

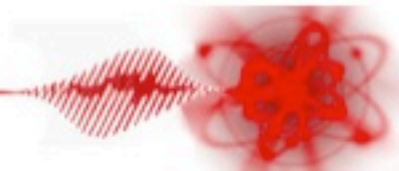


Focal Spot and Collimation Diagnostics

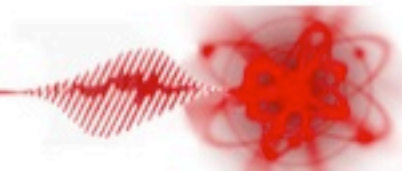
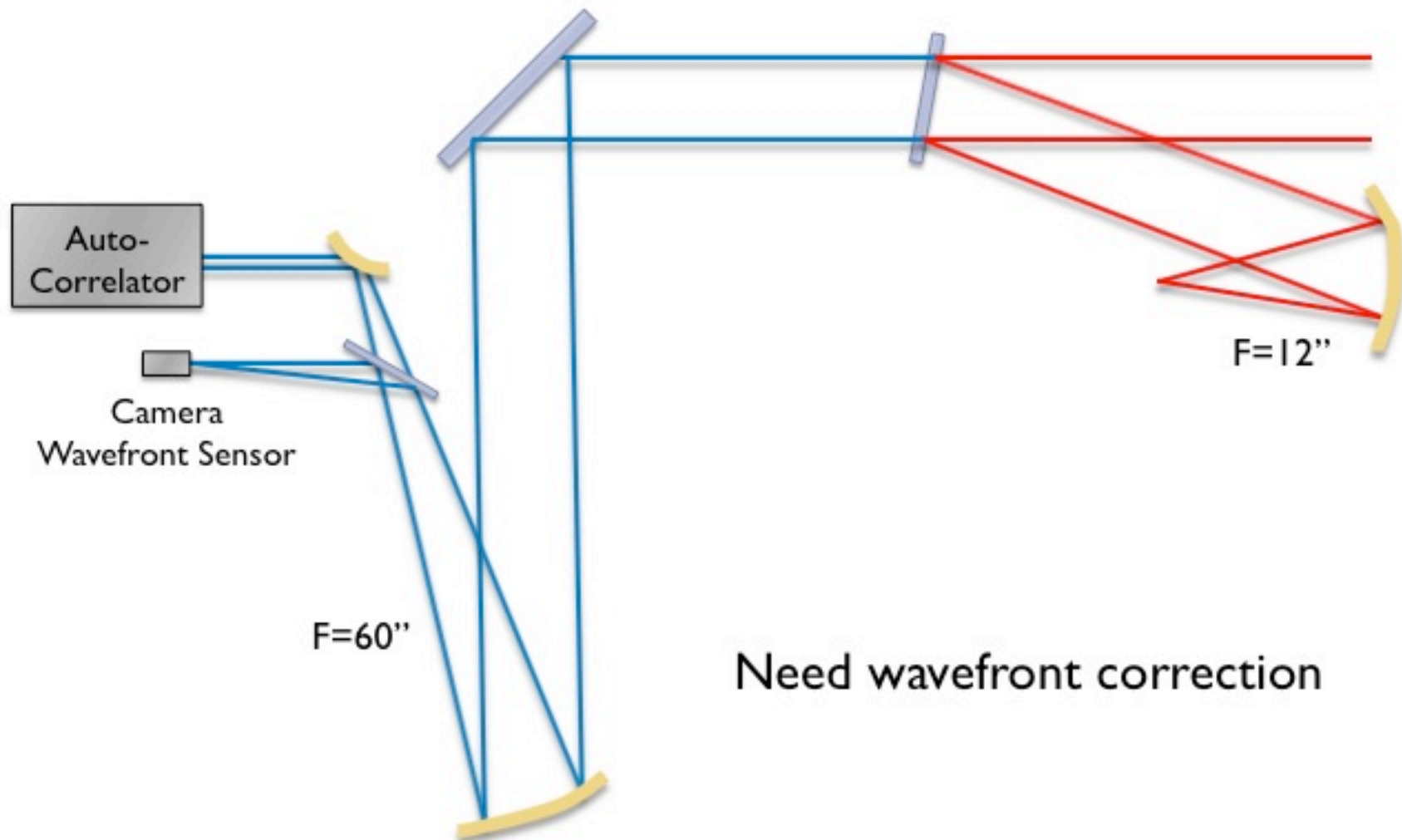
Sheng Jiang

