

New Adaptive Optical Device, based on thermo-optical Effects

A new adaptive optical device has been developed which is based on thermo-optical effects. The device has the ability to dynamically change the wavefront of a light beam, either in reflection or transmission. Such a device may be used to improve optical images, or generate shapeable custom modes from a laser resonator.

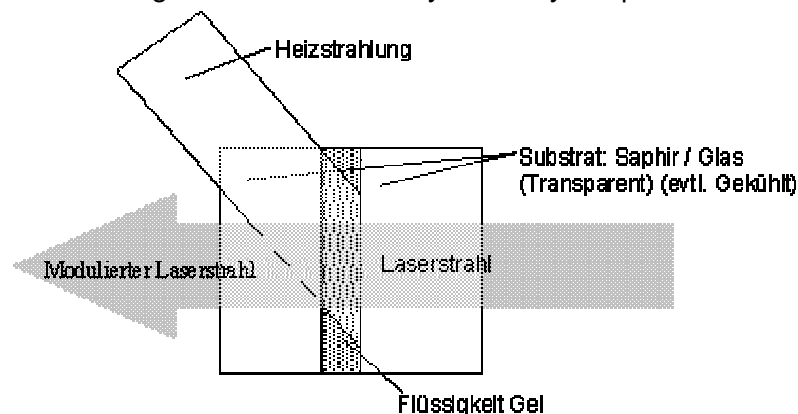
Keyword Adaptive optics, wavefront modulator, custom modes, optical aberration

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Reference in preparation

Background Adaptive optical devices are elements, typically mirrors, that can change their optical properties in response to control signals. Currently known adaptive optical systems such as deformable mirrors with piezo-actuators, electrostatically deformable membrane mirrors, micro-mechanical systems or liquid crystal devices are not suited for intra-cavity beam control of lasers in the visible and near-infrared spectral region. Either they cannot be modulated with sufficient spatial resolution, or they cannot withstand the power levels reached in modern laser systems.

Invention The new technology is based on applying a heating pattern on an active layer that is either placed on a mirror, below the reflective film (reflective device), or within a glass cell (transmissive device, see figure). The thermal variation induces a thermal expansion and a variation of the refractive index of the active layer, which modifies the wavefront reflected or transmitted by such a device. The technology can be used for any application where the wavefront of a light beam has to be dynamically adapted.



Applications High-Power Laser, Laser Rangefinder, Surveillance Imaging Systems, Large-Aperture Cameras, Biomedical Imaging, Space Observation and Photography

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