

Mark A. Hoefer

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Education

University of Colorado at Boulder	2006	Ph.D. Applied Mathematics (Advisor: M. J. Ablowitz)
Harvard University	2000	M.S. Applied Mathematics
University of California, Los Angeles	1997	B.S. Mathematics of Computation

Professional Positions

2020-present	Professor of Applied Mathematics, University of Colorado, Boulder.
2016-2020	Associate Professor of Applied Mathematics, University of Colorado, Boulder.
2014-2016	Assistant Professor of Applied Mathematics, University of Colorado, Boulder.
2009-2014	Assistant Professor of Mathematics, NC State University, Raleigh, NC.
2008-2009	NSF Mathematical Sciences Research Postdoctoral Fellow, Department of Applied Physics and Applied Mathematics, Columbia University, New York, NY.
2006-2008	NRC Postdoctoral Fellow, NIST, Boulder, CO.

Administration

2024-present	Chair, CU Boulder Department of Applied Mathematics
2017-2020	Director of Graduate Studies, CU Boulder Department of Applied Mathematics.
2014-present	Director, CU Boulder Dispersive Hydrodynamics Laboratory.

Visiting Professorships

2025	Leverhulme Institute Visiting Professorship, Northumbria University, Newcastle, UK.
2024	Isaac Newton Institute Satellite Program on <i>Emergence Phenomena in Nonlinear Dispersive Waves</i> , Newcastle, UK, Organizer's Fellowship.
2022	Isaac Newton Institute Program on <i>Dispersive Hydrodynamics</i> , Cambridge, UK, Organizer's Fellowship.
2019-present	Department of Mathematics, Physics, and Electrical Engineering, Northumbria University, Newcastle, UK.
2017	Laboratory of Theoretical Physics and Statistical Models (LPTMS), Université Paris-Sud, Orsay, France.

Honors and Awards

2020	T. Brooke Benjamin Prize in Nonlinear Waves, Society for Industrial and Applied Mathematics Activity Group on Nonlinear Waves and Coherent Structures.
2020	College Scholar Award, College of Arts & Sciences, CU Boulder.
2016-present	Wizard, CU Boulder.
2013	NSF Division of Mathematical Sciences CAREER Award.
2006	Research and Creative Work Award for best PhD thesis, CU Boulder.

Plenary/prize lectures:

- “An Introduction to Dispersive Hydrodynamics and Dispersive Shock Waves”, Minitutorial, SIAM Conference on Nonlinear Waves and Coherent Structures, Baltimore, MD, June 2024.
- “When Nonlinear Waves Breathe, They Radiate”, Plenary, KUMUNU-ISU PDE, Dynamical Systems and Applications Conference, Lawrence, Kansas, April 2024.
- “Dispersive Hydrodynamics: Dispersive Shock Waves and (Non)convexity”, Plenary, SIAM Annual Meeting, Online, July 2021.
- “A New Kind of Wave-Mean Flow Interaction”, T. Brooke Benjamin Prize Lecture, SIAM Nonlinear Waves and Coherent Structures, Online, July 2020.

Funding (Total as PI or co-PI \$2M)