Outline

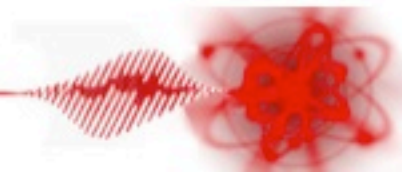
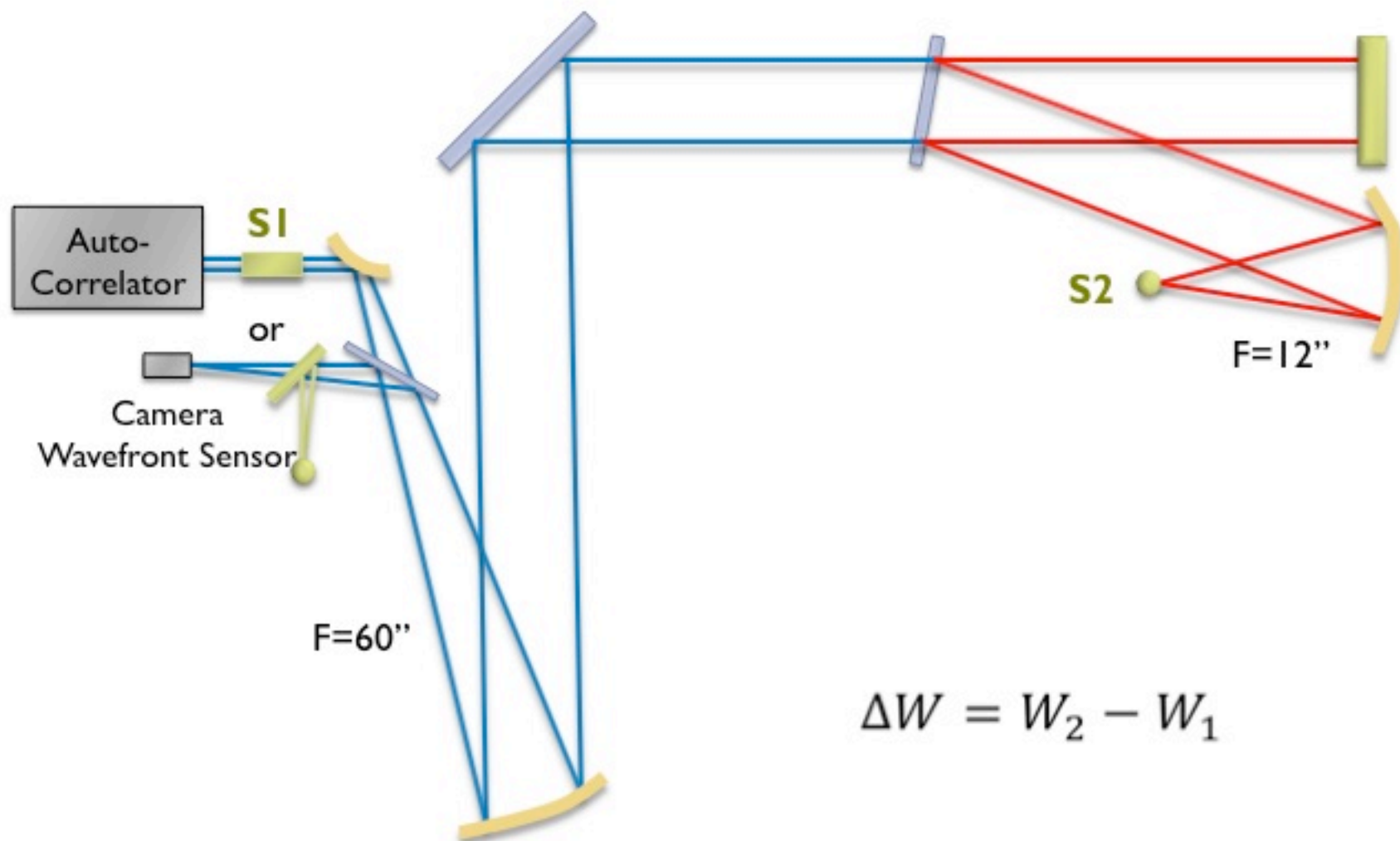
- ▶ Focal spot diagnosis
 - ▶ Omega-EP setting
 - ▶ Our Plan
- ▶ Collimation diagnosis
 - ▶ Accuracy of the shear plate
 - ▶ Compressor OAP alignment
 - ▶ Rough alignment of the compressor grating pair



