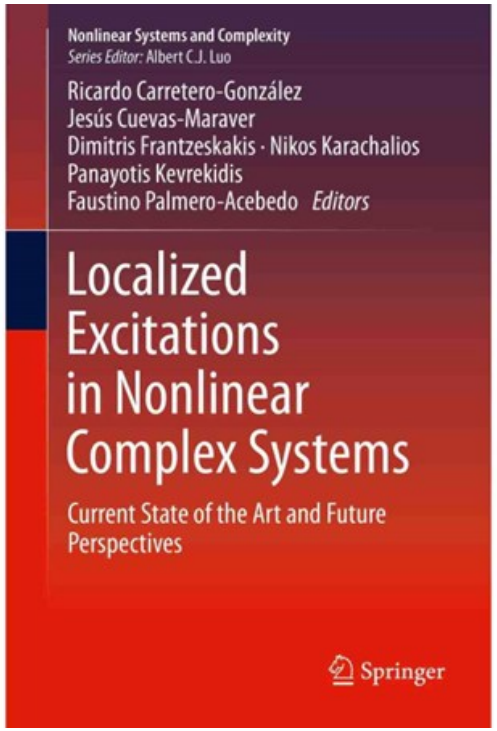
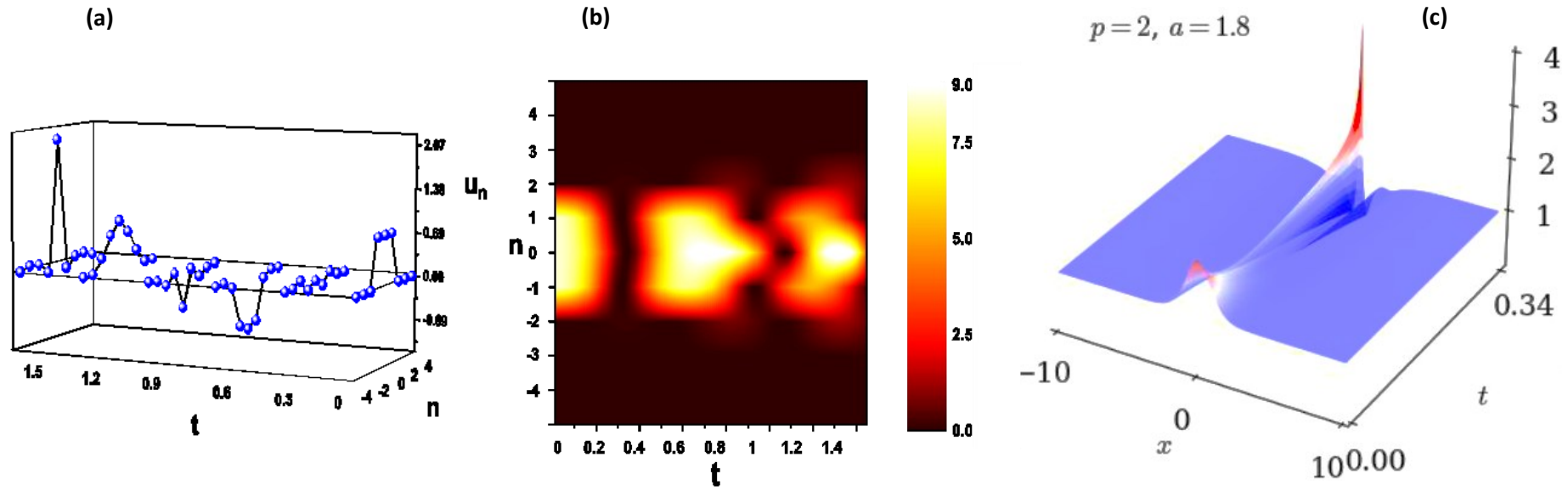
Publications and Preprints

Nikos I. Karachalios in [AMS-Mathematical Reviews, ZbMath, Scopus, Web of Science]* , Google Scholar *(for subscribers)
https://orcid.org/0000-0002-5580-3957

Book (edited) **R. Carretero-González, J. Cuevas, D. J. Frantzeskakis, N. I. Karachalios, P. G. Kevrekidis, F. Palmero.** (eds.) *Localized Excitations in Nonlinear Complex Systems: Current State of the Art and Future Perspectives.* Nonlinear Systems and Complexity **7,** Springer, 2014





Figures: (a) Escape of a 3-unit lattice segment from a potential well of depth U=1. Initial positions at U<<1 (b) Progressive energy localization on the 3-unit segment. The figures (a), (b) are from [28]. (c) Instantaneous blow-up for the critical NLS with non-zero boundary conditions. The figure is from [60].