- 5/25-8/25: Leverhulme Institute Trust Visiting Professorship, *Dispersive Hydrodynamics & Soliton Gas in Viscous Core-Annular Flows and Beyond*, co-PI, £29,308.
- 7/24-6/25: NSF Applied Mathematics DMS-2339212, *Conference: Emergent Phenomena in Nonlinear Dispersive Waves*, PI, \$15,000.
- 7/24-8/24: *Emergent phenomena in nonlinear dispersive waves*, one-month satellite research program in Newcastle, UK, funded by the Isaac Newton Institute, Cambridge, UK, co-PI, £110,000.
- 8/23-7/26: NSF Applied Mathematics DMS-2306319, *Nonlinear Wave Interactions*, PI, \$300,000.
- 7/22-12/22: *Dispersive hydrodynamics: mathematics, simulation and experiments, with applications in nonlinear waves*, six-month residential research program at the Isaac Newton Institute, Cambridge, UK.
- 7/2020-6/2023: NSF Applied Mathematics DMS-1941489, *Conference Funding Proposal for the Dispersive Hydrodynamics Program at the Isaac Newton Institute*, PI, \$35,000.
- 7/2018-6/2023: NSF Applied Mathematics DMS-1816934, *Dispersive Hydrodynamics and Applications*, PI, \$433,609.
- 7/2017-6/2020: University of Colorado Seed Grant, *By Faculty for Faculty: Building a Faculty Community Center*, co-PI, \$120,000.
- 1/2018-2/2018: London Mathematical Society Visitors Grant, £1200.
- 9/2017-8/2021: Department of Energy DE-SC0018237, *Soliton Formation and Topology Manipulation of Coupled Spins via Ultrafast Re-magnetization*, co-PI managing \$397,854 out of \$2,465,010.
- 5/2015: Corresponding Organizer of *Dispersive Hydrodynamics: The Mathematics of Dispersive Shock Waves and Applications*, 5-day workshop at the Banff International Research Station, Canada.
- 3/2014-2/2016: Royal Society of London International Exchanges Scheme – 2013/R3, *Dispersive Regularisation of Non-Convex Hyperbolic Conservation Laws*, Co-PI with Gennady El of Loughborough University, UK, £12,000.
- 8/2014: London Mathematical Society Visitors Grant, £1200.
- 6/2013-5/2018: NSF DMS CAREER Award 1255422 and 1521607, *Solitary Waves and Wavetrains in Dispersive Media*, PI, \$510,801.
- 10/2012: London Mathematical Society Visits to the UK (presented three lectures at UK universities: Edinburgh, Loughborough, Cambridge), £1200.
- 7/2010-6/2013: NSF DMS Applied Math Individual Investigator 1008973, *Supersonic Dispersive Fluid Dynamics*, \$130,713.
- 7/2010-6/2011: NCSU Faculty Research and Development grant, \$4000.
- 9/2008-7/2010: NSF DMS Postdoctoral Fellowship 0803074, *A Mathematical Study of Dispersive Shock Waves*, Columbia University, \$108,000.
- 6/2006-5/2008: NRC Postdoctoral Fellowship, NIST, Boulder, CO.

4/2006: Research and Creative Work Award for best PhD dissertation, University of Colorado, Boulder, CO, \$1000.

Professional Activities

Founding Deputy Editor, Journal of Nonlinear Waves, Cambridge University Press (2024-present)

Editorial board membership: Journal of Nonlinear Science (2023-2026)

Organizer, “Emergent phenomena in nonlinear dispersive waves,” 7/24-8/24, 1 month satellite research program funded by the Isaac Newton Institute, Cambridge, UK.

Vice Chair, SIAM Activity Group on Nonlinear Waves and Coherent Structures, elected to serve 1/2021–12/2022.

Principal organizer, “Dispersive hydrodynamics: mathematics, simulation and experiments, with applications in nonlinear waves”, 7/22-12/22, 6 month residential research program at the Isaac Newton Institute, Cambridge, UK.

External reviewer, Applied Mathematics graduate program, Univ Calif Merced, 3/2022;

Math Alliance mentor for doctoral studies, 4/2020–present.

Co-organizer, “Front Range Applied Magnetism Symposium”, August 15, 2019, Boulder, CO.

Guest editor/proposer for special issue of the journal *Physica D* on Dispersive Hydrodynamics, 10/2014-4/2016.

Corresponding Organizer/Proposer, *Dispersive Hydrodynamics: The Mathematics of Dispersive Shock Waves and Applications* 5-day workshop competitively funded by the Banff International Research Station, May 17-22, 2015.

Panelist, National Science Foundation (11/2013, 11/2014, 10/2017, 2/2019).

Co-organizer, SIAM Southeastern-Atlantic Section Conference, March 20-21, 2010, Raleigh, NC.