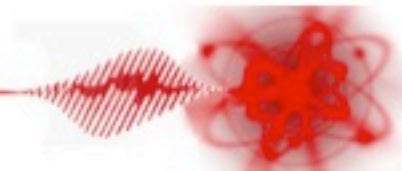
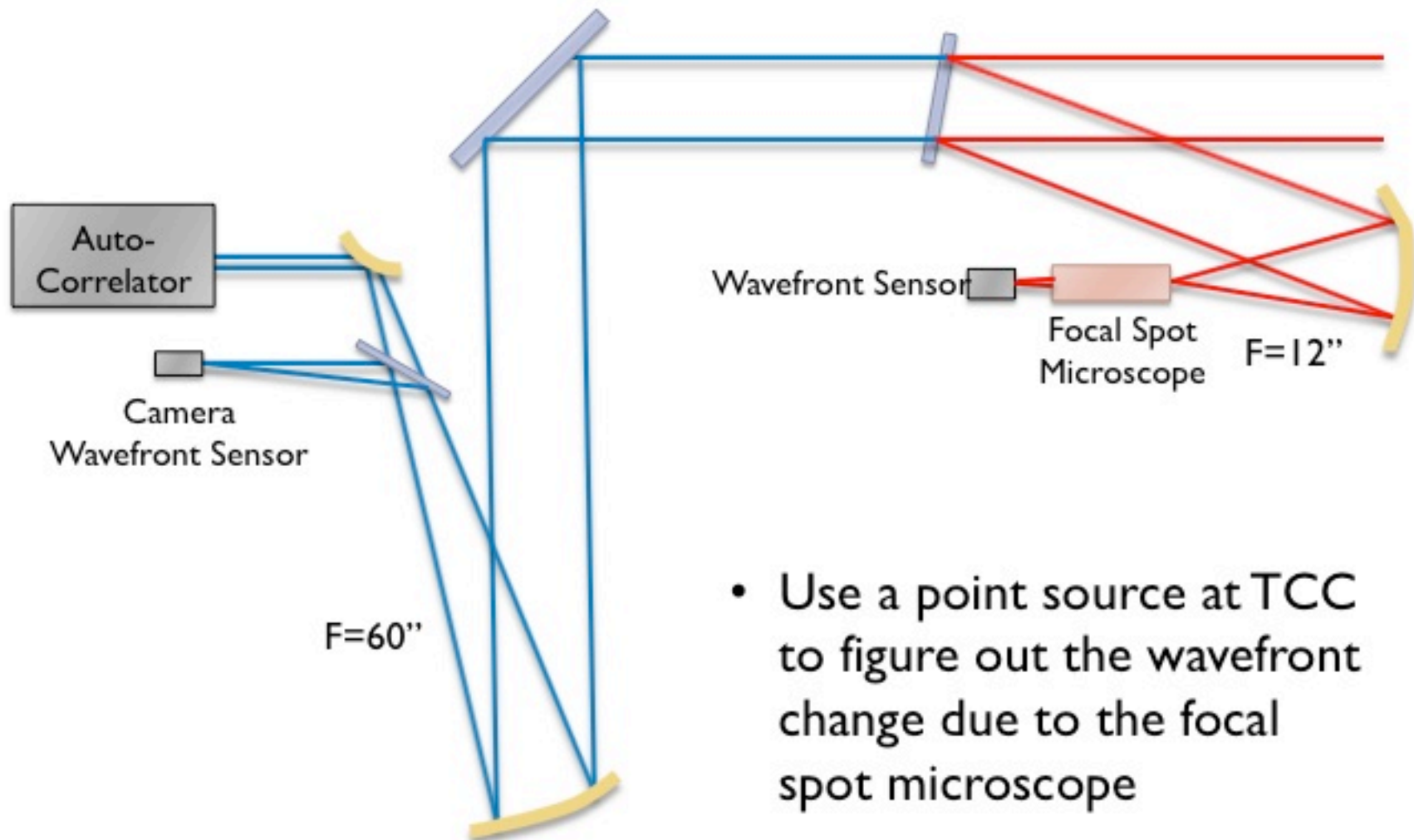
Focal Spot Diagnosis Setup



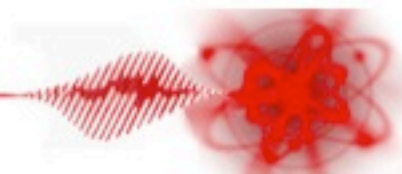
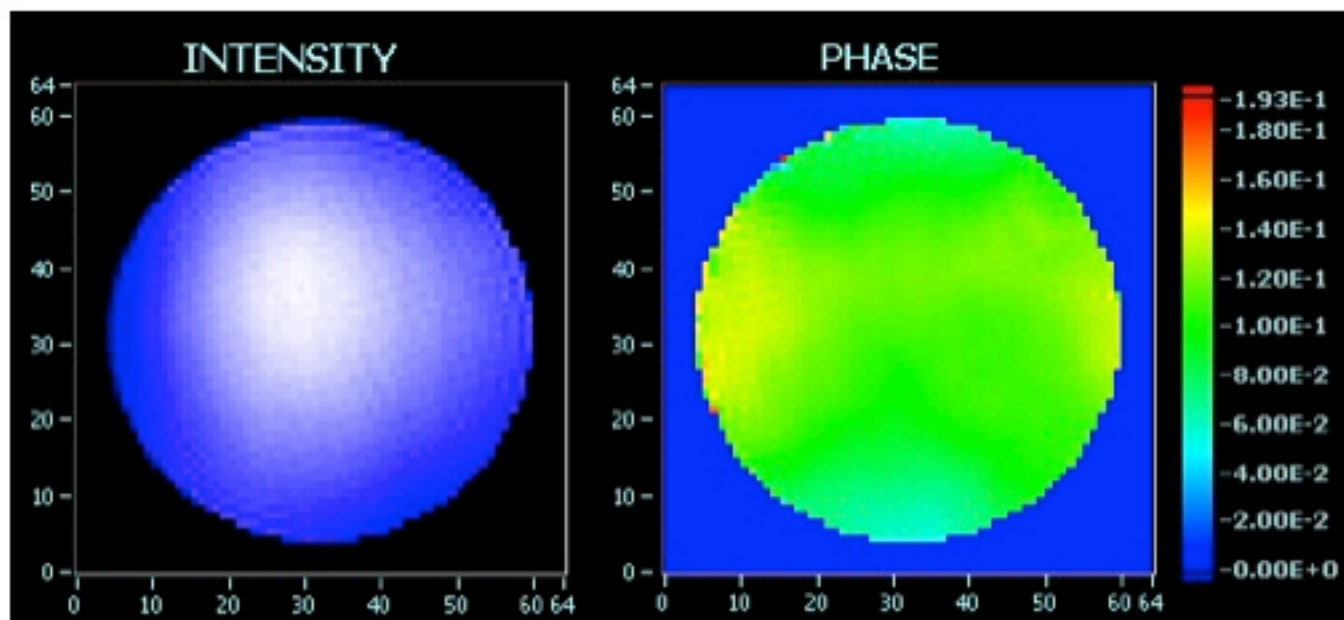
Omega-EP Method