Referred articles

60. Dirk Hennig, Nikos I. Karachalios, Dionyssios Mantzavinos and Dimitrios Mitsotakis. On the lifespan of nonzero background solutions to a class of focusing nonlinear Schrödinger equations. **Wave Motion 132** (2025), 103419 (11pp). Link

59. N. I. Karachalios, A. Krypotos and P. Kyriazopoulos. Nonlinear lattices from the physics of ecosystems: The Lefever-Lejeune nonlinear lattice in Z^2. **Mathematical Methods in the Applied Sciences 47** (2024), no. 16, 12487–12506. https://doi.org/10.1002/mma.10293 . Preprint: https://arxiv.org/abs/2406.16598 (Movie on the 2D dynamics and the emergence of 2D fronts)

58. G. Fotopoulos, N. I. Karachalios, V. Koukouloyannis, P. Kyriazopoulos and K. Vetas. The discrete nonlinear Schrödinger equation with linear gain and nonlinear loss: the infinite lattice with nonzero boundary conditions and its finite dimensional approximations. **Journal of Nonlinear Science 34**:72 (2024) (36pp). Link. Preprint: https://arxiv.org/abs/2312.03683

57. E. G. Charalampidis, G. James, J. Cuevas-Maraver, D. Hennig, N. I. Karachalios and P. G. Kevrekidis. Existence, stability and spatio-temporal dynamics of time-quasiperiodic solutions on a finite background in discrete nonlinear Schrödinger models. **Wave Motion 128** (2024), Paper No. 103324. Link.

56. Dirk Hennig, Nikos I. Karachalios, Dionyssios Mantzavinos, Jesús Cuevas-Maraver and I. G. Stratis. On the proximity between the wave dynamics of the integrable focusing nonlinear Schrödinger equation and its non-integrable generalizations. **Journal of Differential Equations 397** (2024), 106-165. Link. Preprint: https://arxiv.org/abs/2307.16408

55. Dirk Hennig and Nikos I. Karachalios. Periodic travelling wave solutions of discrete nonlinear Klein-Gordon lattices. **Mathematical Methods in the Applied Sciences 46** (2023), 18400-18419. Link. Preprint.

54. Dirk Hennig, Nikos I. Karachalios and Jesús Cuevas-Maraver. Dissipative localised structures for the complex Discrete Ginzburg Landau equation. **Journal of Nonlinear Science 33**:51 (2023), (27pp). Link. Preprint.

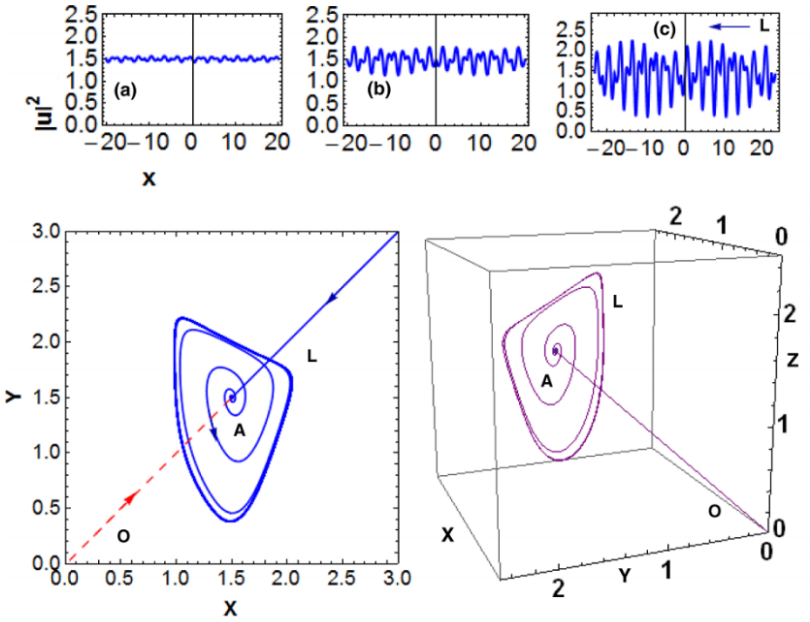
53. Dirk Hennig and Nikos I. Karachalios. Existence of exponentially and superexponentially spatially localised breather solutions for nonlinear Klein-Gordon lattices in Z^d, d≥1. **Proceedings of the Edinburgh Mathematical Society 65** (2022), no. 2, 480–499. Link. Preprint.

