Q 36 Poster Photonik in komplexen und periodischen Strukturen

Zeit: Dienstag 16:30–18:30 Raum: Labsaal

Q 36.1 Di 16:30 Labsaal

Diffusing-wave spectroscopy from multilayer media with non-scattering inclusions — •T. Gisler, F. Jaillon, J. Li, G. Maret, and G. Dietsche — Universität Konstanz, Fachbereich Physik, Fach M621, 78457 Konstanz

Dynamic multiple light scattering (diffusing-wave spectroscopy - DWS) is emerging as a new tool for non-invasive biomedical diagnosis, as it is a marker-free method which is very sensitive to microscopic displacement of scatterers within tissue. Recently DWS has been used to detect activation of the human brain fully non-invasively through intact scalp and skull (T. Durduran et al., Opt. Lett. **29**, 1766-1768 (2004); J. Li et al., J. Biomed. Opt. **10**, 044002 (2005)). These experiments have raised the question about the validity of the diffusion approximation for the description of the measured temporal field autocorrelation function $g^{(1)}(\tau)$ when a non-scattering layer such as the cerebrospinal fluid (CSF) is present.

In this contribution we present experimental results from a 3-layer tissue phantom with calibrated optical and dynamic properties. Field autocorrelation functions $g^{(1)}(\tau)$ measured in backscattering geometry with source and receiver at a distance of 1-4 cm are found to agree well with predictions from correlation-diffusion theory if the presence of the non-scattering layer is accounted for by a distance-dependent modification of the boundary conditions between non-scattering and turbid layers. Experiments and theory also agree well with multilayer Monte-Carlo simulations of $g^{(1)}(\tau)$.

Q 36.2 Di 16:30 Labsaal

Complex counterpropagating solitary structures in photorefractive media — •Christoph Bersch, Denis Träger, and Cornelia Denz — Institut für Angewandte Physik, Westfälische Wilhelms-Universität Münster, Corrensstr. 2/4, 48149 Münster, Germany

Counterpropagating optical spatial solitons are known to show significantly different behaviour than their copropagating counterparts [1]. Due to the inherent feedback, qualitatively new phenomena can be observed, including temporal dynamics. Up to now only few experimental results of very simple counterpropagating configurations in (2+1)D exist [2]. In contrast, complex copropagating structures, i.e. soliton arrays, and their interactions had been studied extensively in the recent years [3].

In this contribution we present experimental results of complex counterpropagating structures in a photorefractive SBN crystal. We investigate the interaction of a counterpropagating single beam and a soliton array in dependence of the beam position.

[1] Belić et al, Phys. Rev. E 68, 025601 (2003)
[2] Petrović et al, Phys. Rev. Lett. 95, 053901 (2005)
[3] Träger et al, J. Opt. A 5, 518 (2003)