Focal Spot Diagnosis



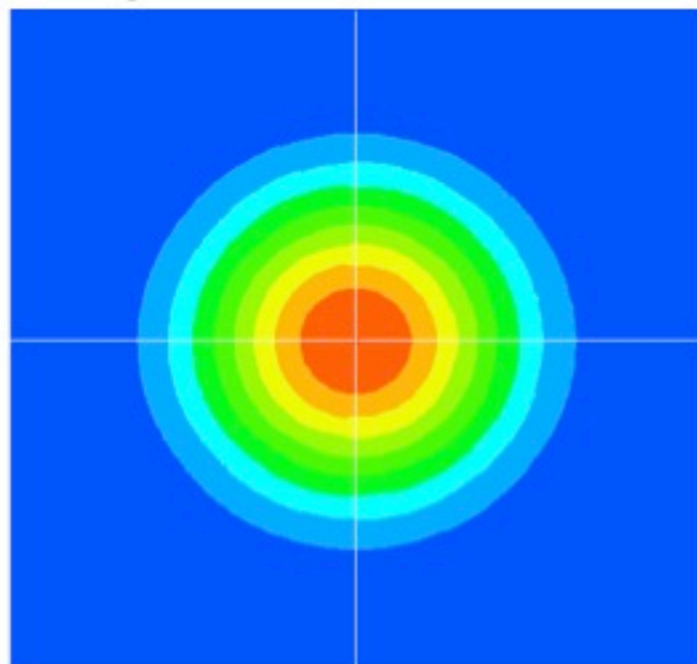
An Example of the Wavefront Sensor Image