52. Dirk Hennig, Nikos I. Karachalios and Jesús Cuevas-Maraver. The closeness of localised structures between the Ablowitz-Ladik lattice and Discrete Nonlinear Schrödinger equations: Generalised AL and DNLS systems. **Journal of Mathematical Physics 63**, no.4 (2022), 042701, 18pp. Link. Preprint.

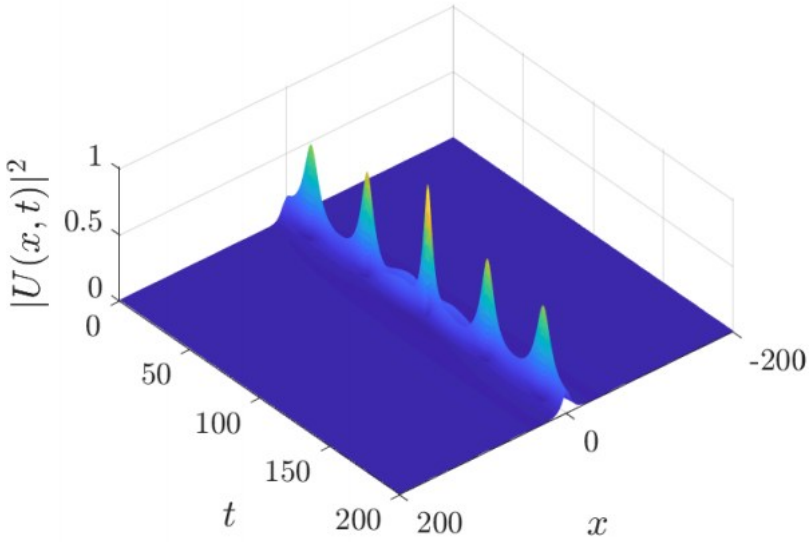
51. Dirk Hennig, Nikos I. Karachalios and Jesús Cuevas-Maraver. The closeness of the Ablowitz-Ladik lattice to the Discrete Nonlinear Schrödinger equation**.** **Journal of Differential Equations 316** (2022) 346–363**.** Link. Preprint: https://arxiv.org/abs/2102.05332

50. Dirk Hennig and Nikos I. Karachalios. Note added to proof and corrigendum to ``Dynamics of nonlocal and local discrete Ginzburg-Landau equations: global attractors and their congruence" [Nonlinear Anal. 215 (2022), Paper No. 112647]. **Nonlinear Analysis 218** (2022), Paper No. 112808, 4 pp., Link. [With a new result for the critical damping case of the nonlocal discrete Ginzburg-Landau equation of paper 49 and a correction for the small damping case.

49. Dirk Hennig and Nikos I. Karachalios. Dynamics of nonlocal and local discrete Ginzburg-Landau equations: global attractors and their congruence. **Nonlinear Analysis 215** (2022),112647. Link. Preprint: https://arxiv.org/abs/2104.00338



Travelling waves of the higher-order Ginzburg-Landau equation as limit cycles, [33].



A breather of non-integrable NLS with nonzero boundary conditions, [60].

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47. T. P. Horikis, Nikos I. Karachalios and D. J. Frantzeskakis. Dynamics of a Higher-Order Ginzburg–Landau-Type Equation. Nonlinear Analysis, Differential Equations, and Applications, **Springer Optimization and Its Applications** **173** (2021), 187-207. Link

46. S. Diamantidis, T. P. Horikis and N. I. Karachalios. Exciting extreme events in the damped and AC-driven NLS equation through plane wave initial conditions **Chaos** **31** (2021), no. 5, 053103, (20 pp). Link. Preprint.

45. N. Gialelis, N. I. Karachalios and I. G. Stratis. Regularity of nonvanishing-at infinity or at the boundary-solutions of the defocusing nonlinear Schrödinger equation. **Communications in Partial Differential Equations** **46** (2021) 233-281 (49pp). Link. Preprint.

44. G. Abbas, P. G. Kevrekidis, J. E. Allen, V. Koukouloyannis, D. J. Frantzeskakis, and N. I. Karachalios. Propagation of periodic wave trains along the magnetic field in a collision-free plasma. **Journal of Physics A: Mathematical and Theoretical** **53** (2020), 425701 (17pp). Link. Preprint.

