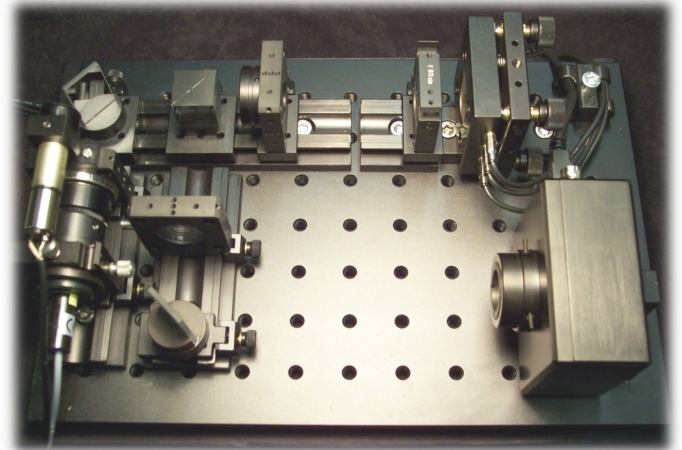


Laser Beam Stabilization System

The limited pointing stability of high power laser systems is a question of major concern, since fluctuations of the lateral or angular beam position can cause tremendous problems especially in industrial applications. For compensation of drift effects a Laser Beam Stabilization System was developed, which may be utilized for stabilization and realignment of practically all lasers operating in the UV-VIS-NIR spectral range.

Characteristics:

- ▶ Piezo driven adaptive mirror
- ▶ Closed-loop tip/tilt correction
- ▶ Pointing stability: $< 1 \mu\text{rad}$



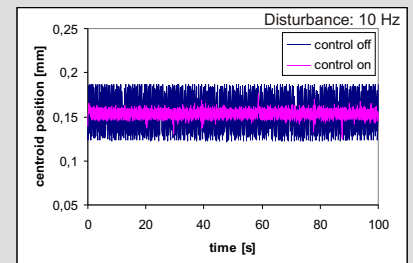
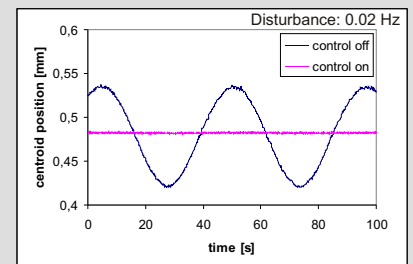
Description

The system makes use of a USB camera which allows monitoring of the far-field of the laser beam to be stabilized at a framerate of 400 Hz. For the measurement a small part of the primary beam is coupled into the detection system. The far-field centroid data provide information on the actual beam direction, allowing compensation in x- and y-direction by the help of a piezo driven mirror. Automated readjustment after a lateral or angular movement of the beam position is achieved by use of a comprehensive computer program, which allows also determination of the beam pointing stability in accordance with the respective ISO standard 11670.

Specifications

- ▶ Accuracy for determination and control of beam direction: $< 50 \text{ mrad}$
- ▶ Max. beam diameter: 40 mm
- ▶ Max. divergence: 10 mrad
- ▶ Suitable for all lasers operating at wavelengths from 190 nm - 1100 nm

The graphs on the right show the variation of the beam position (centroid) when a sinusoidal movement is applied (dark blue lines). With the use of the beam stabilization system ("control on", magenta lines) the centroid position is fixed.



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