

# SHSLab

## Shack-Hartmann wavefront sensors

# The SHSLab wavefront sensors

Optocraft's SHSLab wavefront sensor system is a powerful and comprehensive measurement solution for a multitude of optical applications. It pairs the SHSCam wavefront sensor head with SHSWorks wavefront analysis software and delivers high speed, single-shot measurements with excellent accuracy.

## Alignment of optical systems

Wavefront guiding facilitates and speeds up your alignment process significantly.



## Laser beam measurement

The single shot wavefront measurement allows for fast determination of laserbeam parameters, control of adaptive optics and thermal lens measurement.



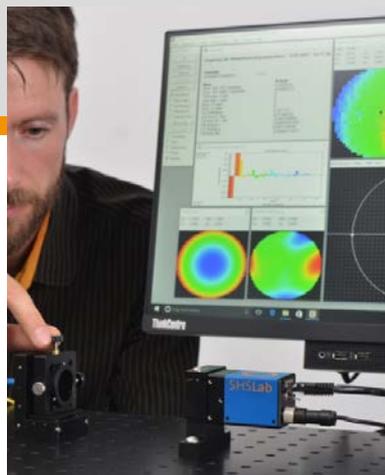
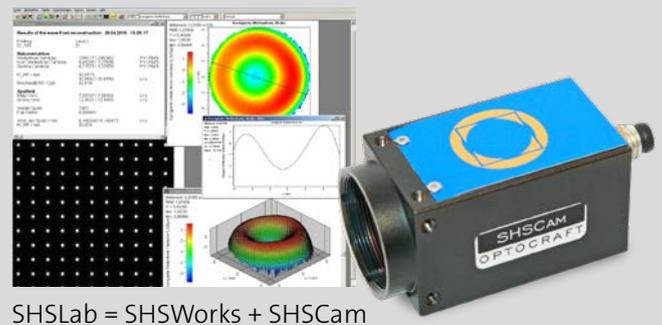
## Optics testing

The precise measurement of the transmitted wavefront provides information on the Zernike wave aberrations and the corresponding PSF/MTF.



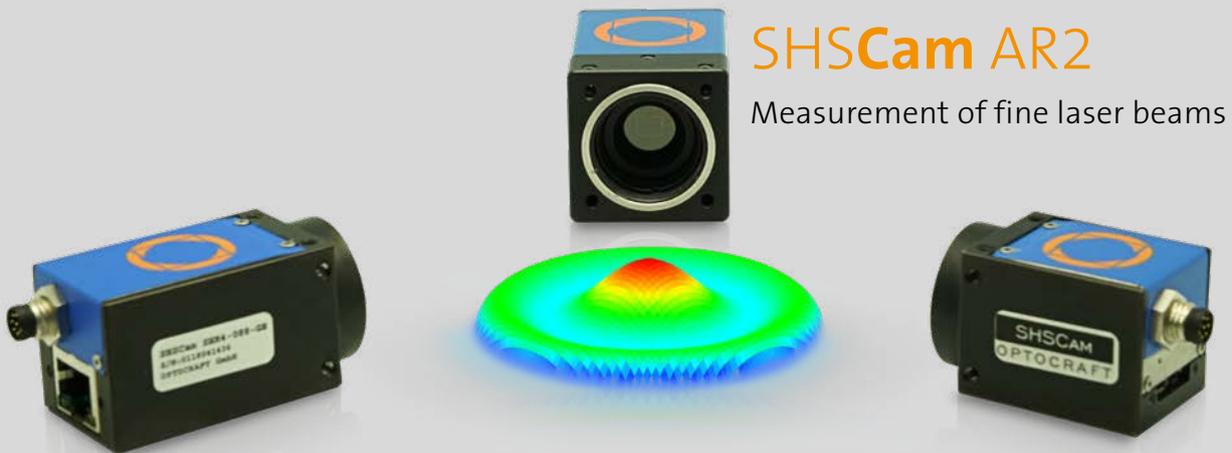
## Why SHSLab?