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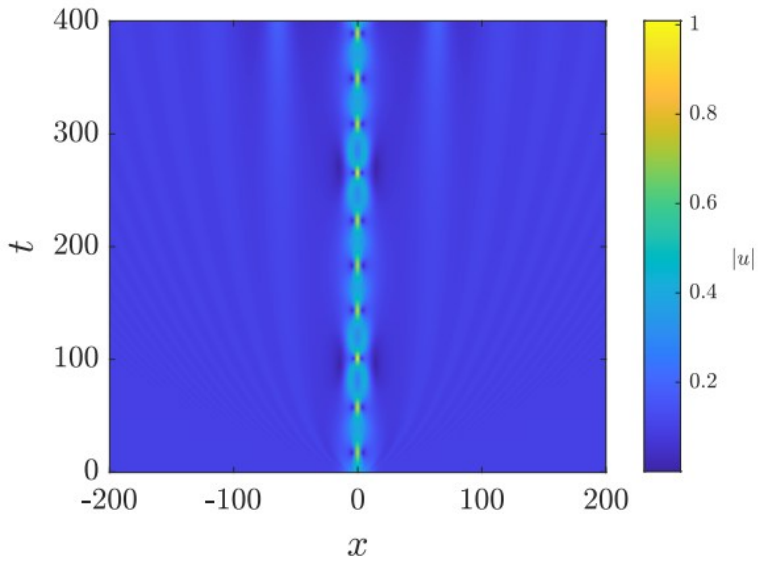
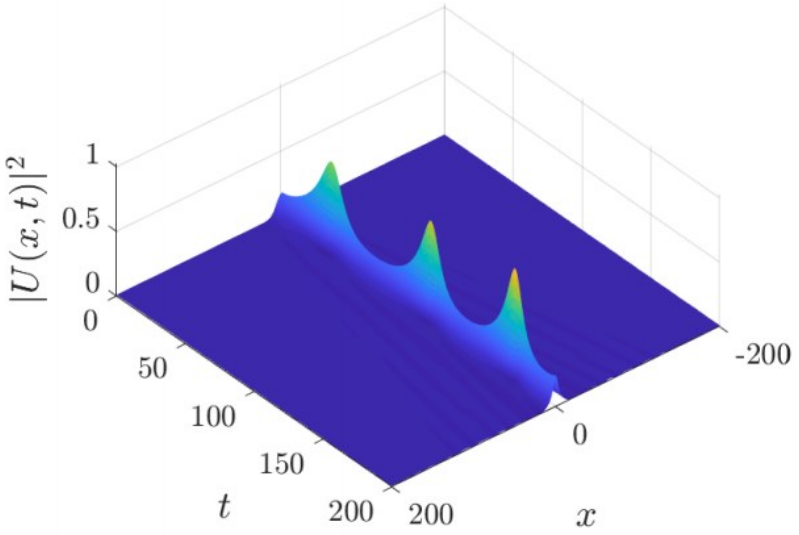
41. N. I. Karachalios, P. Kyriazopoulos and K. Vetas. The Lefever-Lejeune nonlinear lattice: convergence dynamics and the structure of equilibrium states. **Physica D: Nonlinear Phenomena** **409** (2020), 132487 (21pp). Link. Preprint.

40. G. Fotopoulos, N. I. Karachalios, V. Koukouloyannis and K. Vetas. The linearly damped nonlinear Schrödinger equation with localized driving: spatiotemporal decay estimates and the emergence of extreme wave events. **Zeitschrift für Angewandte Mathematik und Physik** **71**:3 (2020) (23pp). Link. Preprint: https://arxiv.org/abs/1910.08425

39. G. Fotopoulos, D. J. Frantzeskakis, N. I. Karachalios, P. G. Kevrekidis, V. Koukouloyannis and K. Vetas. Extreme wave events for a nonlinear Schrödinger equation with linear damping and Gaussian driving. **Communications in Nonlinear Science and Numerical Simulation** **82** (2020), 105058 (14pp) Link Preprint: https://arxiv.org/abs/1812.05439



Breathers of non-integrable NLS with nonzero boundary conditions, [60].



