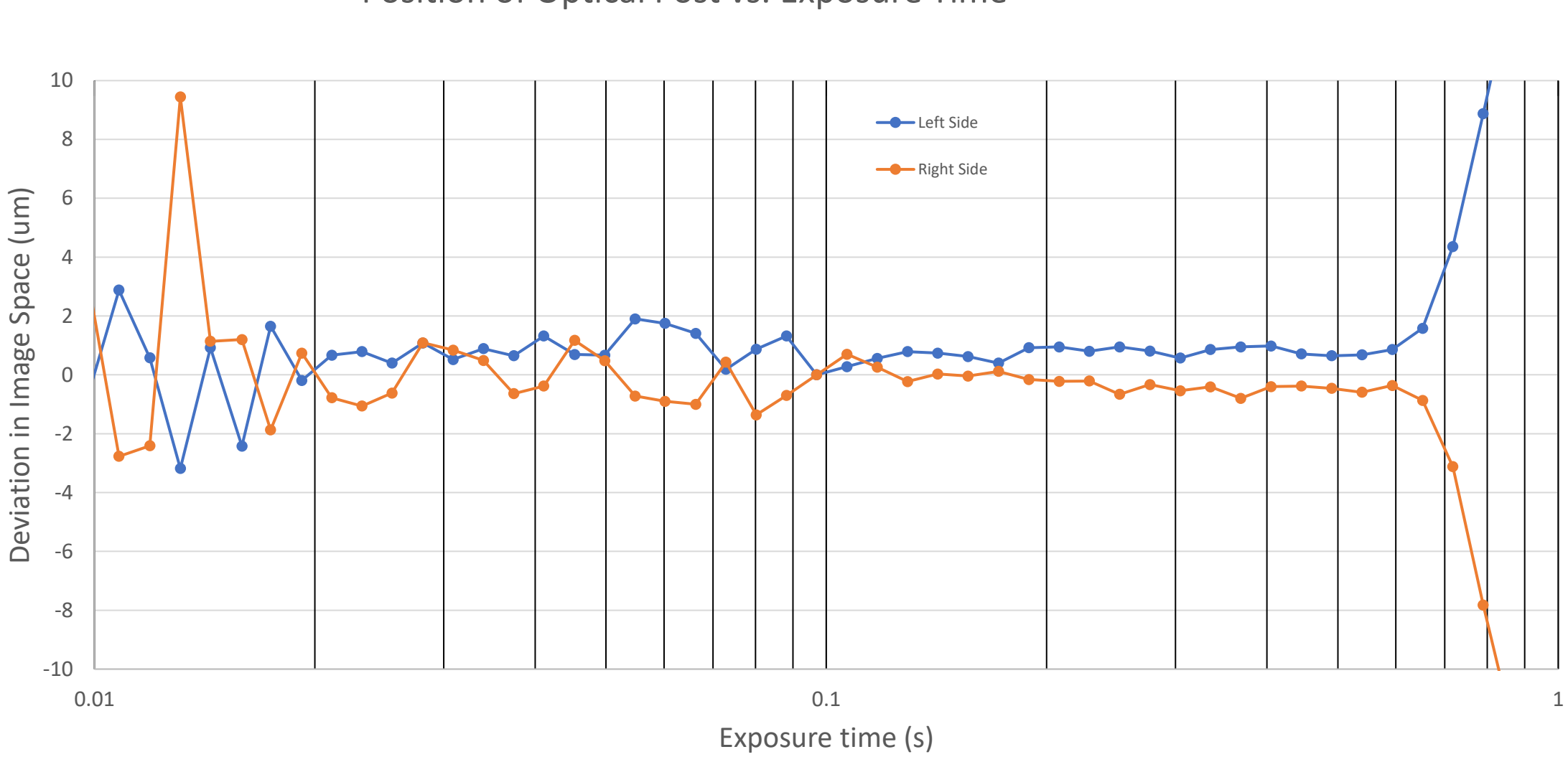
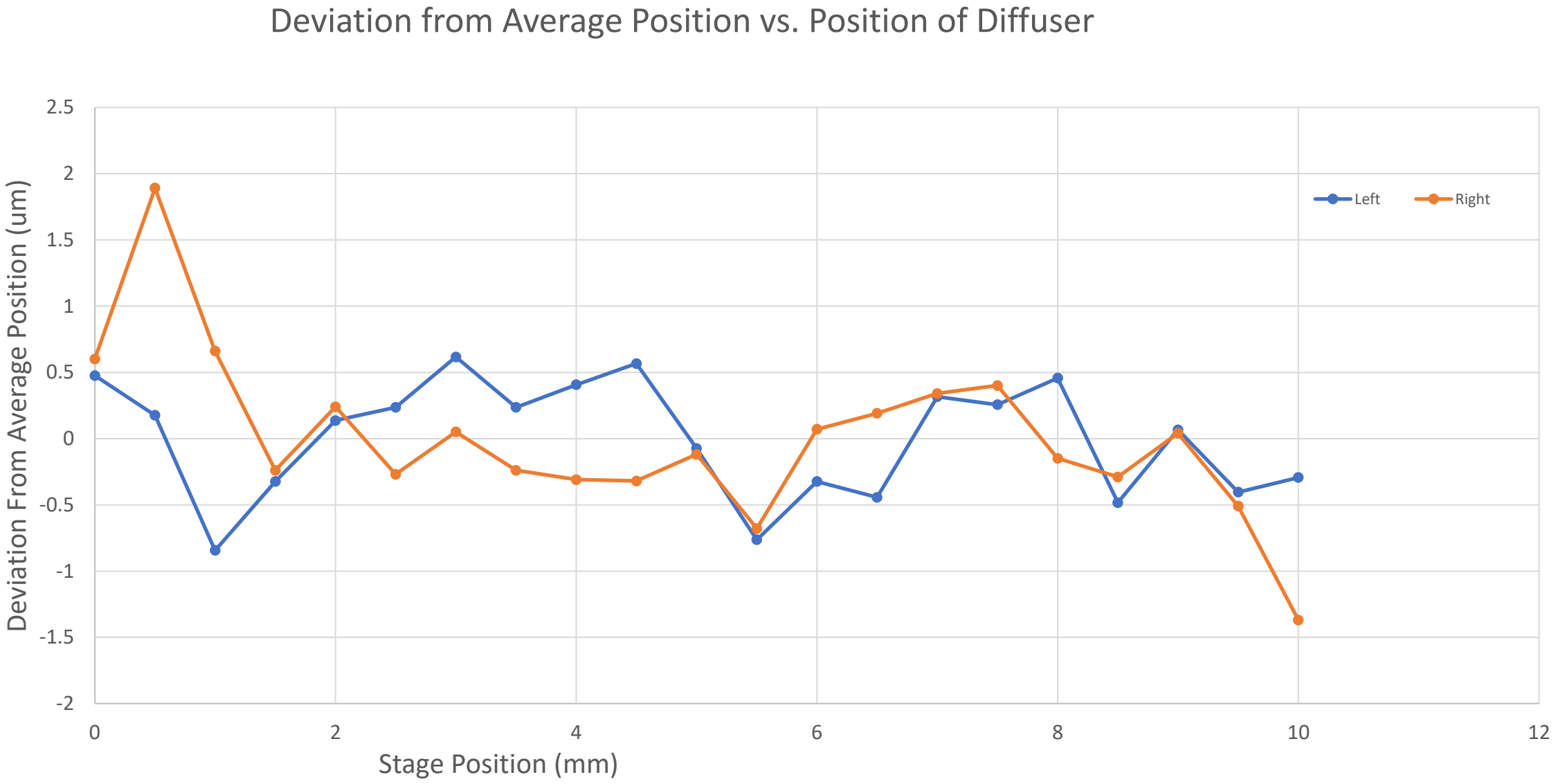
9/5/2022



