Spatiotemporal optical solitons in carbon nanotube arrays

Titre	Spatiotemporal optical solitons in carbon nanotube arrays
Type de publication	Article de revue
Auteur	Leblond, Hervé [1], Mihalache, Dumitru [2]
Editeur	American Physical Society
Type	Article scientifique dans une revue à comité de lecture
Année	2012
Langue	Anglais
Date	2012/10/23
Numéro	4
Pagination	043832
Volume	86
Titre de la revue	Physical Review A
ISSN	1050-2947
Résumé en anglais	We consider the formation of ultrashort spatiotemporal optical waveforms in arrays of carbon nanotubes. We use a short-wave approximation to derive a generic two-dimensional sine-Gordon equation, describing ultrashort soliton evolution in such nanomaterials. This model was derived by using a rigorous application of the reductive perturbation formalism (multiscale analysis) for the Maxwell equations and for the corresponding Boltzmann kinetic equation for the distribution function of electrons in carbon nanotubes. We show numerically diffractionless and dispersionless robust propagation over large distances (with respect to the wavelength) of few-cycle (2+1)-dimensional spatiotemporal solitons in the form of optical breathers.
URL de la notice	http://okina.univ-angers.fr/publications/ua5189 [3]
DOI	10.1103/PhysRevA.86.043832 [4]
Lien vers le document	http://dx.doi.org/10.1103/PhysRevA.86.043832 [4]

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