Minisymposium co-organizer (8): “Dispersive Hydrodynamics and Applications”, SIAM Conference on Nonlinear Waves and Coherent Structures, June, 2024, Baltimore, MD; “Recent Advancements in Dispersive Hydrodynamics”, SIAM Annual Meeting, July, 2021, Spokane, WA; “Dispersive hydrodynamics”, September 3-7, 2018, Dynamics Days Europe, Loughborough, UK; “Recent Advances in Dispersive Hydrodynamics”, March 25-28, 2013 IMACS Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA; “Solitons in Semiclassical Dispersive Fluids”, June 13-16, 2012 SIAM Conference on Nonlinear Waves and Coherent Structures, Seattle, WA; “Nonlinear Waves in Inhomogeneous Media”, August 16-19, 2010 SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA; “Nonlinear Waves in Magnetic Systems”, August 16-19, 2010 SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA; “Supersonic Dispersive Fluid Flows” at the June 26-29, 2010 Nonlinear Waves-Theory and Applications Conference, Beijing, China.

Referee for the journals: Journal of Fluid Mechanics, Nature Communications, Physical Review (A, B, E, Fluids, Letters, Research, Applied), Proceedings of the Royal Society A, Scientific Reports, SIAM Journal of Applied Mathematics, Studies in Applied Mathematics, Nonlinearity, Physica D, Wave Motion, Applied Mathematics Letters, European Physics Letters, International Journal of Solids and Structures, Journal of Physics A, Chaos, Physics of Fluids, Journal of Mathematical Analysis and Applications, Communications in Nonlinear Science and Numerical Simulation.

Proposal reviewer for Oak Ridge Associated Universities Nazarbayev University Research Council (2024), NSF (2013, 2014, 2017, 2019, 2020), Leverhulme Trust Research Project Grant (2023), Cottrell Scholar Award (2023), Natural Sciences and Engineering Research Council of Canada (NSERC) Mathematics and Statistics Discovery Grant (2019), German-Israeli Foundation for Scientific Research and Development (2012), New Researchers Start-up Program of Fonds québécois de la recherche sur la nature et les technologies (2009).

Journal Publications (85)

