



Curvature Adaptive Optics

www.aoptix.com

Founders: J Elon "Buzz" Graves and Malcolm Northcott

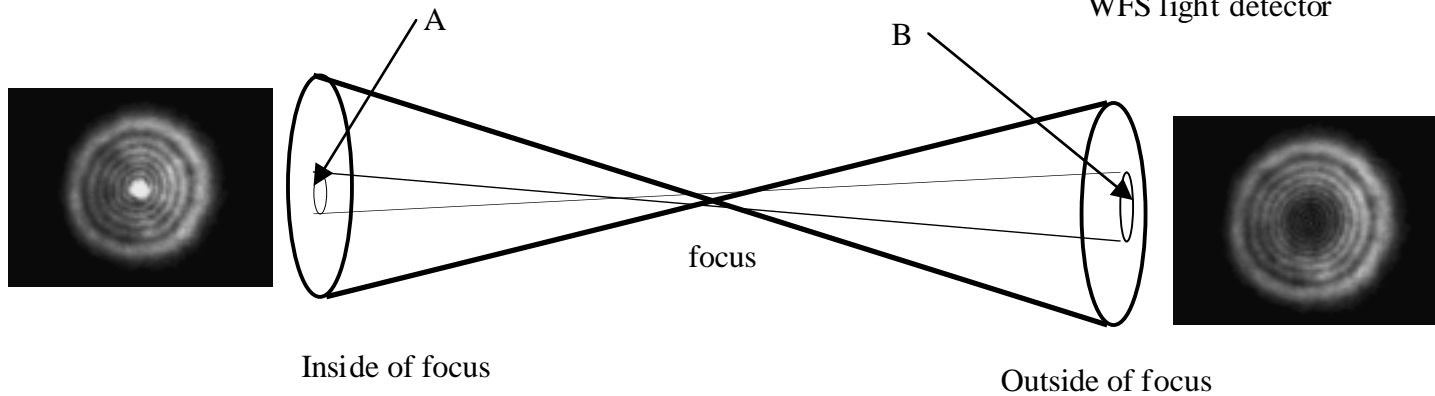
Curvature Wavefront Sensing

Wavefront errors look like intensity differences on either side of focus

$$\text{Error} = A - B$$



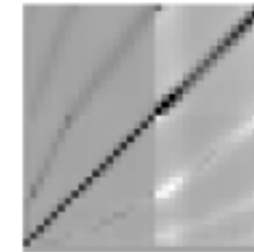
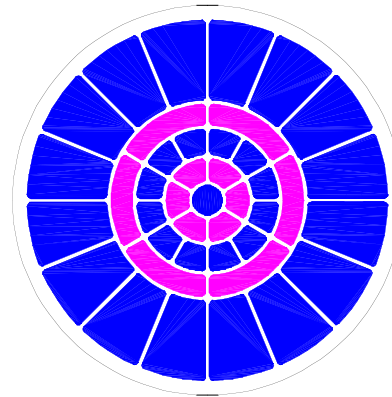
WFS light detector



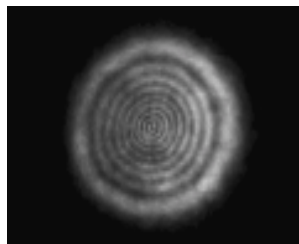
Deformable Mirror

Mirror actuators

- Inner actuators produce pure curvature
- Outer actuators produce radial slope
- DM and WFS have matching geometries