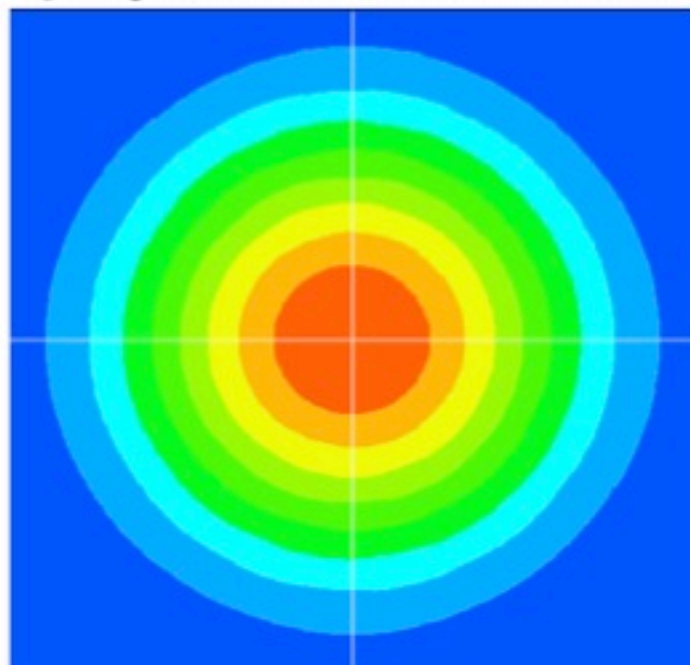
Focal Spot

- Everything Aligned – flat top beam

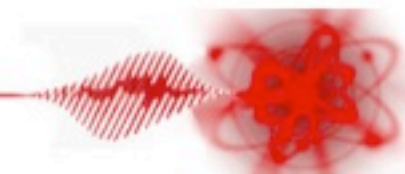
@TCC, FWHM $\sim 1.7 \mu\text{m}$



@Diagnosis Table, FWHM $\sim 8.3 \mu\text{m}$



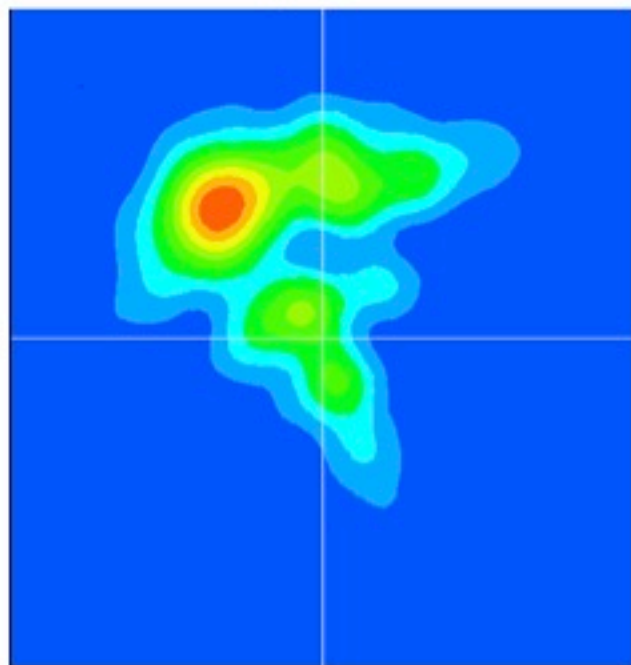
Same for both 800nm single wavelength and 750-850nm spectrum



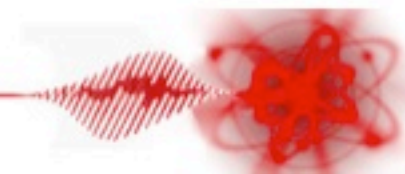
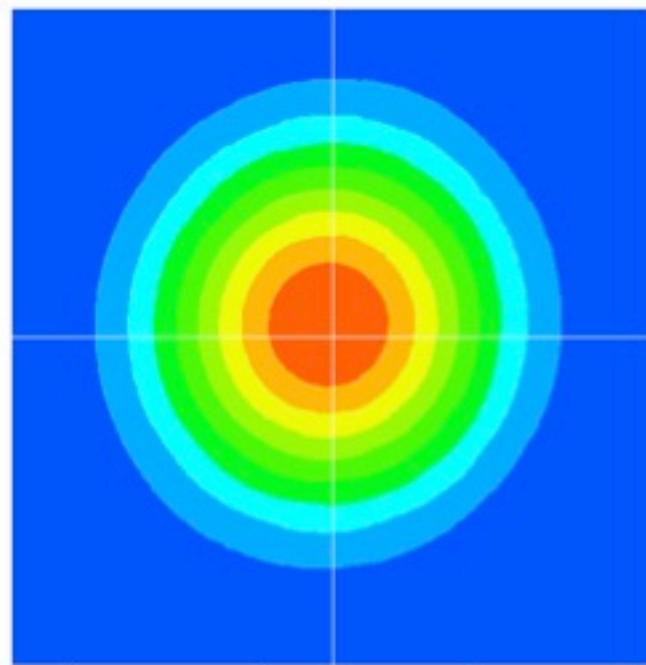
Focal Spot

