

Simulation of the multi-view imaging system with differentiable ray tracing

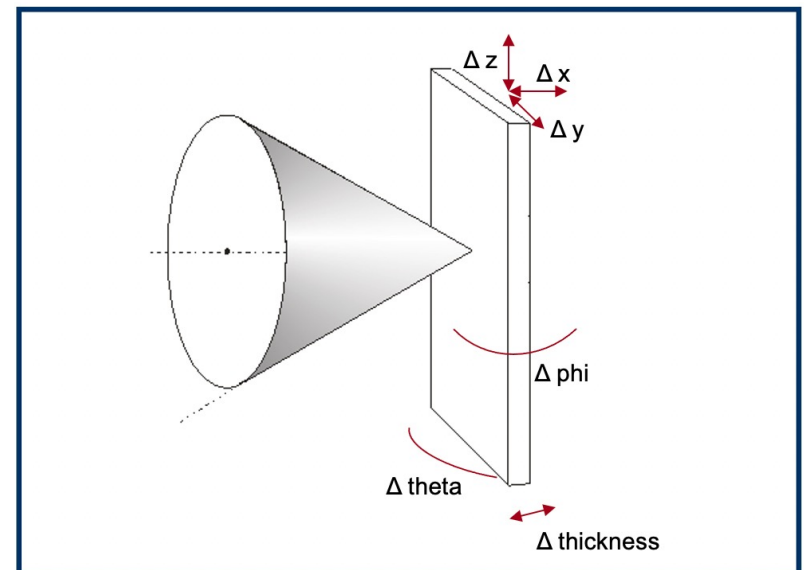
Maxime Vandegar, Michael Kagan

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Mirror misplacement

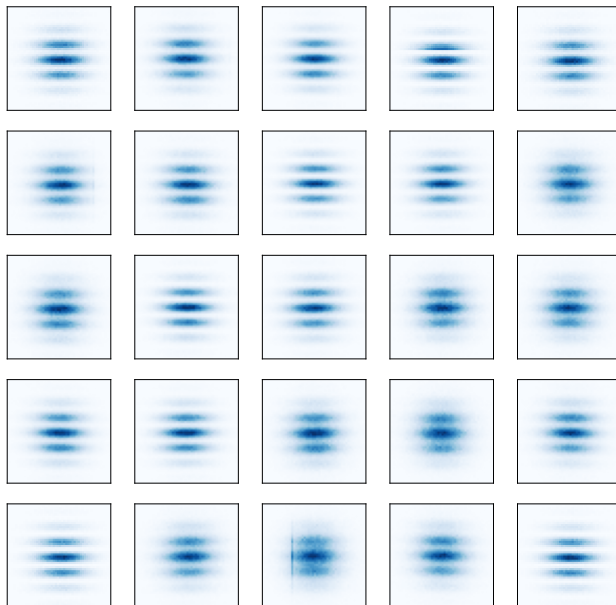
- Translations:
 - $\Delta x, \Delta y, \Delta z$ $\mathcal{O}(\pm 0.4mm)$ / $\mathcal{O}(\pm 2mm)$.
- Shift along the normal
 - Δ thickness $\mathcal{O}(\pm 0.25mm)$.
- Rotations:
 - $\Delta \theta$ $\mathcal{O}(\pm 0.15^\circ)$ / $\mathcal{O}(\pm 0.6^\circ)$.
 - $\Delta \phi$ $\mathcal{O}(\pm 0.3^\circ)$ / $\mathcal{O}(\pm 0.3^\circ)$.

- 20% tolerance
- 90% tolerance

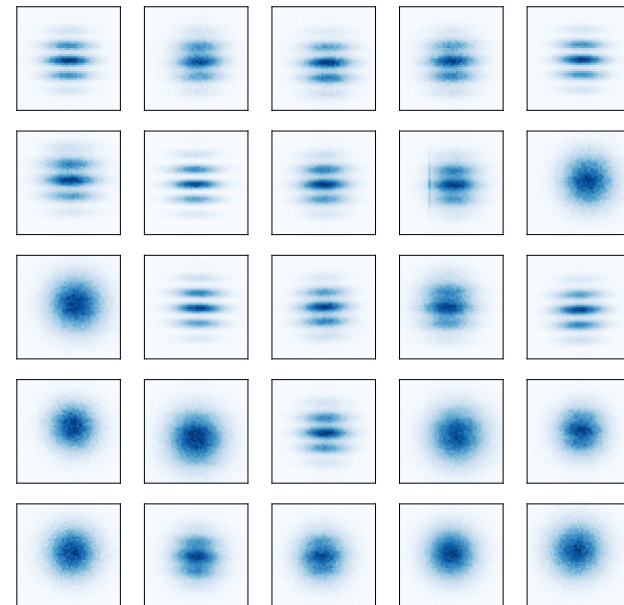


Produced images

- Produced images still look good.
 - 90% tolerance:
 - Unexpected behaviour for 1.2% of the rays.
 - Reflection between mirrors.
 - Only 500 mirrors (out of 760) concentrate light to the lens.