- “Hydrodynamics of a Discrete Conservation Law”, P. Sprenger, C. Chong, E. Okyere, M. Herrmann, P. G. Kevrekidis, and M. A. Hoefer, *Studies in Applied Mathematics* 153 e12767 (2024), 48 pages.
- “Bright traveling breathers in media with long-range, nonconvex dispersion,” Sathyanaryanan Chandramouli, Yifeng Mao, and Mark Hoefer, *Physical Review E* **109** 034212 (2024) 11 pages.
- “Whitham modulation theory and two-phase instabilities for generalized nonlinear Schrödinger equations with full dispersion,” Patrick Sprenger, Mark A. Hoefer, and Boaz Ilan, *SIAM Journal on Applied Mathematics* **84** 1337-1361 (2024) 25 pages.
- “Two-dimensional reductions of the Whitham modulation system for the Kadomtsev-Petviashvili equation,” G. Biondini, A. J. Bivolcic, M. A. Hoefer, and A. Moro, *Nonlinearity* **37** 025012 (2024) 29 pages.
- “Long-time asymptotics and the radiation condition with time-periodic boundary conditions for linear evolution equations on the half-line and experiment,” Yifeng Mao, Dionyssios Mantzavinos, and Mark A. Hoefer, *Studies in Applied Mathematics* doi:10.1111/sapm.12665 (2023) 58 pages.
- “Observation of traveling breathers and their scattering in a two-fluid system,” Y. Mao, S. Chandramouli, W. Xu, and M. A. Hoefer, *Physical Review Letters* **131** 147201 (2023) 7 pages.
- “Energetics of phase transitions in homogeneous antiferromagnets,” M. Hu, M. A. Hoefer, and M. J. Donahue, *Applied Physics Letters* **123** 062401 (2023) 6 pages.
- “Soliton-mean field interaction in Korteweg-de Vries dispersive hydrodynamics”, Mark J. Ablowitz, Justin T. Cole, Gennady A. El, Mark A. Hoefer, and Xu-dan Luo, *Studies in Applied Mathematics* doi:10.1111/sapm.12615 (2023) 62 pages (invited review).
- “KdV breathers on a cnoidal wave background”, Mark A. Hoefer, Ana Mucalica, Dmitry E. Pelinovsky, *Journal of Physics A: Mathematical and Theoretical* **56** 185701 (2023) 25 pages.
- “Computation of high frequency magnetoelastic waves in layered materials”, Samuel J. Ryskamp and Mark A. Hoefer, *Physical Review B* **107** 094431 (2023) 21 pages.
- “Whitham modulation theory for the defocusing nonlinear Schrödinger equation in two and three spatial dimensions”, Asela Abeya, Gino Biondini, and Mark A Hoefer, *Journal of Physics A: Mathematical and Theoretical* **56** 025701 (2023) 34 pages.
- “Experimental investigations of linear and nonlinear periodic traveling waves in a viscous fluid conduit”, Yifeng Mao and Mark A. Hoefer, *Journal of Fluid Mechanics* **954** A14 (2023) 32 pages.
- “Ultrafast perturbation of magnetic domains by optical pumping in a ferromagnetic multilayer”, Dmitry Zusin, Ezio Iacocca, Loïc Le Guyader, Alexander H. Reid, William F. Schlotter, Tian-Min Liu, Daniel J. Higley, Giacomo Coslovich, Scott F. Wandel, Phoebe M. Tengdin, Sheena K. K. Patel, Anatoly Shabalin, Nelson Hua, Stjepan B. Hrkac, Hans T. Nembach, Justin M. Shaw, Sergio A. Montoya, Adam Blonsky, Christian Gentry, Mark A. Hoefer, Margaret M. Murnane, Henry C. Kapteyn, Eric E. Fullerton, Oleg Shpyrko, Hermann A. Dürr, T. J. Silva, *Physical Review B* **106** 144422 (2022) 16 pages.
- “Spin-piston problem for a ferromagnetic thin film: shock waves and solitons”, Mingyu Hu, Ezio Iacocca, and Mark A. Hoefer, *Physical Review B*, **105** 104419 (2022) 14 pages.
- “Modulation theory for soliton resonance and Mach reflection”, Samuel J. Ryskamp, Mark A. Hoefer, and Gino Biondini, *Proceedings of the Royal Society A*, **478** 20210823 (2022) 22 pages.
- “Spin-injection-generated shock waves and solitons in a ferromagnetic thin film”, Mingyu Hu, Ezio Iacocca, and Mark A. Hoefer, *IEEE Transactions on Magnetics*, **58** 1–5 (2022) 5 pages.