38. N. I. Karachalios, P. Kyriazopoulos and K. Vetas. Excitation of Peregrine-type waveforms from vanishing initial conditions in the presence of periodic forcing. **Zeitschrift für Naturforschung A** **75** (2019), 371-382. Editor's choice free access article. Link. Preprint: https://arxiv.org/abs/1811.09812

37. G. Fotopoulos, N. I. Karachalios, V. Koukouloyannis and K. Vetas. Collapse dynamics for the discrete nonlinear Schrödinger equation with gain and loss. **Communications in Nonlinear Science and Numerical Simulation** **72** (2019), 213-231. Link Preprint: https://arxiv.org/abs/1809.08025

36. D. J. Frantzeskakis, N. I. Karachalios, P. G. Kevrekidis, V. Koukouloyannis and K. Vetas. Dynamical transitions between equilibria in a dissipative Klein-Gordon lattice. **Journal of Mathematical Analysis and Applications** **472** (2019), 546-576. Link Preprint: https://arxiv.org/abs/1809.07995

35. Z. A. Anastassi, G. Fotopoulos, D. J. Frantzeskakis, T. P. Horikis, N. I. Karachalios, P. G. Kevrekidis, I. G. Stratis and K. Vetas. Spatiotemporal algebraically localized waveforms for a nonlinear Schrödinger model with gain and loss. **Physica D: Nonlinear Phenomena** **355** (2017), 24–33. Link Preprint: https://arxiv.org/abs/1702.08085

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32. V. Achilleos, S. Diamantidis, D. J. Frantzeskakis, T. P. Horikis, N. I. Karachalios and P. G. Kevrekidis. Collapse for the higher-order nonlinear Schrödinger equation. **Physica D: Nonlinear Phenomena** **316** (2016), 57-68. Link

31. V. Achilleos, S. Diamantidis, D. J. Frantzeskakis, N. I. Karachalios and P. G. Kevrekidis. Conservation laws, exact travelling waves and modulation instability for an extended nonlinear Schrödinger equation. **Journal of Physics A: Mathematical and Theoretical** **48** (2015) no. 35, 355205 (33 pp). Link

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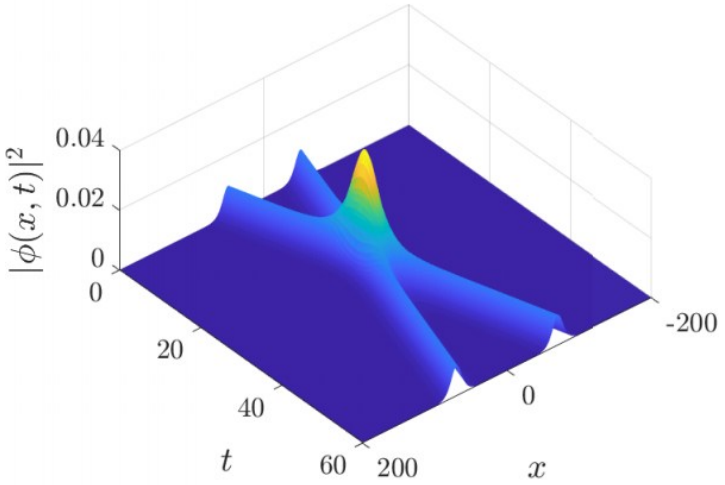
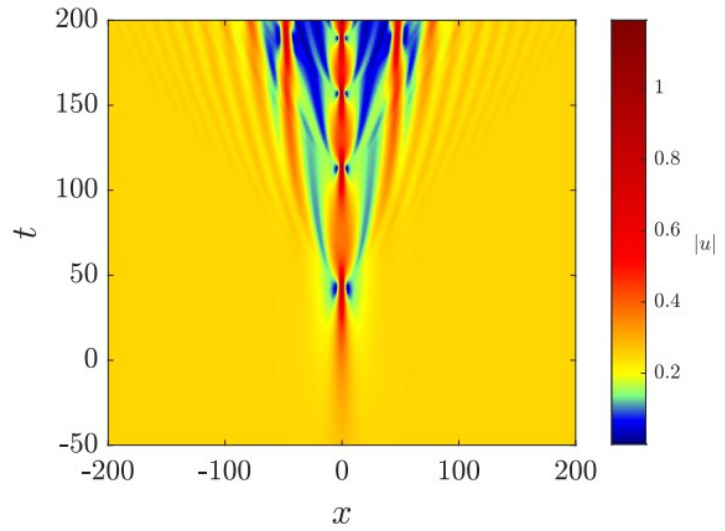


Soliton collision and dynamics of nonintegrable NLS with nonzero boundary conditions, [60].



