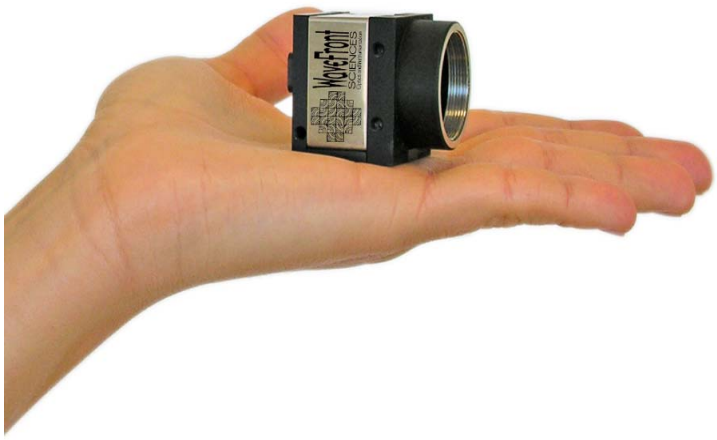
µCLAS™
USB Wavefront Sensor

The µCLAS™ is an optical analysis system providing a solution to quantitative beam analysis of CW lasers and complete optical systems. Replacing interferometers, the µCLAS™ provides a cost effective, multi-use instrument for laboratory, quality control, and process monitoring applications.

The ultimate in beam analysis, the µCLAS™ provides a measurement of the irradiance and phase distribution of the beam. In addition to the spatial irradiance and phase profiles, the beam analysis module includes rms wavefront and many other parameters. Now available in this simple to use, easy to set up system are dynamic wavefront acquisition and analysis, optics testing, laser alignment, and process and quality control.

Several live screens support instrument set up and optical path alignment. Analysis modes provide rapid adjustment and collimation of an optical beam. It is now possible to align lasers using quantitative feedback for pointing and positioning.

The complete optical train can be measured by using an appropriate source. Optical flats, spheres, aspheres, cylinders, and exotic optics can often be measured without expensive test plates or null correctors. Seidel and Zernike aberration coefficients are calculated directly from the data. Raw image, wavefront, irradiance, wavefront gradient, fringes, and 3D plot displays are available.



Because it can acquire data in as little as 35µs, the µCLAS™ is highly vibration insensitive. Most measurements can be made on an ordinary lab bench. In addition, µCLAS™ works well with a broadband source.

The Windows based user environment makes data acquisition and analysis a snap. Interactive windows display irradiance and phase in 3-D, while analysis features provide propagation, aberration coefficients, and monomial or Zernike modes. **All with instant display of the data.**

Production testing of lasers, optical components, and optical systems is supported with additional software. Acceptance test data logging and report generation may be configured for each customer's requirements.

Instant Phase™ and More!!!!

- Simultaneous measurement of phase and irradiance
- High speed, single frame data acquisition
- Large dynamic range (80λ tilt)
- Wavefront sensitivity (~λ/20)
- Multi-frame acquisition for dynamic analysis
- Insensitive to vibration
- No reference beams required
- No phase unwrapping required
- USB interface to operate with your computer
- Compact, rugged design
- Custom configurations for demanding metrology requirements

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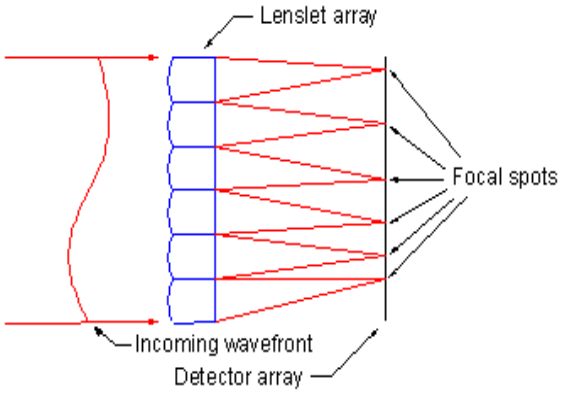
Wavefront Sensor

Based upon a miniature CCD sensor camera built exclusively for AMO WaveFront Sciences, this sensor includes a custom micro-optic lens array with a bandwidth of 300-1100nm. This calibrated wavefront sensor connects to a USB port on the user's own computer.

Analysis and Control Software

µCLAS™ comes complete with custom control and optical analysis software. A user-friendly graphical interface provides µCLAS™ with menu driven controls for calibration, data acquisition, data display, and analysis. Optical parameters available through the standard analysis package include:

- irradiance and phase distribution
- tilt, focus, astigmatism, coma, spherical, and higher order aberrations (Zernike & monomial representations)
- beam width, position, shape, amplitude distribution



µCLAS™ uses a micro-optic lenslet array to dissect a light beam into multiple focal spots. The positions of these focal spots are used to measure the optical wavefront.

Display Modes:

User selectable screens are used to display acquired and analyzed data. These views include:

- Irradiance distribution (2D and 3D)
- Wavefront contour (2D and 3D)
- Fringe display
- Raw image
- Real time alignment
- Input power level
- Wavefront slope vector plot
- Versatile data analysis
- Reference file create

Analysis: Zernike/Monomial fits and coefficients can display tilt, focus, or marked term subtracted images

Additional Features:

- Averaging (BOXCAR, exponential, and running)
- Data masking, xy slices, user control of Zernike circle
- Multi-format export capability (Zemax, Matlab, & ASCII)
- Production environment interface available
- Report/printing

Sensor Specifications:

Wavelength Range: 300nm-1100nm
Sensitivity: l/20 rms (minimum measurable wavefront with 4th order Zernike reconstructor)
Dynamic Range: ±80l (waves of tilt @ 633nm)
Aperture Size: 6.7x5.3mm
Lenslet Diameter: 108µm
Focal Length: 4.6mm
Number of Lenslets: 62x49
Exposure Range: 35ms-580ms
CCD Pixel Size: 5.2x5.2µm
8 Bit Data Resolution
25 Hz Frame Rate

Physical Specifications:

Weight & Size: 2 oz., 1.50"x1.25"x1.35"
Electrical Power: 0.70 Watts