- “Dynamic soliton–mean flow interaction with non-convex flux”, Kiera van der Sande, Gennady A. El, and Mark A. Hoefer, *Journal of Fluid Mechanics*, **928** A21 (2021) 43 pages.
- “Dispersive Riemann problems for the Benjamin-Bona-Mahony equation”, T. Congy, G. A. El, M. A. Hoefer, and M. Shearer, *Studies in Applied Mathematics*, **147** 1089–1145 (2021) 57 pages.
- “Oblique interactions between solitons and mean flows in the Kadomtsev-Petviashvili equation”, S. Ryskamp, M. A. Hoefer, and G. Biondini, *Nonlinearity*, **34** 3583–3617 (2021) 36 pages.
- “Whitham modulation theory for generalized Whitham equations and a general criterion for modulational instability”, Adam L. Binswanger, Mark A. Hoefer, Boaz Ilan, Patrick Sprenger, *Studies in Applied Mathematics*, **147** 724–751 (2021) 28 pages.
- “Evolution of truncated and bent gravity wave solitons: the Mach expansion problem”, Samuel Ryskamp, Michelle D. Maiden, Gino Biondini, Mark A. Hoefer, *Journal of Fluid Mechanics*, **909** A24 (2020) 33 pages.
- “Integrability, exact reductions and special solutions of the KP-Whitham equations”, Gino Biondini, Mark A. Hoefer, and A. Moro, *Nonlinearity*, **33** 4114–4132 (2020) 19 pages.
- “Discontinuous shock solutions of the Whitham modulation equations as zero dispersion limits of traveling waves”, Patrick Sprenger and Mark A. Hoefer, *Nonlinearity*, **33** 3268–3302 (2020) 36 pages.
- “Solitary wave fission of a large disturbance in a viscous fluid conduit”, M. D. Maiden, N. A. Franco, E. G. Webb, G. A. El, and M. A. Hoefer, *Journal of Fluid Mechanics*, **883** A10 (2019) 31 pages.
- “Perspectives on spin hydrodynamics in ferromagnetic materials”, Ezio Iacocca and Mark A. Hoefer, *Physics Letters A*, **383** 125858 (2019) 8 pages.
- “Interaction of linear modulated waves with unsteady dispersive hydrodynamic states with application to shallow water waves”, T. Congy, G. A. El, and M. A. Hoefer, *Journal of Fluid Mechanics*, **875** 1145–1174 (2019) 30 pages.
- “Stochastic ejection of nanocontact droplet solitons via drift instability”, Richard O. Moore and Mark A. Hoefer, *Physical Review B*, **100** 014402 (2019) 10 pages.
- “Controlling Dispersive Hydrodynamic Wavebreaking in a Viscous Fluid Conduit”, Dalton V. Valentine, Michelle D. Maiden, and Mark A. Hoefer, *Physical Review Fluids*, **4** 074804 (2019).
- “Hydrodynamic description of long-distance spin transport through noncollinear magnetization states: the role of dispersion, nonlinearity, and damping”, Ezio Iacocca and Mark A. Hoefer, *Physical Review B*, **99** 184402 (2019) 14 pages.
- “Spin-current-mediated rapid magnon localization and coalescence after ultrafast optical pumping of ferromagnetic alloys”, E. Iacocca, T.-M. Liu, A. H. Reid, Z. Fu, S. Ruta, P. W. Granitzka, E. Jal, S. Bonetti, A. X. Gray, C. E. Graves, R. Kukreja, Z. Chen, D. J. Higley, T. Chase, L. Le Guyader, K. Hirsch, H. Ohldag, W. F. Schlotter, G. L. Dakovski, G. Coslovich, M. C. Hoffmann, S. Carron, A. Tsukamoto, M. Savoini, A. Kirilyuk, A. V. Kimel, Th. Rasing, J. Stöhr, R. F. L. Evans, T. Ostler, R. W. Chantrell, M. A. Hoefer, T. J. Silva, and H. A. Dürr, *Nature Communications*, **10** 1756 (2019) 11 pages.
- “Magnonic Band Structure Established by Chiral Spin-Density Waves in Thin Film Ferromagnets”, Patrick Sprenger, Mark A. Hoefer, and Ezio Iacocca, *IEEE Magnetics Letters*, **10** 1–5 (2019) 5 pages.
- “Nonlinear Schrödinger equations and the universal description of dispersive shock wave structure”, T. Congy, G. A. El, M. A. Hoefer, and M. Shearer, *Studies in Applied Mathematics*, **142** 241–268 (2019) 28 pages.
- “Modulation theory solution for nonlinearly resonant, fifth order Korteweg-de Vries non-classical traveling dispersive shock waves”, Mark A. Hoefer, Noel F. Smyth, and Patrick Sprenger, *Studies in Applied Mathematics*, **142** 219–240 (2019) 22 pages.