28. V. Achilleos, A. Álvarez, J. Cuevas, D. J. Frantzeskakis, N. I. Karachalios, P. G. Kevrekidis and B. Sánchez-Rey. Escape Dynamics in the Discrete Repulsive φ^4-Model. **Physica D: Nonlinear Phenomena** **244** (2013), no. 1, 1-24. Link

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22. Nikos Karachalios and Nikos Zographopoulos. The semiflow of a reaction-diffusion equation with a singular potential. (2009). **Manuscripta Mathematica** **130** (2009) no. 1, 63-91. Preprint. Link

21. Nikos Karachalios. The number of bound states for a Discrete Schrödinger operator on Z^N, $N \geq 1$, lattices.**Journal of Physics A: Mathematical and Theoretical** **45** (2008) no. 45, 455201 (14 pp). Link

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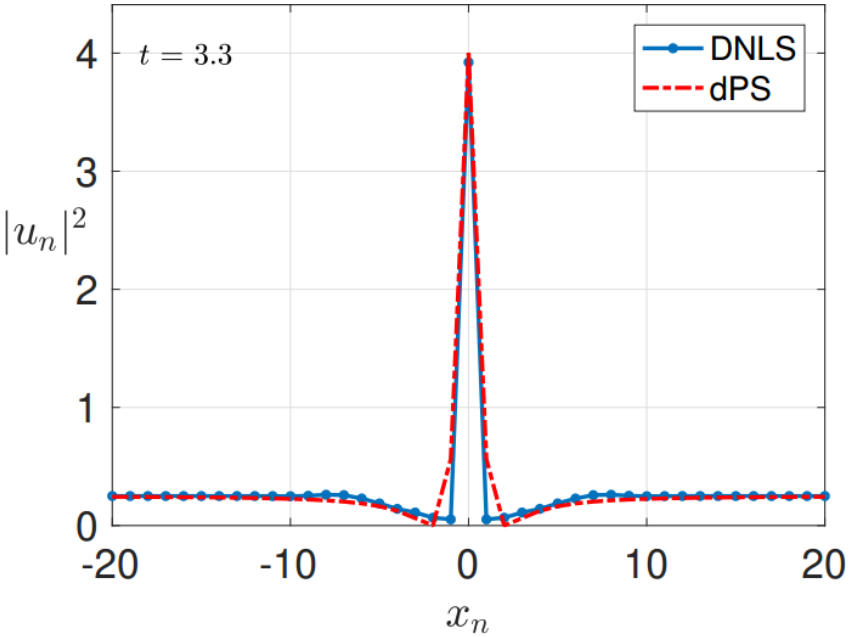
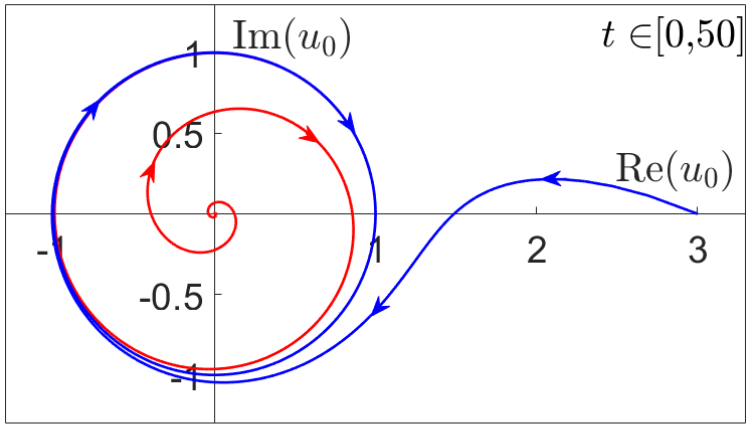
19. Jesús Cuevas, Chris Eilbeck and Nikos Karachalios. Thresholds for breather solutions of the Discrete Nonlinear Schrödinger equation with saturable and power nonlinearity. **Discrete and Continuous Dynamical Systems-Series A** **21** (2008) no.2, 445-475. Link

18. Jesús Cuevas, Chris Eilbeck and Nikos Karachalios. A lower bound for the power of periodic solutions of the defocusing Discrete Nonlinear Schrödinger equation. **Dynamics of Partial Differential Equations** **5** (2008) no. 1, 69-85. Link



A discrete rogue wave for the DNLS equation with gain and loss compared with the analytical discrete Peregrine soliton [58].



The plane wave attractor of the DNLS equation with gain and loss [58].