- High speed, single-shot measurements
- Excellent unreferenced accuracy
- Extreme dynamics and broad spectral range
- High intrinsic stability and reliability
- Powerful, customizable evaluation software
- Versatile and flexible usage
- Optocrafts systems are in operation in many demanding customer applications



# SHSCam family

Various wavefront sensor models with broad range of applications



## SHSCam AR2

Measurement of fine laser beams

## SHSCam SHR4

High lateral resolution for measurement of highly dynamic wavefronts

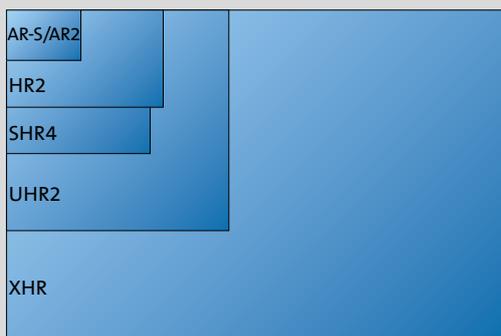
## SHSCam HR2

All-round wavefront sensor with high sensitivity

Further SHSCam models available.

### The range of SHSCam wavefront sensors

- Detection area: 4.8mm<sup>2</sup> to 36mm<sup>2</sup>
- Lateral resolution: 24x32 spots to 160x240 spots
- Evaluation rate up to 50 Hz (1000Hz on small ROI, SDK based software)
- Wavelength range from DUV to SWIR



SHSLab detection area



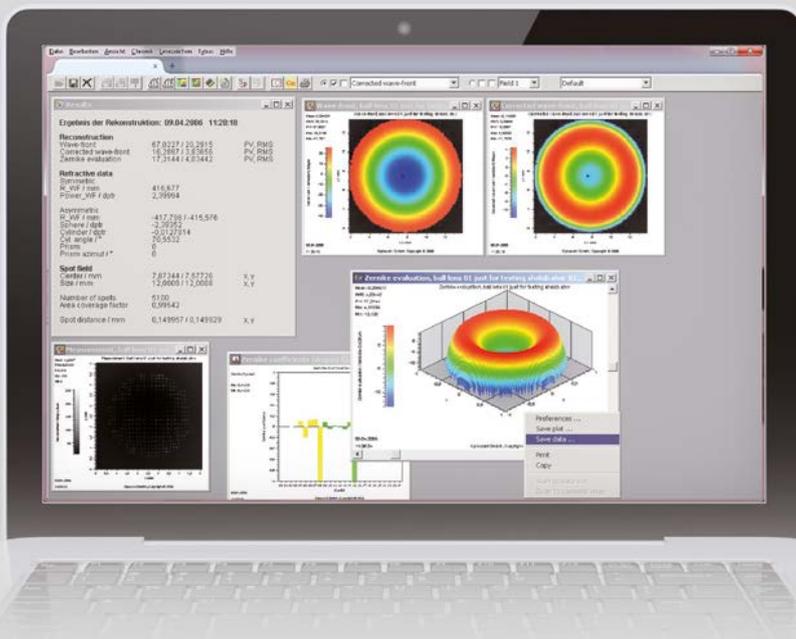
SHSLab wavelength range

*“We apply OPTOCRAFT-wavefront sensors to evaluate our laser crystals. The results of the wavefront measurement help to satisfy the increasing demands, since excellent solutions can only be found if a detailed understanding of the system under investigation is achieved. During our work we receive professional support from OPTOCRAFT and thanks to a very helpful initial training we are able to obtain reliable data in shortest time.”*

**Team Laser Development, ROFIN-SINAR Laser GmbH**

# SHSWorks - advanced wavefront metrology software

Powerful and comprehensive wavefront analysis software package



- ✓ Complete Zernike analysis
- ✓ PSF/MTF calculation
- ✓ Laser beam parameter calculation
- ✓ Quick-setup using predefined configurations
- ✓ Variable software configuration
- ✓ Pass/Fail analysis
- ✓ Advanced reporting and data logging
- ✓ Optional user access restriction
- ✓ Various camera and bus types
- ✓ Remote control via TCP/IP

## Accessories

Besides the broad range of different wavefront sensor models, Optocraft offers accessories to facilitate the setup of your individual measurement system.

