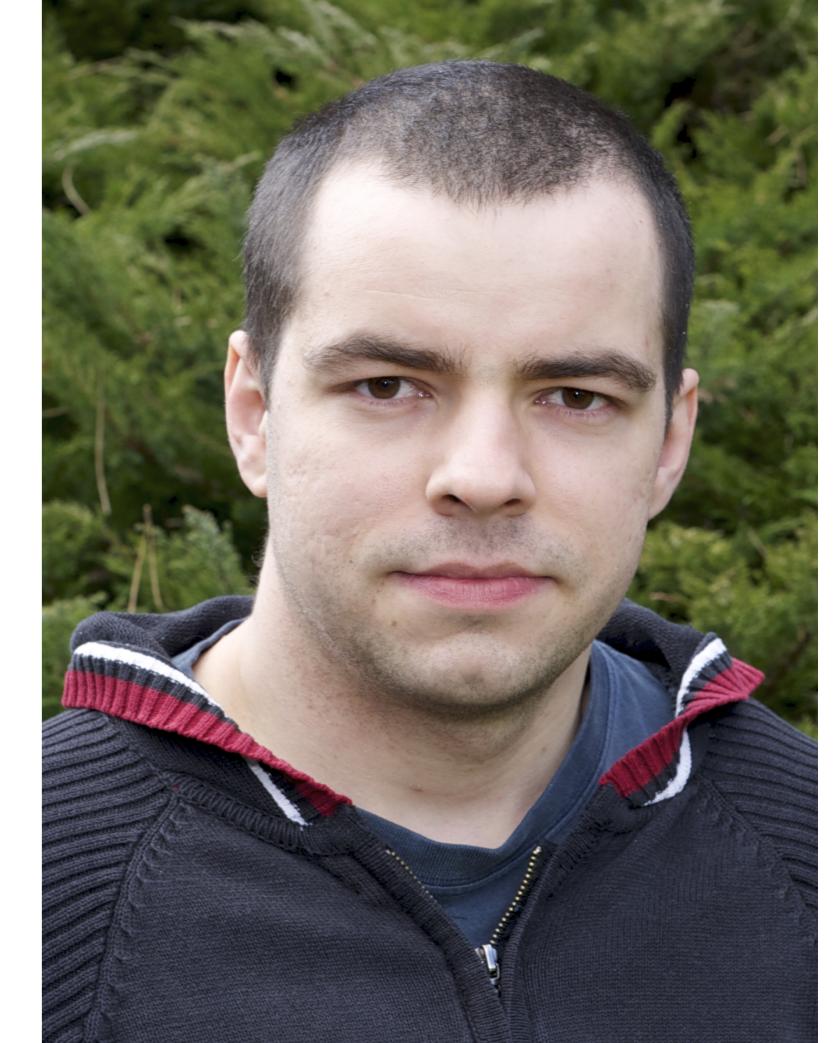


2D PSF characterization

Neven Caplar, Joshua Meyers (Princeton University)



PSF of the Prime Focus Spectrograph will be caused by 3 different components: telescope pupil illumination, focal ratio degradation in the fibres and the camera. Goal of the project is to understand and to characterize the contribution of the camera imperfections to the PSF. Because PSF variation due to camera change spatially we aim to be able to model and separate different contributions to the final PSF. We have started analysing defocused images taken by the red arm camera which has been mounted at LAM. At the moment, we are using package Galsim and forward modelling of the wavefront to estimate Zernike coefficients describing the wavefront aberrations. In this early stage, we are also investigating different methods and procedures on how to best model the system.

To get the data, 10 fibers are illuminated with HgAr lamp (see figures on the right and below). Slit is moved in order to produce defocused images.

