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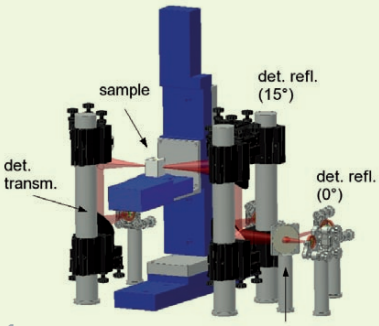

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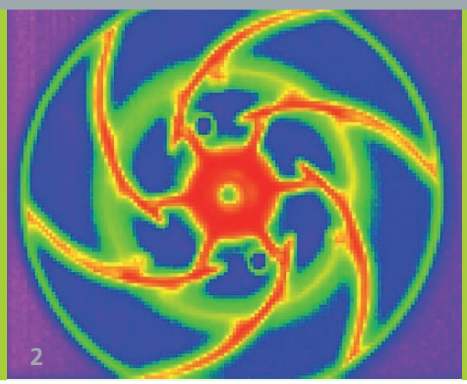
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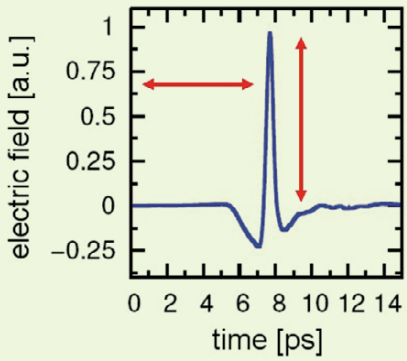

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1 *Measurement system for THz tomography in transmission and reflection.*
2 *Inspection of laser weld spots in an impeller made of plastics.*
3 *Time-resolved Terahertz pulse.*

TERAHERTZ-TECHNOLOGIES FOR IMAGING AND TOMOGRAPHY

Fundamentals

Terahertz (THz) radiation is low in energy and therefore not harmful to health. It penetrates paper, clothing, most plastics, polystyrene foams and semiconductors. However, it is strongly absorbed by water and reflected by metals. Many molecules, e.g. organic substances, pharmaceutical products, illicit drugs and explosives, can be detected and identified using THz radiation.

Competences of IOF

- Design, development and realization of customized THz systems
- Studies on the suitability of THz radiation
- Imaging, tomographic and spectroscopic measurements in transmission and reflection
- Test of homogeneity, characterization of layer structures
- Comparison of CAD and measurement data

Application

Time-resolved measurements of ultrashort THz pulses combined with broadband spectroscopy enable a wide variety of applications in the fields of non-destructive testing, security and tomography. For example determination of layer thickness, delamination of optically opaque materials, inspection of plastics on inhomogeneities and inclusions are possible. Moreover the sample's inner content can be revealed.

Measured quantities

Fig. 3 shows the time-resolved measurement of the electrical field strength of an ultra-short THz pulse. The information used for imaging and tomography are amplitude and time-delay of the THz pulses as well as spectroscopic indicators which are calculated by means of the fourier transform.

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