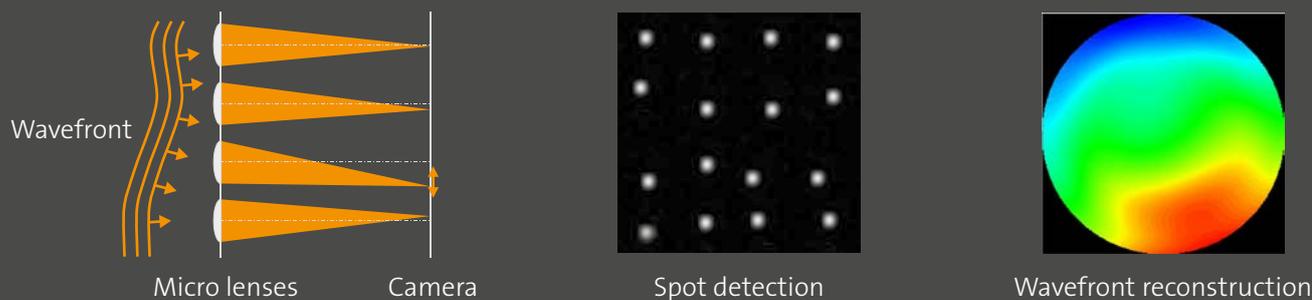
- Telescopes
- Objective lenses
- Light sources
- Reference spheres



# High performance wavefront measurement

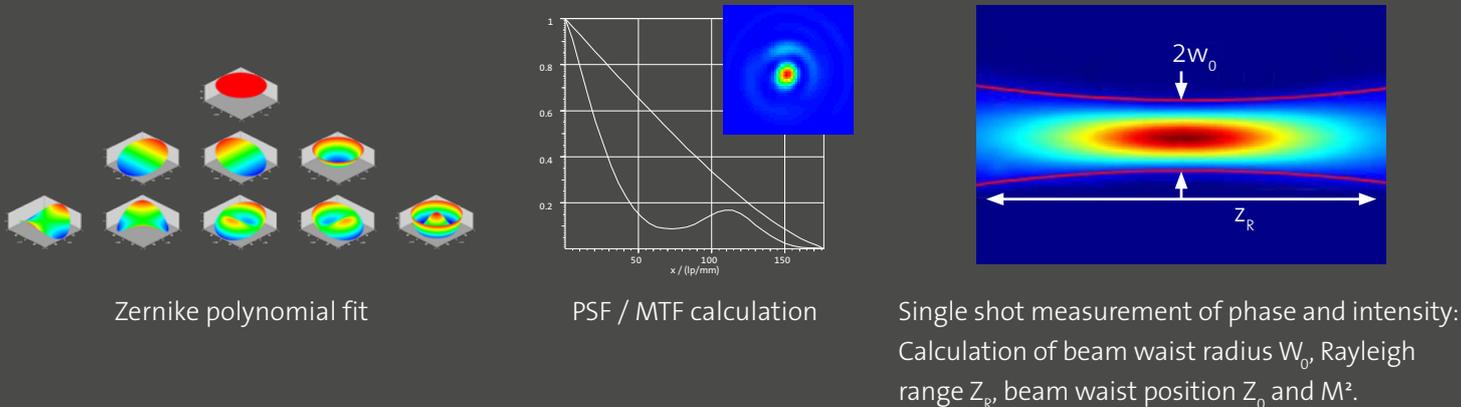
## SHSLab - Measurement principle

Wavefront reconstruction from spot field using extended spot assignment algorithms:

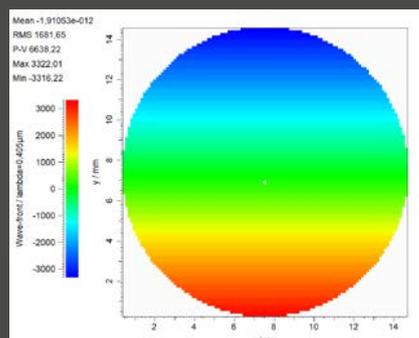


## Advanced wavefront evaluation

Wavefront analysis using Zernike polynomials, calculation of PSF/MTF, laser beam parameters and refractive data.