- Compressor OAP got tipped and tilted for 0.005°

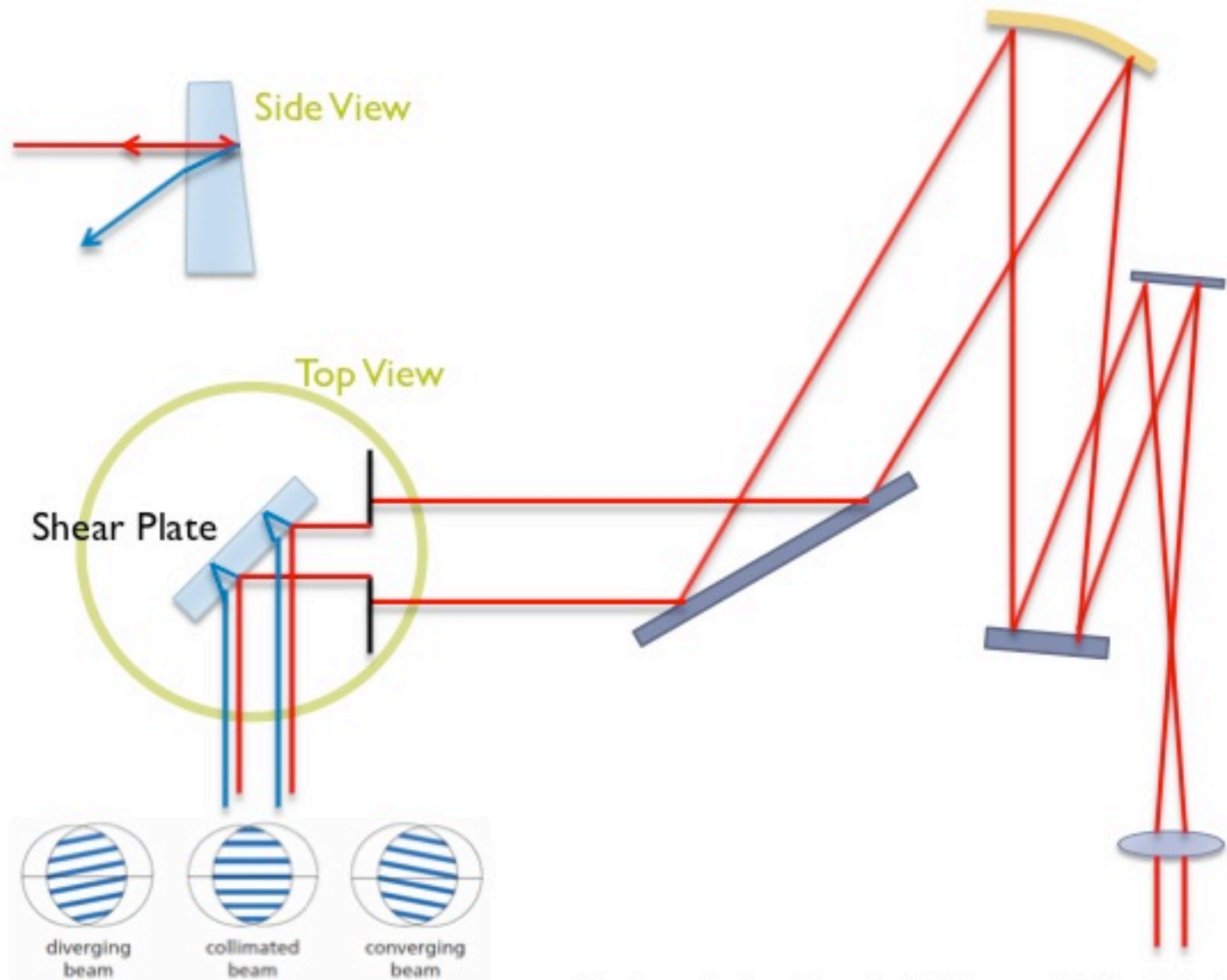
@TCC



@Diagnosis Table

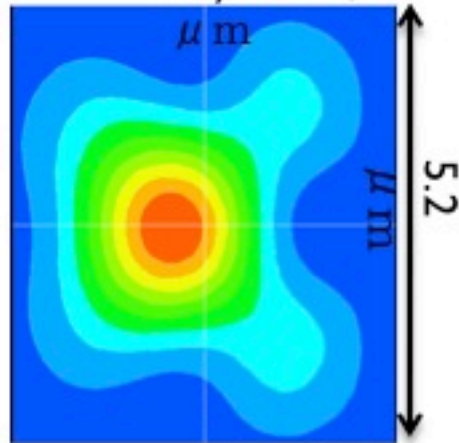


Compressor OAP Alignment

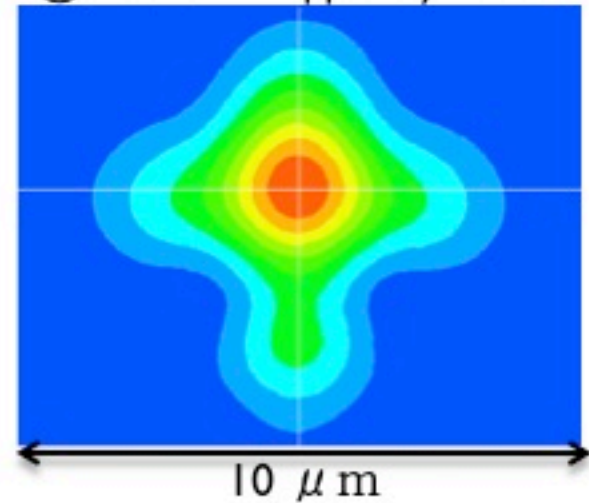


Focal Spot With OAP Misalignment

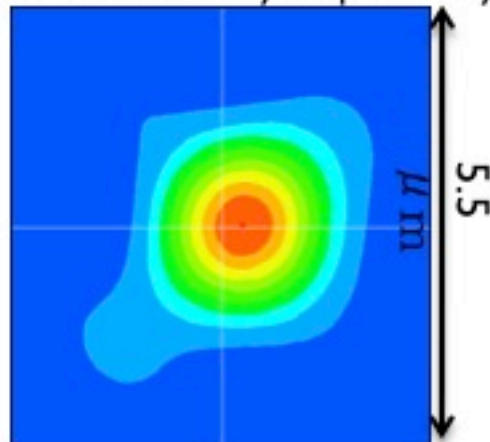
@TCC. OAP tilted by 0.005° , FWHM ~ 2



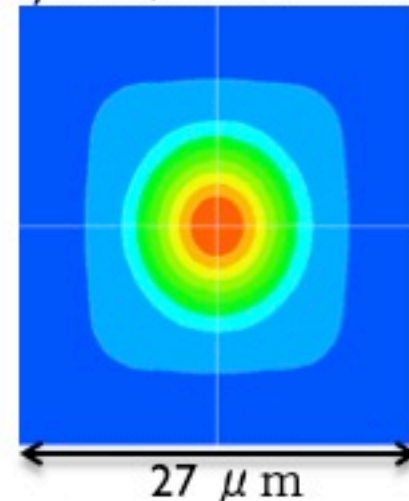
@TCC. OAP tipped by 0.005°



@TCC. OAP transversally displaced by 1mm



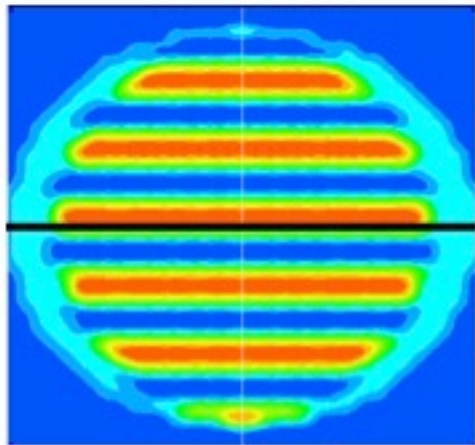