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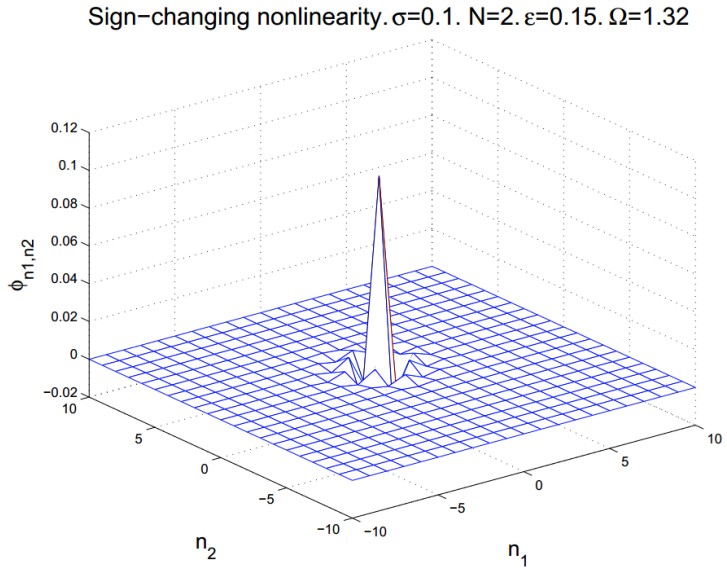
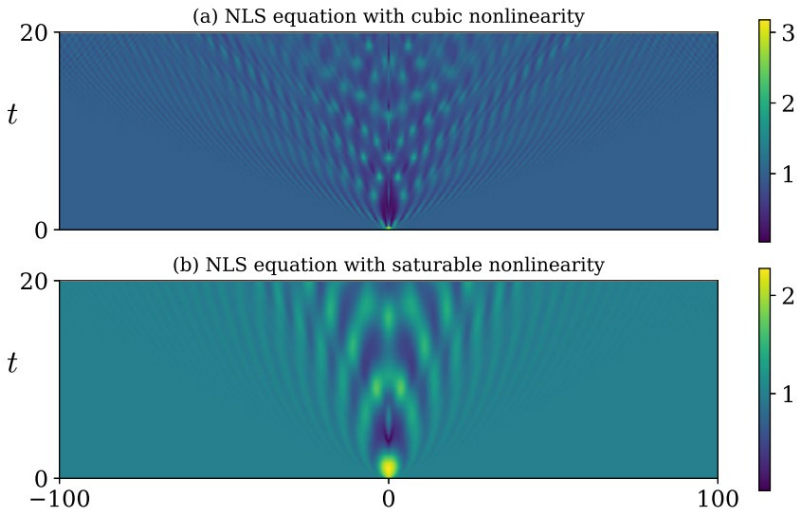
9. Nikos Karachalios and Nikos Zographopoulos. Global attractors and convergence to equilibrium for degenerate Ginzburg-Landau and parabolic equations. **Nonlinear Analysis 63** (2005), no. 5-7, 1749-1768. Link

8. Nikos Karachalios, Nikos Stavrakakis and Pavlos Xanthopoulos. Parametric exponential energy decay for dissipative electron-ion plasma waves. **Zeitschrift für Angewandte Mathematik und Physik 56** (2005) no.2, 218--238. Link

7. Nikos Karachalios and Nikos Zographopoulos. Convergence towards attractors for a degenerate Ginzburg-Landau equation**.** . **Zeitschrift für Angewandte Mathematik und Physik 56** (2005) no. 1, 11--30. Link



Localized solution of the 2-dimensional DNLS equation with sign-changing nonlinearity close to its excitation threshold [25].



Modulation instability dynamics for the integrable and the nonintegrable NLS with saturable nonlinearity for large initial data [60].

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4. Nikos Karachalios and Nikos Stavrakakis. Global attractor for the weakly damped driven Schrödinger equation in $H^2(R)$. **NoDEA Nonlinear Differential Equations and Applications. 9** (2002), no.3, 347-360. Link