- “Dissipative shock waves generated by a quantum-mechanical piston”, M. E. Mossman, M. A. Hoefer, K. Julien, P. Kevrekidis, P. Engels, *Nature Communications*, **9** 4665 (2018) 7 pages.
- “Solitonic dispersive hydrodynamics: theory and observation”, Michelle D. Maiden, Dalton V. Anderson, Nevil A. Franco, Gennady A. El, and Mark A. Hoefer, *Physical Review Letters*, **120** 144101 (2018) 5 pages.
- “Hydrodynamic optical soliton tunneling”, Patrick Sprenger, Gennady A. El, and Mark A. Hoefer, *Physical Review E*, **97** 032218 (2018) 8 pages.
- “Transverse instabilities of stripe domains in magnetic thin films with perpendicular magnetic anisotropy”, Max E. Ruth, Ezio Iacocca, Panayotis G. Kevrekidis, and Mark A. Hoefer, *Physical Review B*, **97** 104428 (2018) 12 pages.
- “Solitary wave solutions and their interactions for fully nonlinear water waves with surface tension in the generalized Serre equations”, Denys Dutykh, Mark Hoefer, Dimitrios Mitsotakis, *Theoretical and Computational Fluid Dynamics*, **32** 371-397 (2018) 27 pages.
- “Symmetry-broken dissipative exchange flows in thin-film ferromagnets with in-plane anisotropy”, Ezio Iacocca, Thomas J. Silva, and Mark A. Hoefer, *Physical Review B*, **96** 134434 (2017) 8 pages.
- “Stationary Expansion Shocks for a Regularized Boussinesq System”, Gennady El, Mark Hoefer, and Michael Shearer, *Studies in Applied Mathematics*, **140** 27-47 (2017) 21 pages. Selected by the editorial board as one of four 2018 “Highlights of the Year” for its “novelty, quality, and importance.”
- “Observation of Self-Cavitating Envelope Dispersive Shock Waves in Yttrium Iron Garnet Thin Films”, P. A. Praveen Janantha, P. Sprenger, Mark A. Hoefer, Mingzhong Wu, *Physical Review Letters*, **119** 024101 (2017) 5 pages.
- “Vortex-Antivortex Proliferation from an Obstacle in Thin Film Ferromagnets”, Ezio Iacocca and Mark A. Hoefer, *Physical Review B*, **95** 134409 (2017) 10 pages. (*Editor’s Suggestion*)
- “Oblique Spatial Dispersive Shock Waves in Nonlinear Schrödinger Flows”, M. A. Hoefer, G. A. El, and A. M. Kamchatnov, *SIAM Journal on Applied Mathematics*, **77** 1352-1374 (2017) 23 pages.
- “Breaking of Galilean Invariance in the Hydrodynamic Formulation of Ferromagnetic Thin Films”, E. Iacocca, T. J. Silva, and M. A. Hoefer, *Physical Review Letters*, **118** 017203 (2017), 6 pages.
- “Shock Waves in Dispersive Hydrodynamics with Nonconvex Dispersion”, P. Sprenger and M. A. Hoefer, *SIAM Journal on Applied Mathematics*, **77** 26-50 (2017), 25 pages.
- “Dispersive and Diffusive-Dispersive Shock Waves for Nonconvex Conservation Laws”, G. A. El, M. A. Hoefer, and M. Shearer, *SIAM Review*, **59** pp. 3-61 (2017), 59 pages.
- “Modulations of Viscous Fluid Conduit Periodic Waves”, M. D. Maiden and M. A. Hoefer, *Proceedings of the Royal Society A*, **472** 20160533 (2016), 19 pages.
- “Onset of Transverse Instabilities of Confined Dark Solitons”, M. A. Hoefer and B. Ilan, *Physical Review A*, **94** 013609 (2016), 10 pages.
- “Observation of Dispersive Shock Waves, Solitons, and Their Interactions in Viscous Fluid Conduits”, M. D. Maiden, N. K. Lowman, D. V. Anderson, M. E. Schubert, and M. A. Hoefer, *Physical Review Letters*, **116** 174501 (2016), 5 pages.
- “Dispersive Hydrodynamics: Preface”, G. Biondini, G. A. El, M. A. Hoefer, and P. D. Miller, *Physica D*, **333** 1-5 (2016), 5 pages. Preface written by editors for a Special Issue on *Dispersive Hydrodynamics*.
- “Dispersive Shock Waves and Modulation Theory”, G. A. El and M. A. Hoefer, *Physica D*, **333** 11-65 (2016), 55 pages. Review article in the Special Issue on *Dispersive Hydrodynamics*.