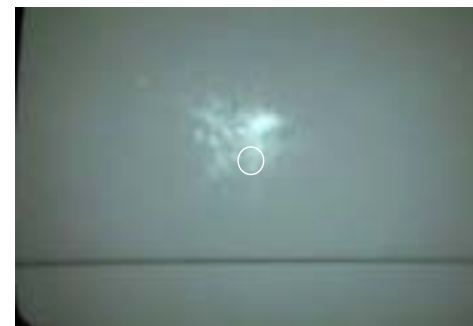
Interaction matrix



Seeing



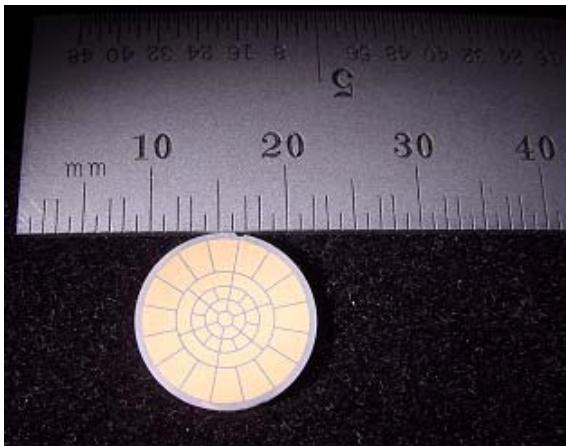
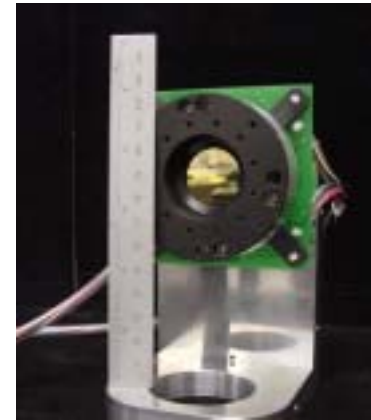
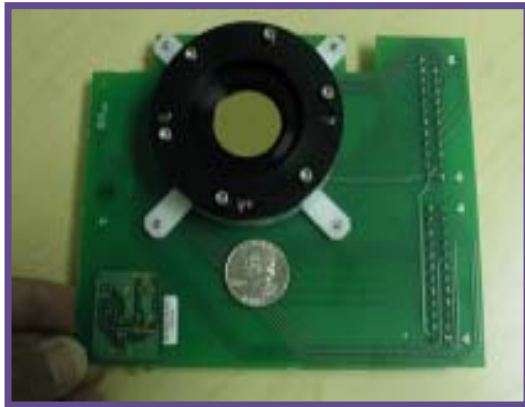
Moving actuators



AO correction

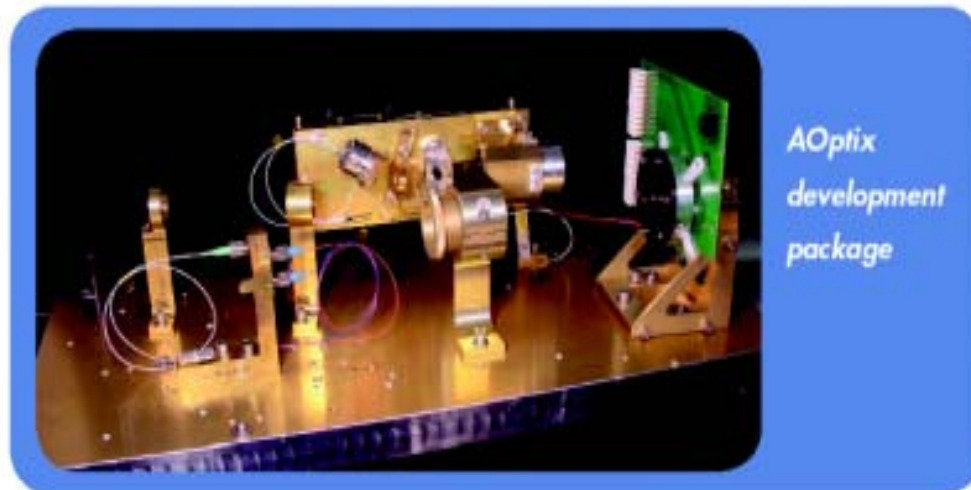
AOptix Adaptive Optics

Fast, Simple, & Robust



AOptix Curvature Bimorph Mirrors

- Simple bimorph mirror construction (PZT, PMN)
- Large stroke in low-order modes
- Natural frequency 4 -16 kHz
- Few to a 100 actuators
- Monolithic design is immune to temperature
- Pupil 6mm to 60 mm dia.
- Large Tip/tilt and high-order correction in one mirror avoids complex woofer/tweeter
- Voltage requirements +230v to +100v



Closed loop bandwidth (0dB) 900 Hz

Operational feedback frequency 9 kHz

Maximum feedback latency 70 μ sec

Maximum focus stroke, measured on wavefront (typical)
+/- 15 μ m

Maximum tip-tilt stroke measured on wavefront (typical)
+/- 0.5 mrad

Wavefront Sensor dynamic range >60 dB

Wavefront Sensor material/sensitivity InGaAs/-55dBm

Number of Curvature Actuator segments (deformable mirror) 35

Deformable Mirror pupil diameter 25 mm

Deformable Mirror material PZT

Voltage +/- 250 V

Temperature -40 - +80° C