@Diagnosis Table. Shortened Distance by 6mm, FWHM $\sim 8.8 \mu\text{m}$



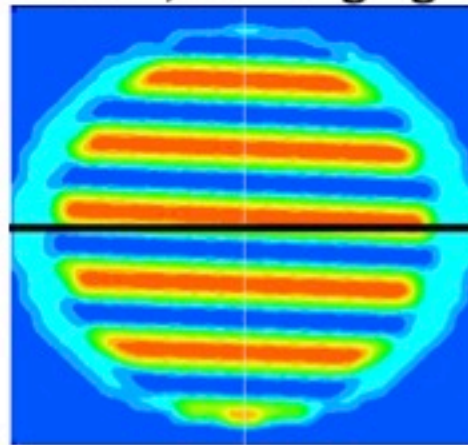
Shear Plate Test

- Single Wavelength 800nm

Collimated

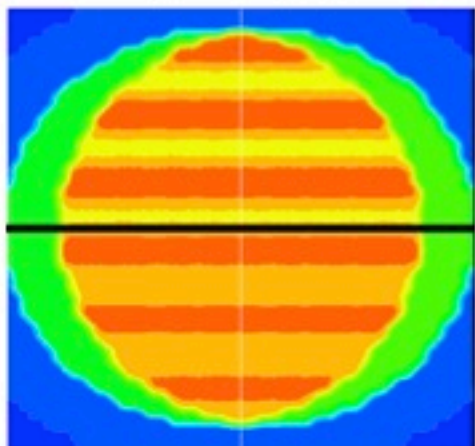


0.001°, converging

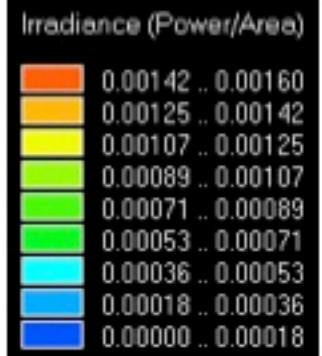
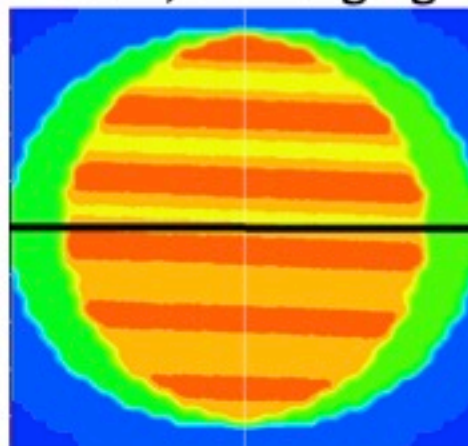


- Uniform Spectrum (750nm – 850nm)

Collimated



0.001°, converging

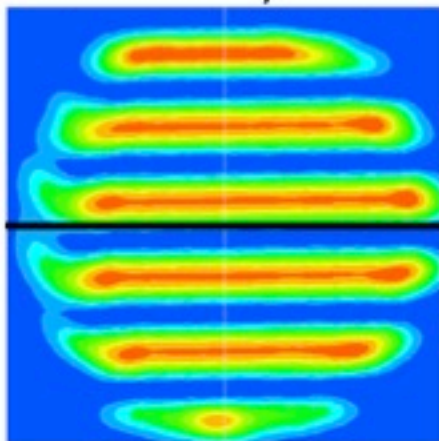


CVI shear plate. Wedge angle: 4.9 sec; Clear aperture: 85mm; Thickness: 15mm.

