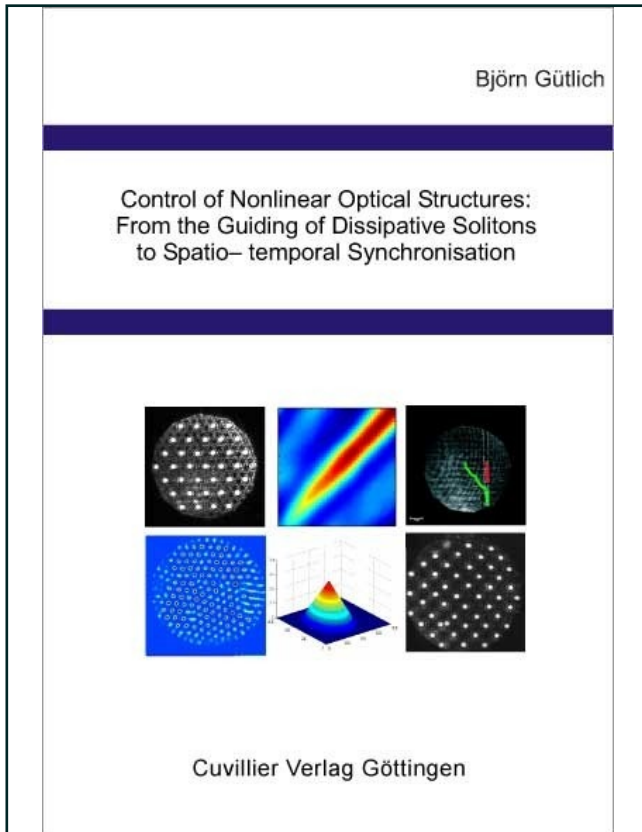




Björn Gütlich (Autor)

Control of Nonlinear Optical Structures: From the Guiding of Dissipative Solitons to Spatio-temporal Synchronisation



<https://cuvillier.de/de/shop/publications/1698>

Copyright:

Cuvillier Verlag, Inhaberin Annette Jentsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen, Germany

Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>

Contents

1	Introduction	1
2	Control methods for nonlinear optical systems	5
2.1	Fundamental concepts for the control of nonlinear optical systems . . .	8
2.2	Forcing of spatio-temporal systems	14
2.3	Spatio-temporal synchronisation	15
3	Optical structures propagating in nonlinear media	21
3.1	Modulation instability of propagating beams	24
3.2	Spatial optical solitons	25
3.3	Modulation instability of incoherent beams	29
4	Self-organised optical structures in systems with feedback	37
4.1	Optical cavity	37
4.2	Optical single feedback systems	39
4.3	Cavity and feedback solitons	48
5	Liquid crystal light valve single feedback systems	53
5.1	Liquid crystal light valves (LCLV)	53
5.2	The LCLV single feedback loop	70
5.3	Optical pattern formation in the LCLV system	75
5.4	Pattern formation in phase only mode	76
5.5	Pattern formation in polarisation mode	85
6	External control of dissipative optical feedback solitons	91
6.1	Experimental implementation of external control	92
6.2	Balancing spatial inhomogeneities	96
6.3	Static position control	101
6.4	A complete and robust addressing scheme	103
6.5	Gradient induced drift motions	106
6.6	Dynamic position control	119
6.7	Interactions of drifting feedback solitons with static gradients	123

7	Spatio–temporal synchronisation	137
7.1	Experimental realisations of unidirectional coupling	138
7.2	Characterisation of the uncoupled system states	141
7.3	Characterisation methods for spatio–temporal synchronisation	144
7.4	Lagged synchronisation	147
7.5	Numerical simulations	150
7.6	Experimental influence of spatial inhomogeneities	153
8	Summary and Outlook	165
	Bibliography	171
	Acknowledgements	191
	List of publications	193
	Deutschsprachige Zusammenfassung	195
	Curriculum Vitae	198