Figure below shows 100 spots as they appear on the detector (data taken on November 2)

- Numbers above each image denote the id of each fiber and the wavelength of the light in nm, respectively
- Note the movement of the detector and three supporting struts as a function of the position on the detector (i.e., function of wavelength and fiber)
- Also visible is the slit which intersect the beam

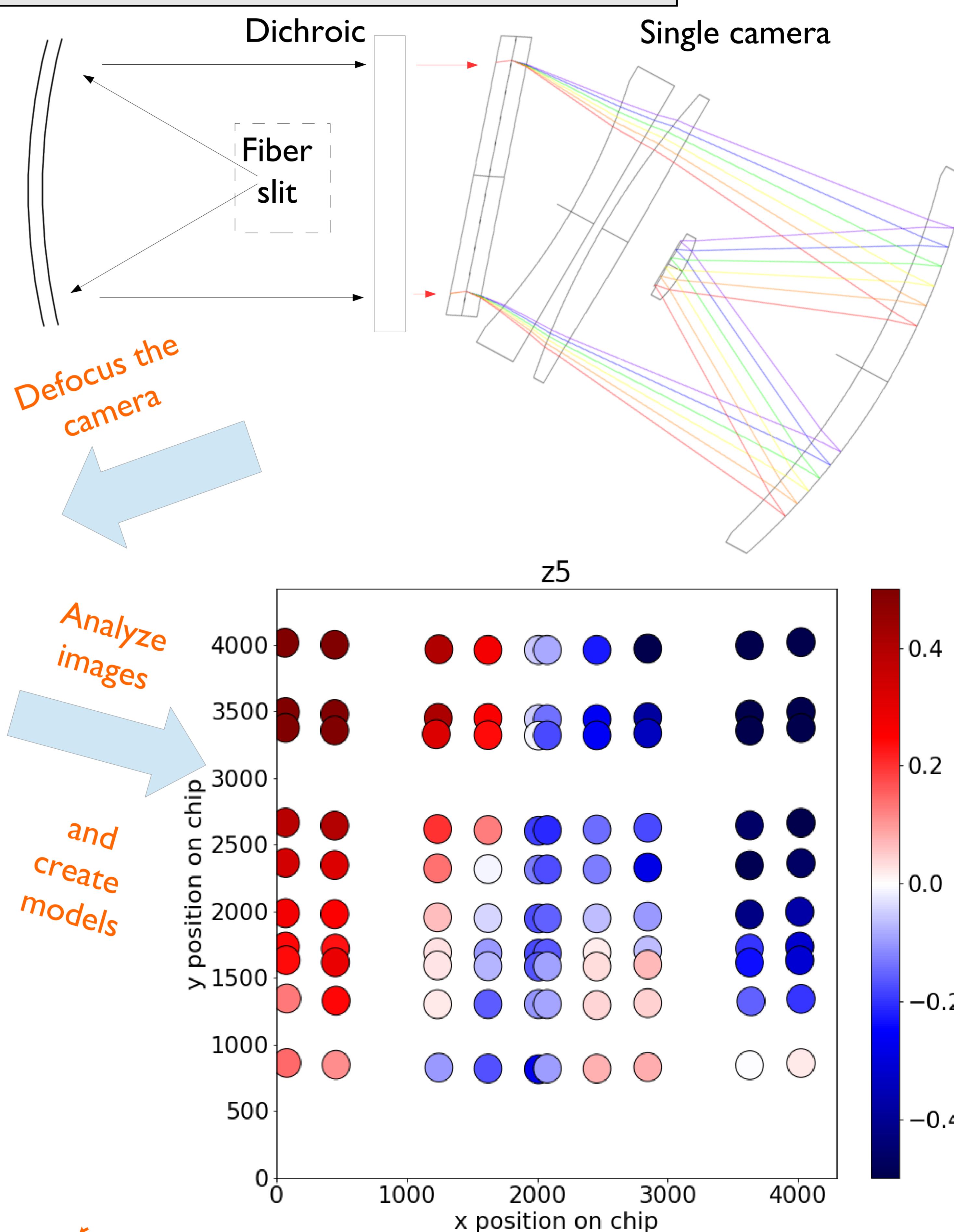
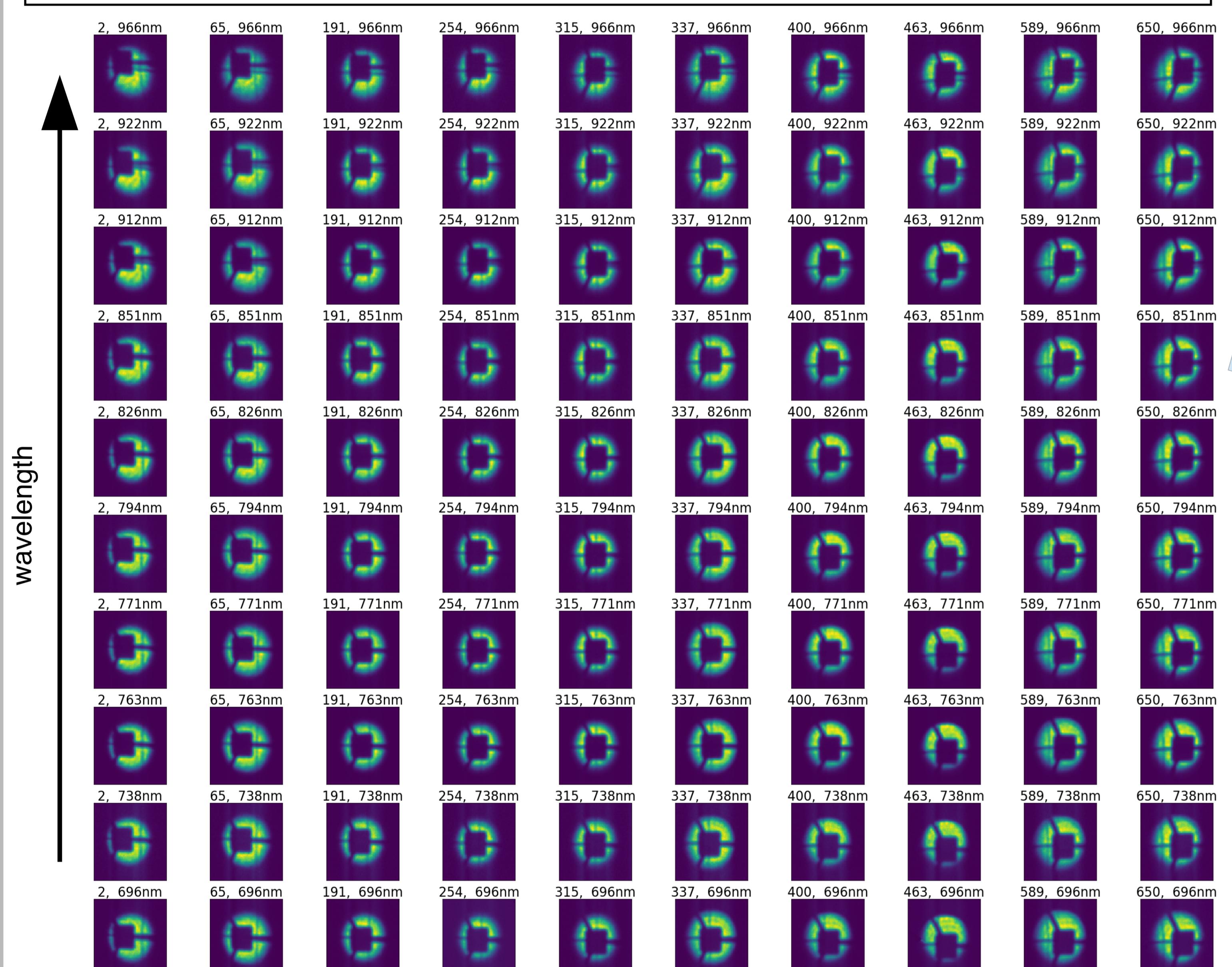