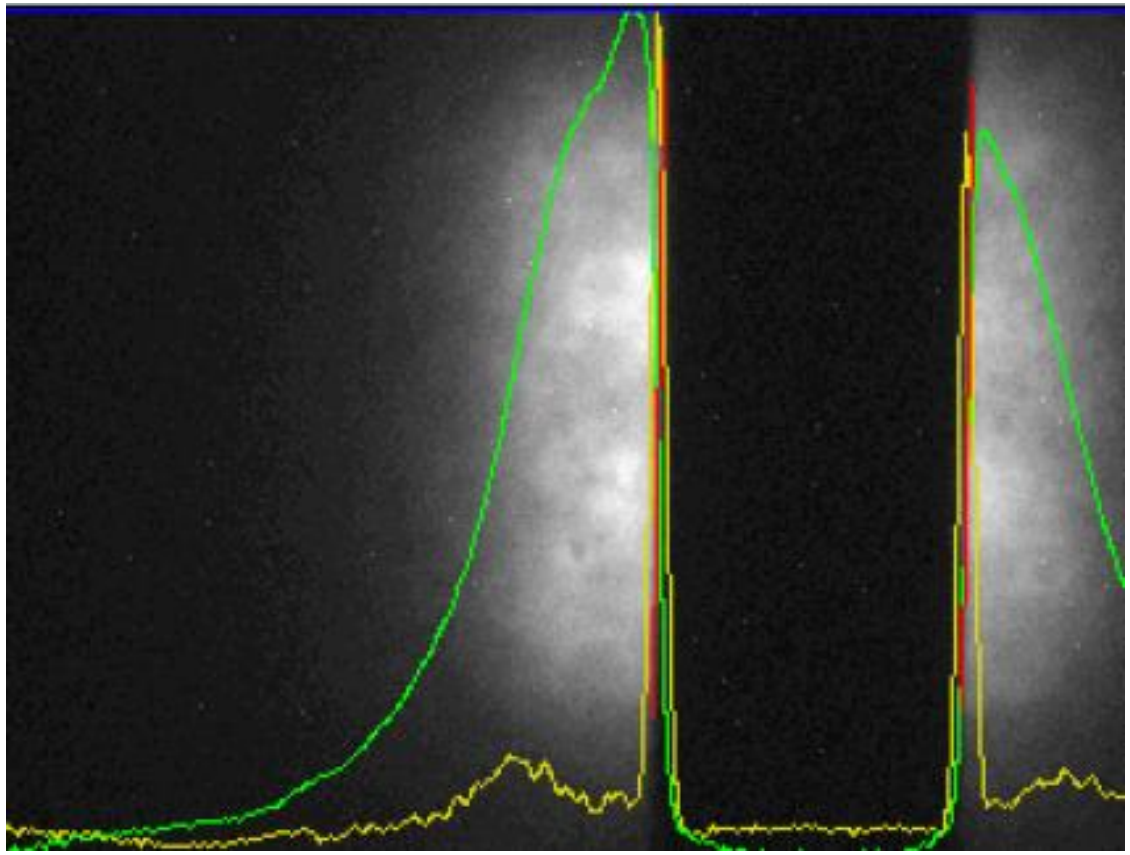
The IR LEDs are positioned 20mm behind the diffuser and the diffuser is 340mm behind the optical post (12.7mm wide). Exposure time= 10ms.



