Q 71 Transversale nichtlineare Optik

Zeit: Mittwoch 15:00–16:00 Raum: HU 1070

Q 71.1 Mi 15:00 HU 1070

Bistable localized emission states in vertical-cavity surface-emitting lasers with frequency-selective feedback — •T. Ackemann[1], M. Sondermann[1], F. Marino[2], and R. Jäger[3] — [1]Institut für Angewandte Physik, Westfälische Wilhelms-Universität Münster, Corrensstr. 2-4, 48149 Münster, Germany — [2]Instituto Mediterráneo de Estudios Avanzados (IMEDEA), Universitat de les Illes Balears, E-07071 Palma de Mallorca, Spain — [3]ULM Photonics, Lise-Meitner-Str. 13, 89081 Ulm, Germany

The turn-on characteristics of broad-area bottom-emitting vertical-cavity surface-emitting lasers with frequency-selective feedback by a diffraction grating are studied experimentally. In the vicinity of the threshold, we observe the formation of bistable localized emission states. These states might have applications in potentially massively parallel all-optical switching schemes.

Q 71.2 Mi 15:15 HU 1070

Dynamic Fourier control of a photorefractive single-mirror feedback system
— •Christian Ripperda, Philip Jander, and Cornelia Denz — Institut für Angewandte Physik, Westfälische Wilhelms-Universität, Corrensstrasse 2, 48149 Münster

Photorefractive single feedback systems are known to exhibit a variety of transverse patterns [1]. In addition to predominant hexagonal patterns, stripes, squares and squeezed hexagons can be observed to coexist and compete. Fourier control is an established method for statically selecting specific patterns which may be relatively unstable or to inhibit specific pattern geometries or orientations [2].

We experimentally demonstrate dynamic Fourier control in a Michelson feedback geometry. Using this method, patterns can be dynamically selected, inhibited or otherwise controlled. Electronic feedback of the current system state on the control signal is realized, opening a new possibility for minimally invasive control. Additionally, dynamic Fourier control is exploited to investigate the relative stability of two-dimensional patterns with different geometries.

[1] M. Schwab, C. Denz, M. Saffman, Appl. Phys. B 69, 429-433 (1999)
[2] M. Schwab, M. Saffman, C. Denz, T. Tschudi, Opt. Commun. 170, 129-136 (1999)

Q 71.3 Mi 15:30 HU 1070

Secondary modulation instability of partially coherent beams in anisotropic media — •Björn Gütlich[1], Cornelia Denz[1], Thomas König[1], Kristian Motzek[2], and Friedemann Kaiser[2] — [1]Institute for Applied Physics, WWU Münster, Corrensstraße 2, 48149 Münster — [2]Institute for Applied Physics, TU Darmstadt, Hochschulstraße 4a, 64289 Darmstadt

Induced by noise uniform optical beams break up into filaments in the presence of a nonlinearity. Initially such modulation instability was only considered to be possible with coherent beams. Recent experiments show that in noninstantaneous media also partially coherent beams exhibit a modulation instability. Incoherent modulation instability attracts interest due to the co-existence with optical solitons, which promise interesting features for application in optical information processing. In anisotropic media, such as photo-refractive crystals, used in our experiment, the beam break up does not occur isotropically in both transversal directions, but occurs successively from stripes at a first threshold into two dimensional filaments at a second threshold. We investigate experimentally and numerically the dependence of first and second threshold of the modulation instability on the coherence properties of the beam.

Q 71.4 Mi 15:45 HU 1070

Addressing and steering of optical-solitary structures in a single feedback experiment with a saturable Kerr nonlinearity — •Holger Zimmermann, Björn Gütlich, and Cornelia Denz — Institut für Angewandte Physik - WWU Münster

Solitary structures are localised spots, which offer interesting approaches to optical information processing due to their applicability as waveguides and their binary features. Challenging for the implementation are interactions between the solitary structures as well as inhomogeneities of the used nonlinearity. To allow application, a method to steer the solitary structures is necessary. We experimentally realise the steering of solitary structures by adding an incoherent white light distribution to a single feedback system with a LCLV (liquid crystal light valve) as a saturable nonlinearity. Due to steering it is possible to create solitary structures at predefined positions and to control their spatial location.