- “Expansion Shock Waves in Regularized Shallow Water Theory”, G. A. El, M. A. Hoefer, and M. Shearer, *Proceedings of the Royal Society A* **472** 20160141 (2016), 10 pages.
- “Magnetic Droplet Nucleation Boundary in Orthogonal Spin-Torque Nano-Oscillators”, S. Chung, A. Eklund, E. Iacocca, S. M. Mohseni, S. R. Sani, L. Bookman, M. A. Hoefer, R. K. Dumas, and J. Åkerman, *Nature Communications* **7** 11209 (2016), 7 pages.
- “Deterministic Drift Instability and Stochastic Thermal Perturbations of Magnetic Dissipative Droplet Solitons”, P. Wills, E. Iacocca, and M. A. Hoefer, *Physical Review B*, **93** 144408 (2016), 10 pages.
- “Perturbation Theory for Propagating Magnetic Droplet Solitons”, L. D. Bookman and M. A. Hoefer, *Proceedings of the Royal Society A*, **471** 20150042 (2015), 20 pages.
- “Interactions of Large Amplitude Solitary Waves in Viscous Fluid Conduits”, N. K. Lowman, M. A. Hoefer, and G. A. El, *Journal of Fluid Mechanics*, **750** 372-384 (2014), 13 pages.
- “Attraction, Merger, Reflection, and Annihilation in Magnetic Droplet Soliton Scattering”, M. D. Maiden, L. D. Bookman, and M. A. Hoefer, *Physical Review B*, **89** 180409(R) (2014), 5 pages.
- “Spin Transfer Torque Generated Magnetic Droplet Solitons (invited)”, S. Chung, S. M. Mohseni, S. R. Sani, E. Iacocca, R. K. Dumas, T. N. Anh Nguyen, Ye. Pogoryelov, P. K. Muduli, A. Eklund, M. Hoefer and J. Åkerman, *Journal of Applied Physics*, **115** 172612 (2014), 6 pages.
- “Shock Waves in Dispersive Eulerian Fluids”, M. A. Hoefer, *Journal of Nonlinear Science*, **24** 525-577 (2014), 44 pages.
- “Confined Dissipative Droplet Solitons in Spin-Valve Nanowires with Perpendicular Magnetic Anisotropy”, E. Iacocca, R. K. Dumas, L. Bookman, M. Mohseni, S. Chung, M. Hoefer, J. Åkerman, *Physical Review Letters*, **112** 047201 (2014), 5 pages.
- “Analytical Theory of Modulated Magnetic Solitons”, L. D. Bookman and M. A. Hoefer, *Physical Review B*, **88** 184401 (2013), 7 pages.
- “Dispersive Hydrodynamics in Viscous Fluid Conduits”, N. K. Lowman and M. A. Hoefer, *Physical Review E*, **88** 023016 (2013), 10 pages.
- “Fermionic Shock Waves: Distinguishing Dissipative Versus Dispersive Regularizations”, N. K. Lowman and M. A. Hoefer, *Physical Review A*, **88** 013605 (2013), 7 pages.
- “Spin Torque—Generated Magnetic Droplet Solitons”, S. M. Mohseni, S. R. Sani, J. Persson, T. N. Anh Nguyen, S. Chung, Ye. Pogoryelov, P. K. Muduli, E. Iacocca, A. Eklund, R. K. Dumas, S. Bonetti, A. Deac, M. A. Hoefer, and J. Åkerman, *Science*, **339** 1295-1298 (2013), 4 pages.
- “Dispersive Shock Waves in Viscously Deformable Media”, N. K. Lowman and M. A. Hoefer, *Journal of Fluid Mechanics*, **718** 524-557 (2013), 34 pages.
- “Propagation and Control of Nanoscale Magnetic-Droplet Solitons”, M. A. Hoefer, M. Sommacal, and T. J. Silva, *Physical Review B*, **85** 214433 (2012), 7 pages.
- “Beating Dark-Dark Solitons in Bose-Einstein Condensates”, D. Yan, J. J. Chang, C. Hamner, M. Hoefer, P. G. Kevrekidis, P. Engels, V. Achilleos, D. J. Frantzeskakis, and J. Cuevas, *Journal of Physics B: Atomic, Molecular, and Optical Physics*, **45** 115301 (2012), 11 pages.
- “Propagating Two-Dimensional Magnetic Droplets”, M. A. Hoefer and M. Sommacal, *Physica D*, **241** 890-901 (2012), 12 pages.
- “Dark Solitons, Dispersive Shock Waves, and Transverse Instabilities”, M. A. Hoefer and B. Ilan, *SIAM Multiscale Modeling and Simulation*, **10** 306-341 (2012), 36 pages.
- “Counterflow induced modulational instability in miscible, two-component Bose-Einstein condensates”, M. A. Hoefer, C. Hamner, J.J. Chang, P. Engels, *Physical Review A*, **84** 041605(R) (2011), 4 pages.