- We use a toolmaker script to vary exposure time and determine how it affects position.
- The IR LEDs are positioned 20mm behind the diffuser and the diffuser is 340mm behind the optical post

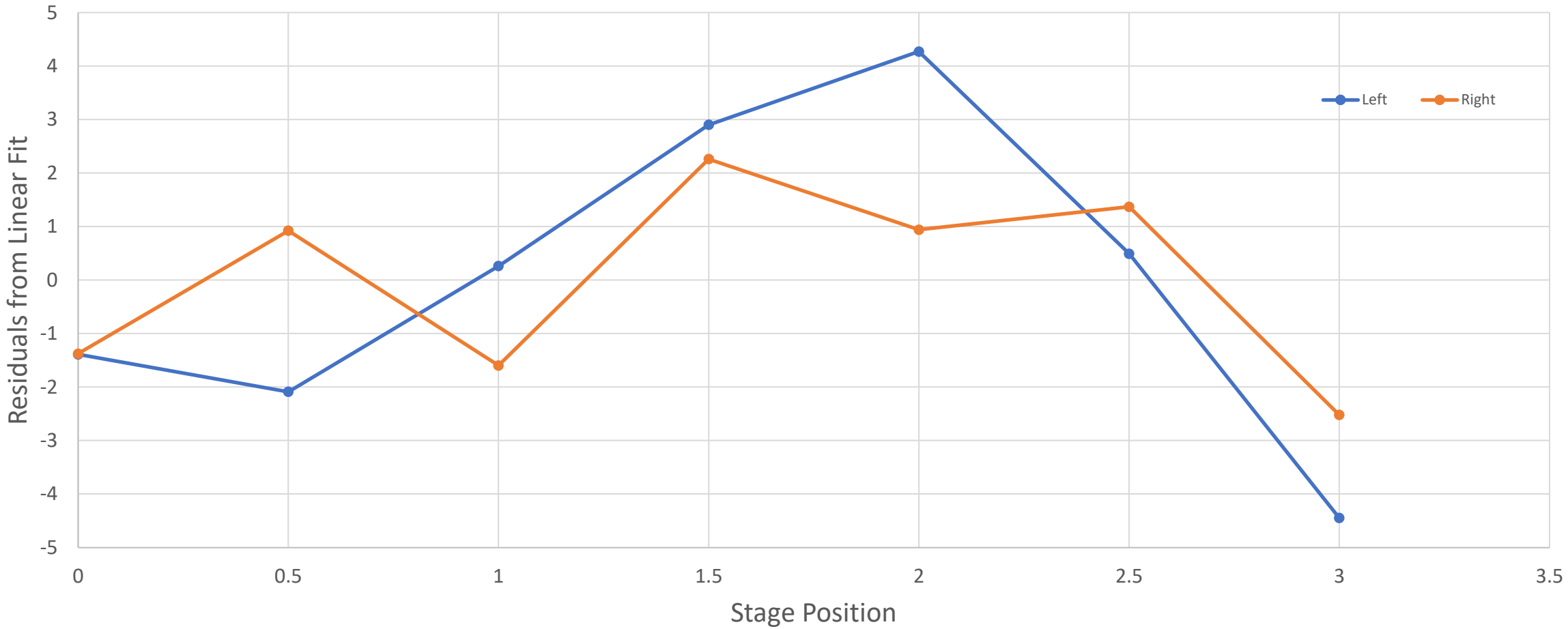


- Diffuser perpendicular to camera axis, mounted on a stage moving perpendicular to camera axis
- 20ms exposure time.
- The IR LEDs are positioned 20mm behind the diffuser and the diffuser is 340mm behind the optical post