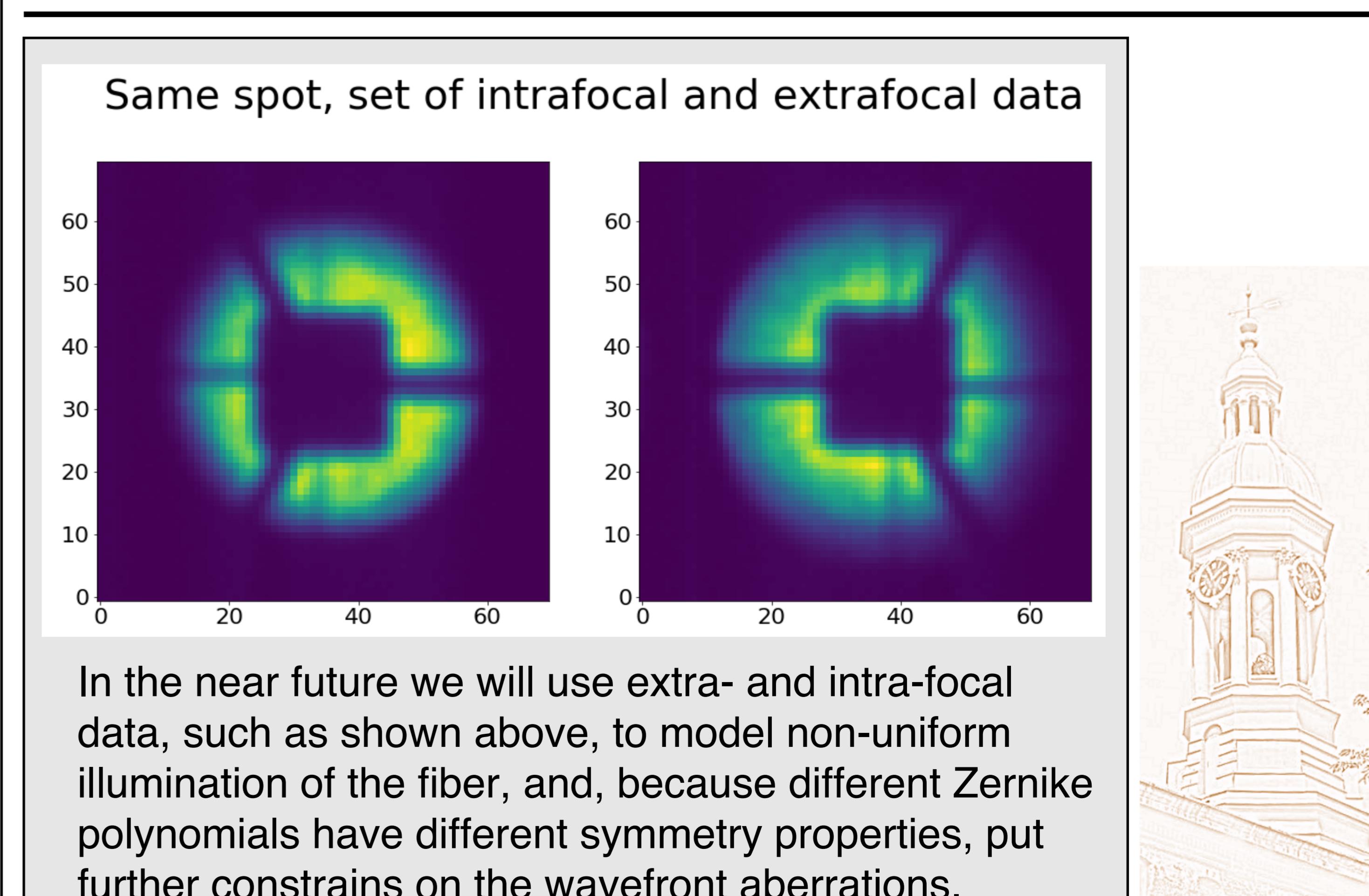
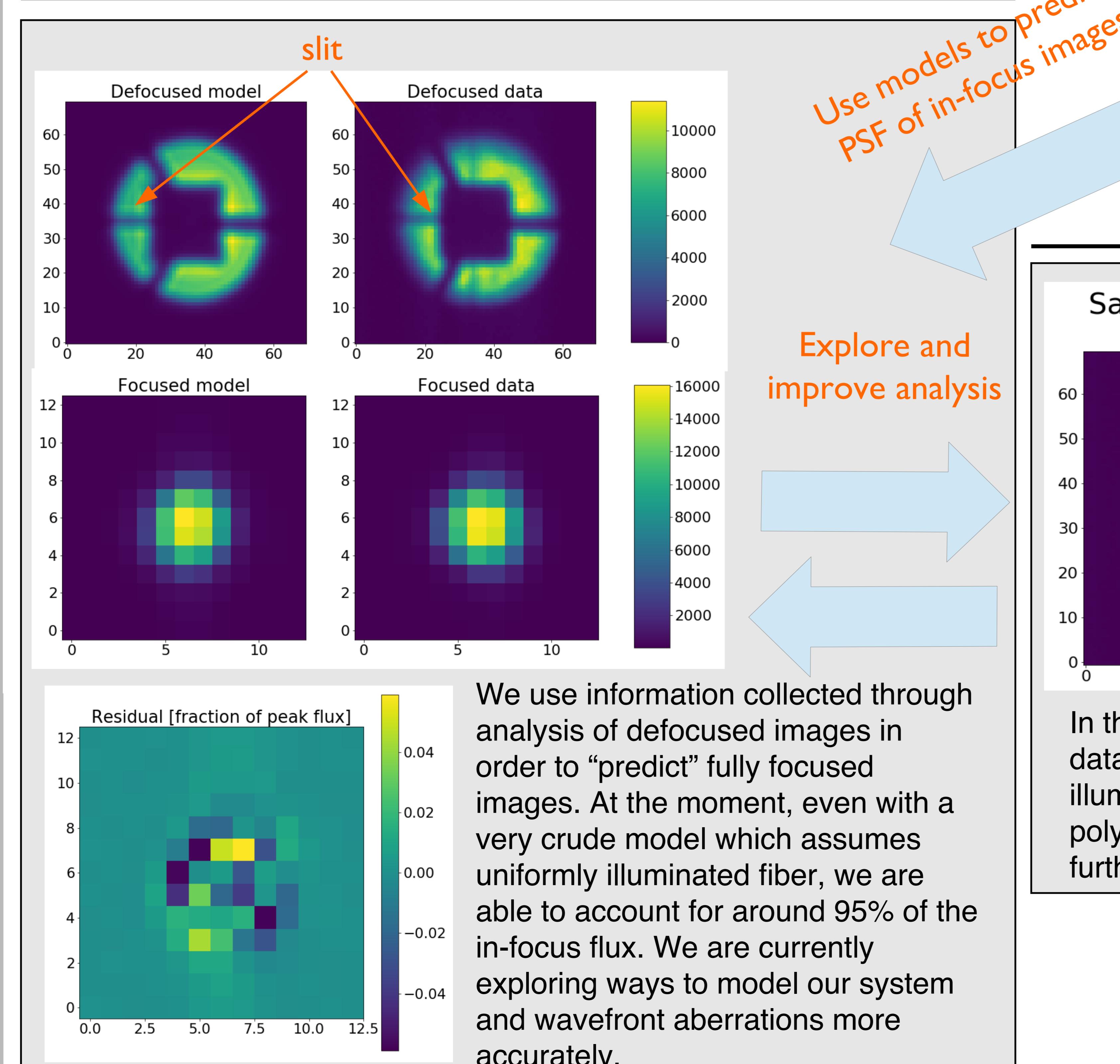


Figure above shows, qualitatively, the inferred dependence of the oblique astigmatism, described by 5th Zernike polynomial, across the detector. The spots are in the same configuration as in Figure on the left. We aim to be able to fully describe each spot through combination of parameters describing the obscuring elements and wavefront aberrations.



PRINCETON
UNIVERSITY