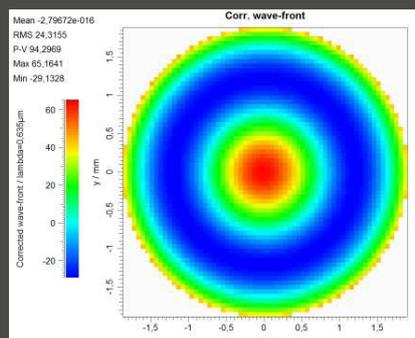


## SHSLab performance - examples



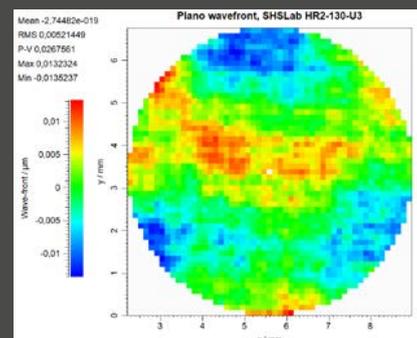
### Extreme tilt dynamic:

Over 1000 waves PV of tilt / defocus;  
 ie  $\pm 15^\circ$  tilt



### Extreme curvature dynamic:

Over 100 waves PV of aberrations;  
 ie  $\pm 10mm$  local WF curvature



### Excellent accuracy of unreferenced sensor:

6nm rms measurement accuracy,  
 no reference used

## Why Optocraft?

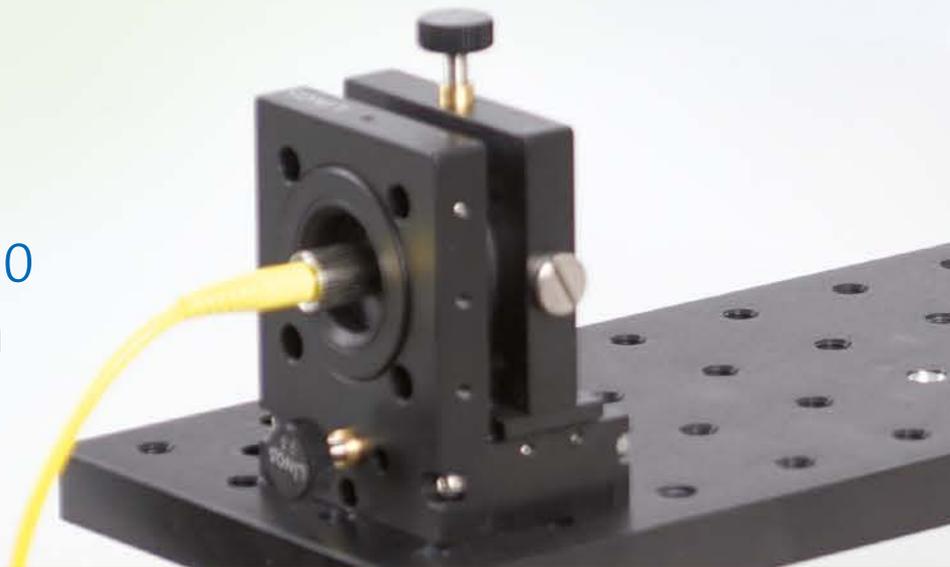
Optocraft has been developing and manufacturing Shack-Hartmann wavefront sensors since 2001. With decades of experience in optical metrology and design, we constantly push the limits of this technology. Our systems can be found all over the world and cover even the most demanding applications. Our customers enjoy our dedicated and reliable support.

We love to be challenged - try us!

## Contact us!

Tel. +49 9131 69 15 00

[sales@optocraft.com](mailto:sales@optocraft.com)



## Know your quality.

Optical metrology made by Optocraft