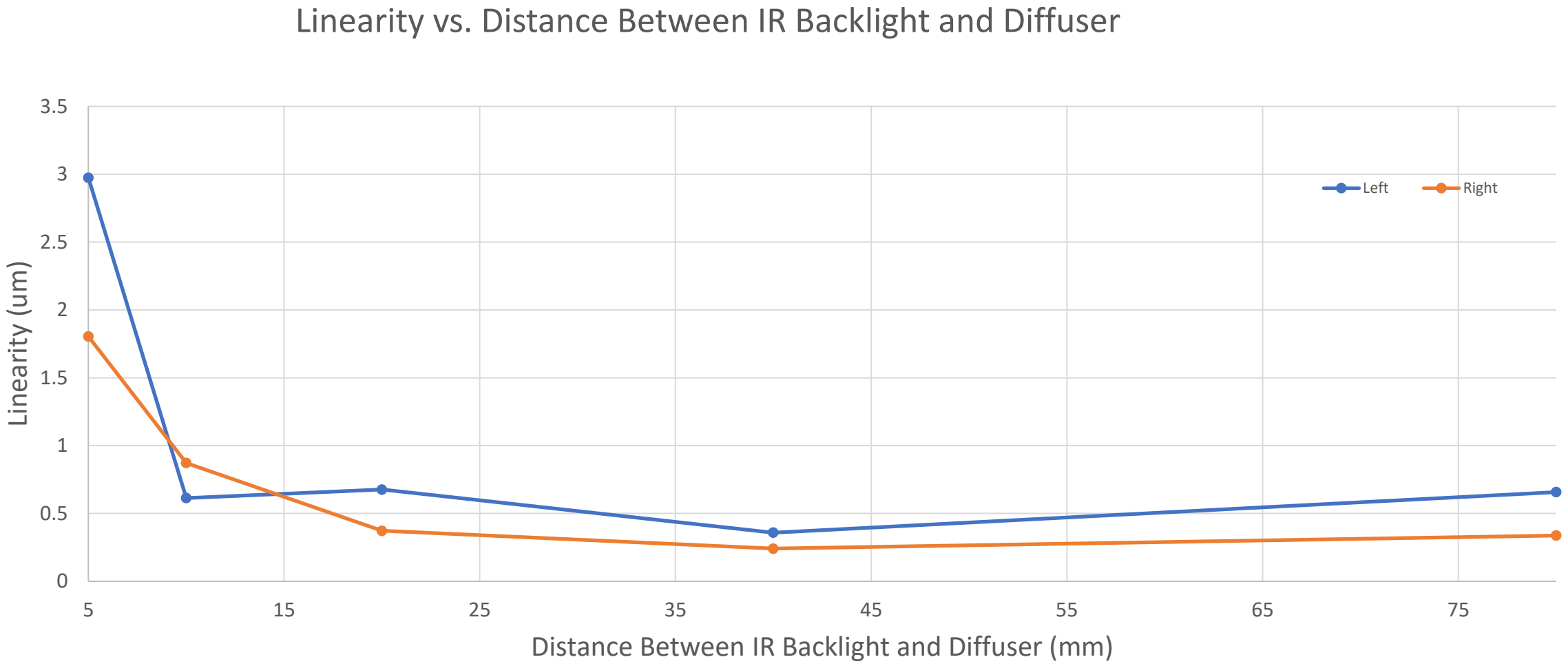


The IR LEDs are positioned 10mm behind the diffuser and the diffuser is 350mm behind the optical post (12.7mm wide). Exposure time= 10ms.

We measure the width of the post in image space to be 879 microns giving us a magnification factor of 14.4. This is consistent with the amount the post moves in image space after being moved 500 microns in real space.



- We move the post on its stage by 500 micron increments and measure its position in the image
- Doing a linear fit on the position, we measure the residuals from the fit at each point
- We define the standard deviation of the residuals from one movement as the “linearity”



We measure the standard deviation of residuals of position while varying the distance between the IR backlight and diffuser to get a sense for how the distance from the diffuser to the backlight affects precision (exposure time=20ms).