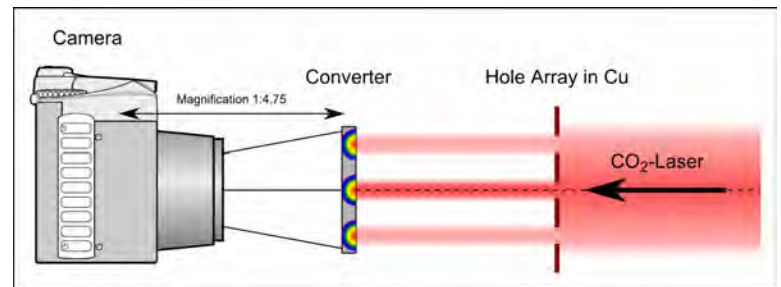
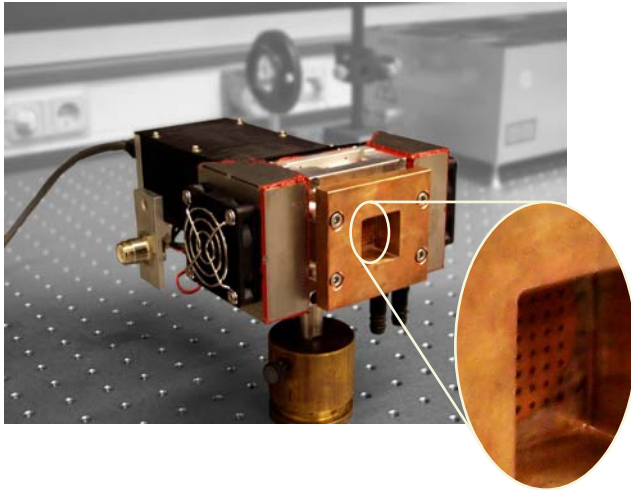


# Wavefront Analyzer for CO<sub>2</sub>-Lasers

## Beam Analysis:

- ▶ ISO beam parameters
- ▶ M<sup>2</sup> in real-time
- ▶ Beam propagation



## Operations Principle

The **Hartmann-type** wavefront sensor was designed for comprehensive laser beam and optics characterization. The system uses a copper plate with an array of holes for dividing the incoming wave into a number of sub-rays (cf. figures left & top). Intensity and position of the individual foci are monitored with a camera, enabling the reconstruction of both **beam profile** and **wavefront** from a single measurement.

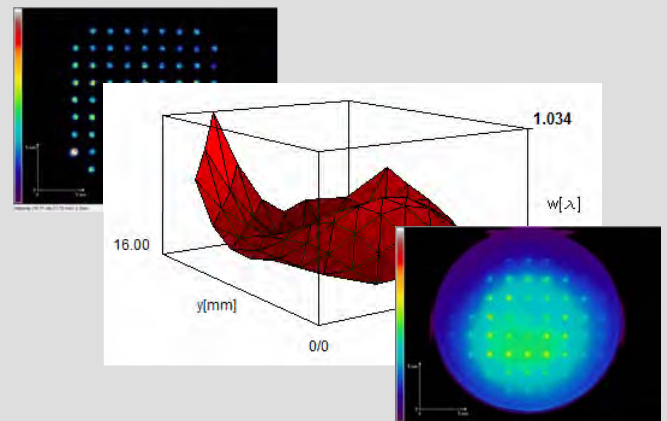
These data accomplish real-time evaluation of beam propagation parameters (beam width, divergence, M<sup>2</sup>) which is especially important for pulsed or fluctuating sources.

M<sup>2</sup> measurement (real-time):

$$M_x^2 = \frac{4\pi}{\lambda} \sqrt{\langle x^2 \rangle \langle \beta x^2 \rangle - \langle x\beta x \rangle^2}$$

## Features

- ▶ All parameters from single measurement
- ▶ Spectral range: 8...30 μm
- ▶ Intensity range: 50...2,000 W/cm<sup>2</sup>
- ▶ Input power (max): 500 W (550 W, 30 s)
- ▶ Converter resolution: 100 μm (50 % MTF)
- ▶ Converter response time: 50 ms (50 % MTF)
- ▶ CCD resolution: 752 x 580 px
- ▶ Frame rate: up to 25 Hz
- ▶ Interface: FireWire (IEEE1394a)



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Dr. Klaus Mann  
kmann@llg-ev.de  
+49-(0)551-5035-41



Laser-Laboratorium Göttingen e.V.  
Hans-Adolf-Krebs-Weg 1  
D-37077 Göttingen

[www.llg-ev.de](http://www.llg-ev.de)