- “Generation of dark-bright soliton trains in superfluid-superfluid counterflow”, C. Hamner, J.J. Chang, P. Engels, and M. A. Hoefer, *Physical Review Letters*, **106** 065302 (2011), 4 pages.
- “Defect Modes and Homogenization of Periodic Schrödinger Operators”, M. A. Hoefer and M. I. Weinstein, *SIAM Journal of Mathematical Analysis*, **43** 971-996 (2011), 26 pages.
- “Semiclassical Dynamics of Quasi-One-Dimensional, Attractive Bose-Einstein Condensates”, A. Tovbis and M. A. Hoefer, *Physics Letters A*, **375** 726-732 (Dec. 2010), 7 pages.
- “Theory for a dissipative droplet soliton excited by a spin torque nanocontact”, M. A. Hoefer, T. J. Silva, and M. W. Keller, *Physical Review B*, **82** 054432 (2010), 14 pages.
- “Theory of Two-Dimensional Oblique Dispersive Shock Waves in Supersonic Flow of a Superfluid”, M. A. Hoefer and B. Ilan, *Physical Review A*, **80** 061601(R) (2009), 4 pages.
- “Dispersive Shock Waves”, M. A. Hoefer and M. J. Ablowitz, *Scholarpedia*, **4** 5562 (2009).
- “Soliton Generation and Multiple Phases in Dispersive Shock and Rarefaction Wave Interaction”, M. J. Ablowitz, D. E. Baldwin, and M. A. Hoefer, *Physical Review E*, **80** 016603 (2009), 5 pages.
- “Matter-Wave Interference in Bose-Einstein Condensates: a Dispersive Hydrodynamic Perspective”, M. A. Hoefer, P. Engels, and J. J. Chang, *Physica D* **238** 1311-1320 (2009), 10 pages. (invited article for a special issue on Nonlinear Phenomena in Degenerate Quantum Gases)
- “Formation of Dispersive Shock Waves by Merging and Splitting Bose-Einstein Condensates”, J. J. Chang, P. Engels, and M. A. Hoefer, *Physical Review Letters*, **101** 170404 (2008), 4 pages.
- “Model for a Collimated Spin-Wave Beam Generated by a Single-Layer Spin Torque Nanocontact”, M. A. Hoefer, T. J. Silva, and M. D. Stiles, *Physical Review B*, **77** 144401 (2008), 8 pages.
- “Piston Dispersive Shock Wave Problem”, M. A. Hoefer, M. J. Ablowitz, P. Engels, *Physical Review Letters*, **100** 084504 (2008), 4 pages.
- “Interactions of Dispersive Shock Waves”, M. A. Hoefer and M. J. Ablowitz, *Physica D*, **236** 44-64 (2007), 21 pages.
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