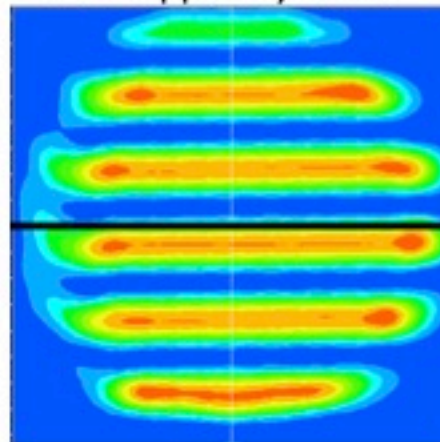
OAP Alignment Using Shear Plate

- Single Wavelength 800nm

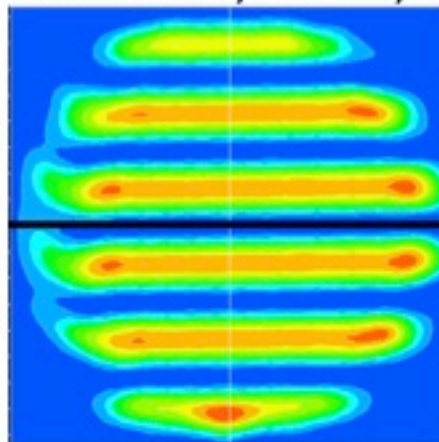
OAP tilted by 0.005°



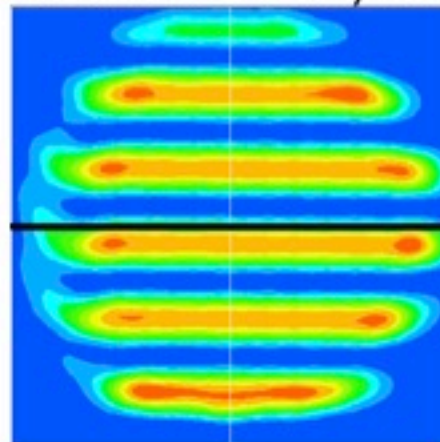
OAP tipped by 0.005°



OAP transversely offset by 1mm

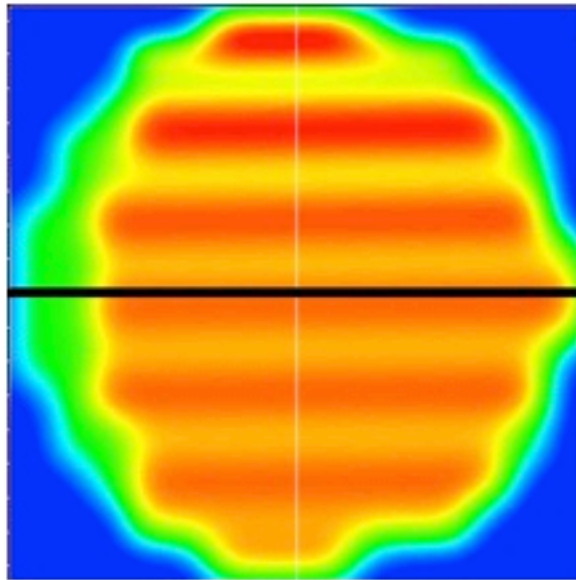


Shortened Distance between
OAP and Achromat by 6mm

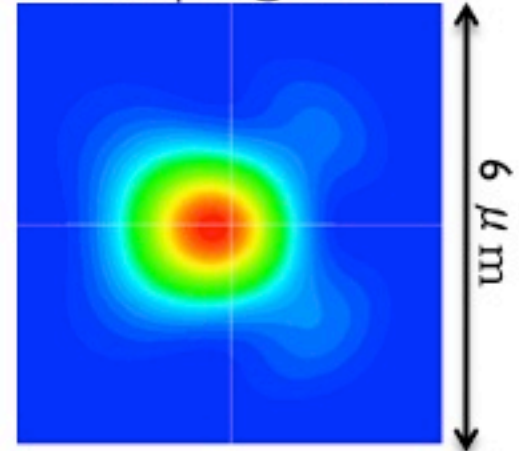


Rough Alignment of the Compressor Grating

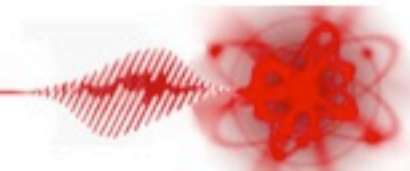
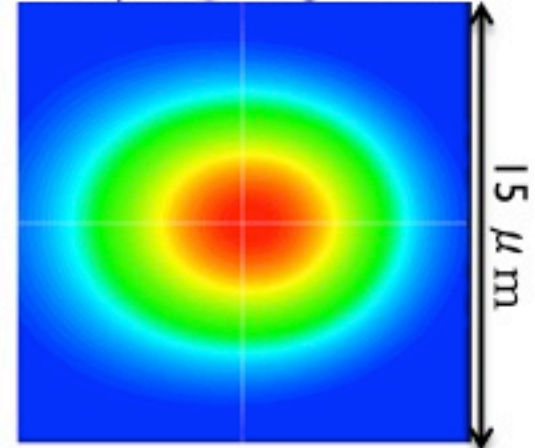
- ▶ Place the shear plate after the output mirror of the compressor.
- Uniform Spectrum (750nm – 850nm)
- Parallelism of the gratings is tilted by 0.001°



Focal Spot @ TCC



Focal Spot @ Diagnosis Table



Summary and Future Work

- ▶ Focal spot monitoring without wavefront correction does not work very well.
- ▶ Checked the accuracy of the shear plate.
- ▶ Use of the shear plate in collimation alignment.
- ▶ Further work on wavefront calibration.
- ▶ Need a more accurate way to align the gratings.