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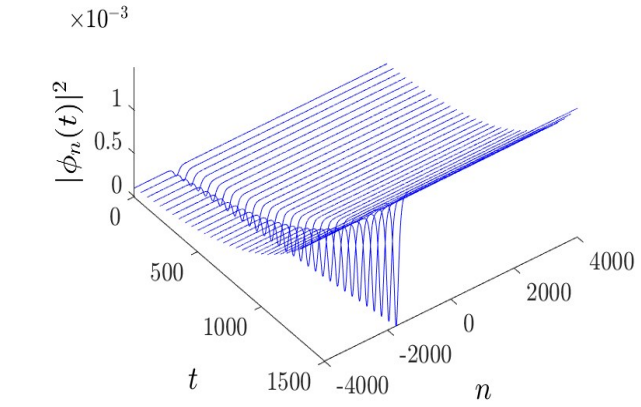
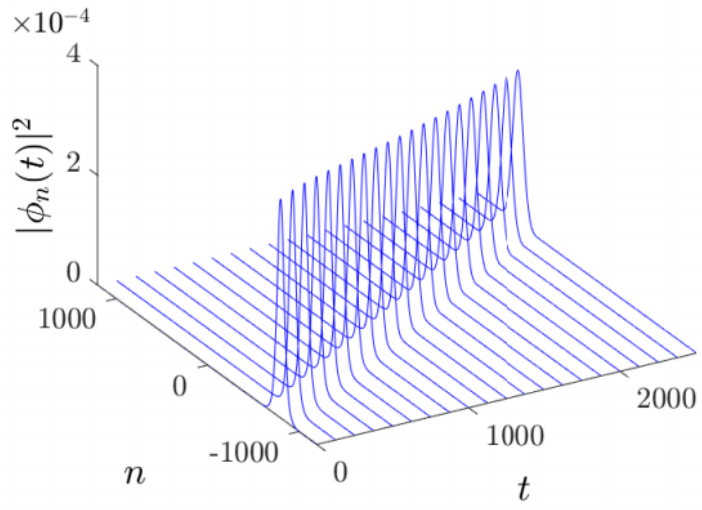
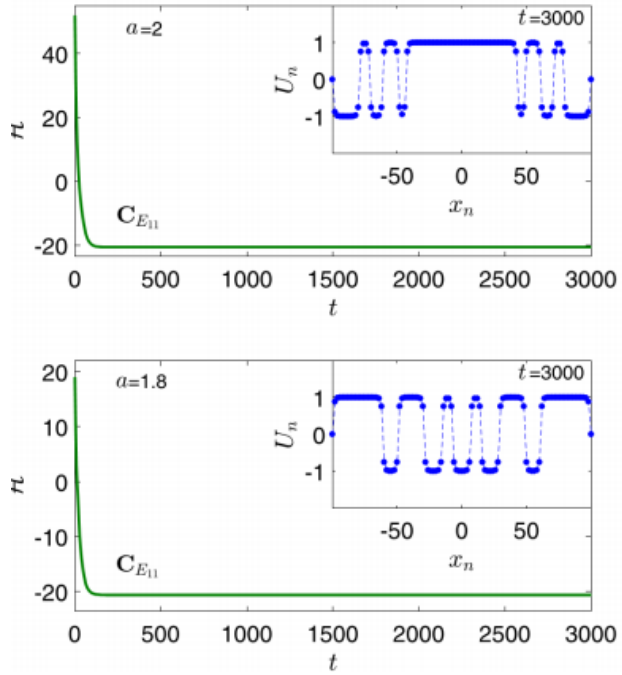
(If you like posters, see one on Discrete Solitons, **created and presented by Jesús Cuevas** in "SOLIQUANTUM 2006" meeting, Cuenca, Spain, 27-30 September 2006.)



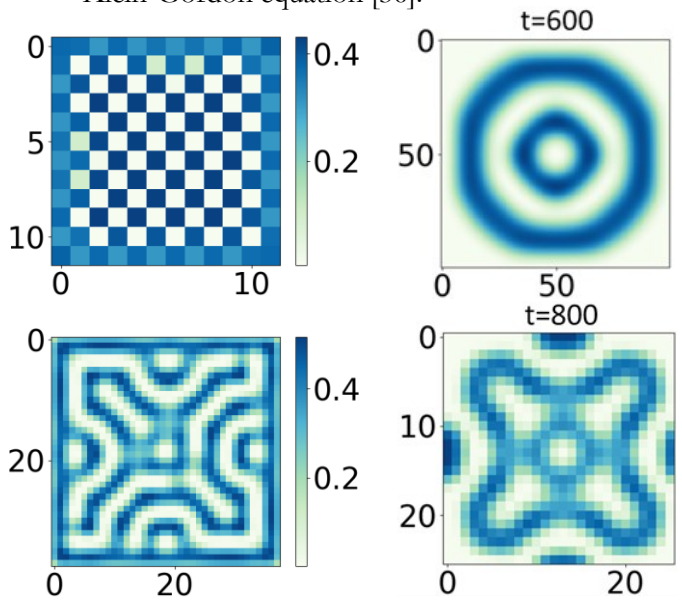
A dissipative discrete dark soliton. The figure is from [54].



Persistence of bright solitons the DNLS [51].



Convergence to steady states for the dissipative discrete Klein-Gordon equation [36].



Patterns form the 2D Discrete Lefever-Lejeune equation [59].