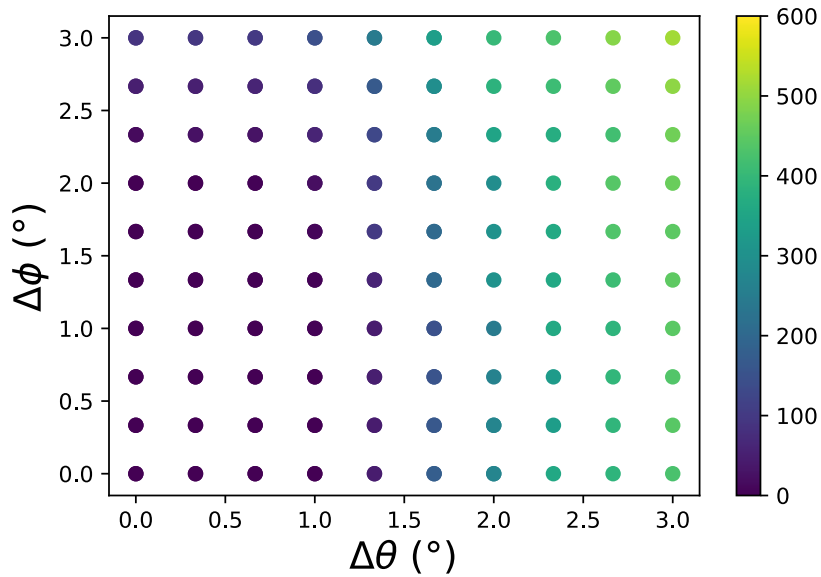
20%



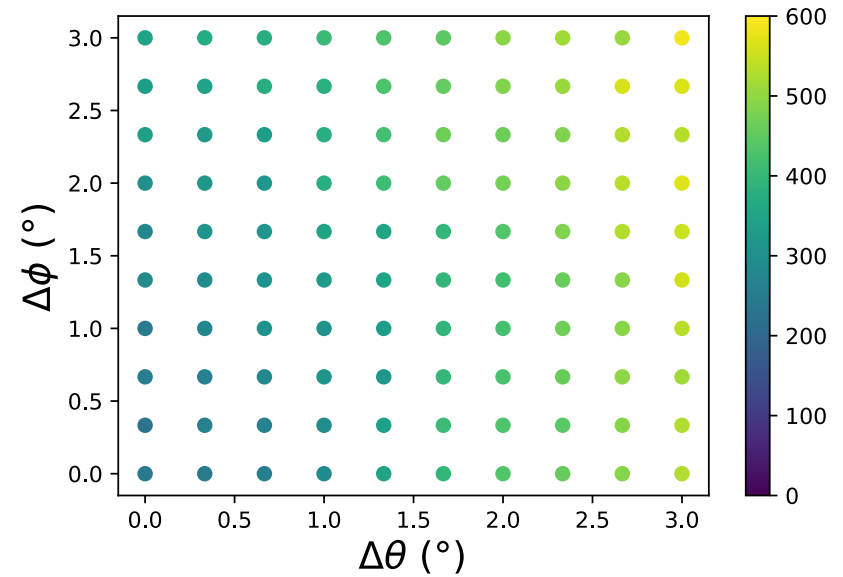
90%

Normal miscplacement

Evolution of the number of invalid mirrors as a function of $\Delta\theta$ & $\Delta\phi$.



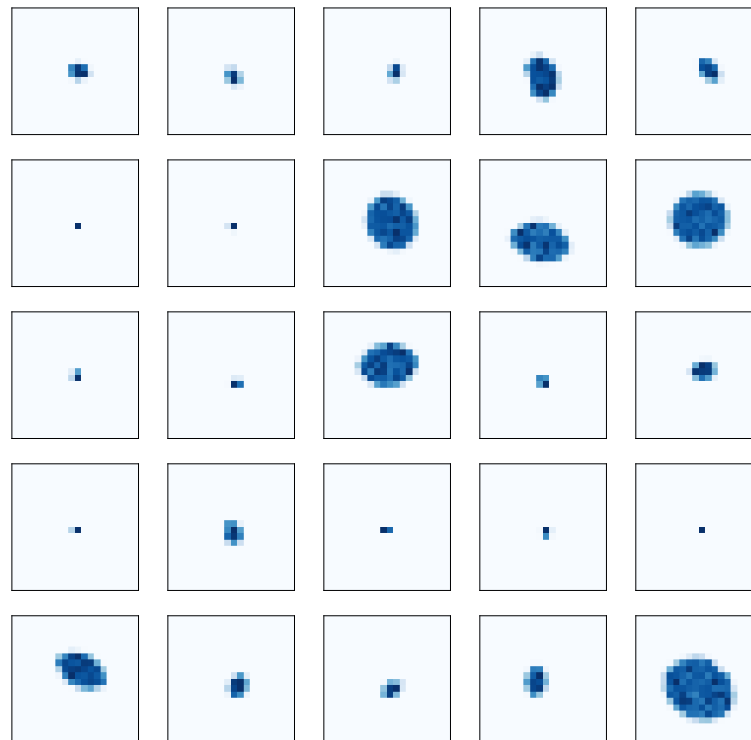
20%



90%

Blur

- PSF due to misplacement only:
 - “Radius” of 2.5 pixels for 20%.
 - “Radius” of 8.5 pixels for 90%.



90%