LASER BEAM CHARACTERIZATION

> SINGLE SHOT MEASUREMENT <

Laser beam quality is more than just governed by the intensity profile! High precision Shack-Hartmann wave-front sensors offer a simple and fast way to characterize laser sources with medium to good beam quality.

Information on the beam propagation ratio \( M^2 \), as well as the beam waist diameter, focus position and Rayleigh range can be obtained from one single measurement.

The software ShSWorks offers comprehensive tools for every day's work and for challenging projects. It enables a detailed analysis of the wavefront aberrations and thus provides further information on the characteristics of the laser beam distribution.

LASER SYSTEM ALIGNMENT

> EASY SYSTEM ALIGNMENT THROUGH EXTREME DYNAMIC RANGE <

Complex optical systems like, e.g., ultra short pulse lasers require careful alignment of various optical elements.

The application of Optocraft's wavefront sensors will simplify and speed up the alignment process when such a system is built, and may also be used to characterize the constituent components of the setup.

Furthermore, measuring the wavefront for monitoring purposes during operation provides valuable information on the performance of the system. Due to their high dynamic range, Optocraft's wavefront sensors are ideally suited for the alignment of optical setups, also when starting from strongly misaligned initial states.

LASER BEAM SHAPING

> PRECISE CHARACTERIZATION OF ADAPTIVE OPTICS <

Many applications require dedicated, but flexible phase and intensity distributions, which are usually generated by adaptive optics like deformable mirrors or spatial light modulators.

In order to characterize and to calibrate such devices, wavefront sensors are successfully used. In applications like laser beam shaping and laser pulse shaping, but also in holography or optical trapping, variable wavefronts are needed.

For those applications Optocraft offers Shack-Hartmann wave-front sensors operating at high frame rates, enabling the verification and control of the generated wavefronts.

HIGH POWER LASERS

> MEASUREMENT OF DYNAMIC EFFECTS <

In high power applications, absorption induced thermal effects may lead to a variation of the laser beam characteristics.

In case of laser resonators or focusing optics, setting up a wavefront sensor to probe those optical elements enables the measurement of the thermal lensing effect. This allows for quantifying the induced focus shift as well as higher order aberrations. Also, the amount of absorbed energy can be estimated from the wavefront deformation measurement.

The impressing sensitivity of Optocraft's wavefront sensors enables the detection of extremely small effects in the optics and laser beams.