Marc Etienne Brachet

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Personal

Born on April 12, 1953.

Born in Neuilly-sur-Seine, France.

French nationality.

Education

Doctorat d'Etat ès Sciences Physiques, University of Nice, 1983
Direction: U. Frisch.

Doctorat de 3e Cycle, University of Paris VI, 1979
Director: E. Tirapegui.

Graduation (DEA) General Relativity and Quantum Fields Theory, University of Paris VI, 1975.

Master of Physics, University of Nice, 1974.

Employment

CNRS Research Director (Emeritus): since 2019

CNRS Research Director (DR1): 2014-2019

Visitor at NCAR, Boulder, Colorado, USA: 2007–2008.

CNRS Research Director (DR2): 1996–2014.

Chargé de Recherche C.N.R.S: 1983–1996.

Attaché de Recherche C.N.R.S: 1982–1983.

Working at Laboratoire de Physique Statistique de l'ENS: since 1989.

Visitor at Groupe de Physique des Solides de l'ENS: 1986–1988.

Working at the Observatory of Nice: 1982–1988.

Post-doctoral: M.I.T., Applied Math. Dept.: 1981–1982.

Honors, Awards, Fellowships, Memberships of Professional Societies

Emilia Valori prize of the French Academy of Sciences 2016

Foreign corresponding member of the Chilean Academy of Sciences 2012.

Edmond Brun prize of the French Academy of Sciences 2007.

Eugénie de Rosemont prize of the Chancellery of the Universities of Paris 1996.

Special Seymour Cray Prize 1989.

CNRS Bronze Medal 1983.

Research Interests

Specialization

Main field: Turbulence, fluid dynamics and superfluidity.

Other fields: Nonlinear physics, statistical physics and numerical methods.

Current research interests: Finite-temperature effects in superfluids, singularities in ideal fluids and dynamics of Galerkin-truncated systems.

Main Recent Scientific Contributions

Turbulence:

Finding a turbulent regime in the relaxation to thermal equilibrium of the truncated Euler equations.

Discovery of intense depressions on the vorticity filaments in direct numerical simulations of three-dimensional turbulence.

Direct observation of vorticity filaments by bubble migration to areas of low pressure in a turbulent flow experiment.

Bose Einstein Condensate and Superfluid Flows:

Characterization of the dynamics of the truncated Gross-Pitaevskii equation: anomalous speed of vortex rings and dispersive bottleneck producing a delay of thermalization.

Characterization of the lifetime of trapped attractive Bose-Einstein condensate.

Characterization of the bifurcation diagram of Bose-Einstein condensate in the presence of moving obstacles: speed limit, saddle-node bifurcation, and three-dimensional sub-criticality.

Kolmogorov scaling in 3D simulations of Gross-Pitaeveskii equation and observation of co-flow turbulence in helium at very low temperatures.

Instability:

Characterization of secondary instabilities of jets and mixing layers.

Global characterization of normal forms.

My initial research was on noisy nonlinear systems (“thèse de 3e cycle" directed by E. Tirapegui). I then studied 3D turbulence by direct numerical simulation (post-doctoral fellow at MIT with S. A Orszag). I was recruited at the CNRS in 1982 and did my “these d’état" under the direction of U. Frisch. Since then my work can be divided into three parts: i) non-linear dynamics (bifurcations, Bose-Einstein condensation and superfluidity), ii) developed turbulence (numerical simulations and experiments), and iii) hydrodynamic instabilities (dynamo effect, jets, mixing layers, plane Poiseuille flow).
Turbulence and truncated Euler equations: The solution of the system of ordinary differential equations obtained by Galerkin truncation from the Euler equation tends slowly towards a statistical equilibrium, known as absolute equilibrium. We studied the slow relaxation of the system to the absolute equilibrium, exhibiting a spontaneous separation of scales due to a progressive thermalization of the flow that has a pseudo-dissipative effect on the large scales. We have shown that the behavior of the large scales is consistent with the Kolmogorov turbulence.
Gross-Pitaevskii equation (GPE): This equation makes a bridge between interesting nonlinear dynamics and hydrodynamics. Perfect fluids are described by the classical Euler equation. Superfluid flows obey the GPE. A superfluid is irrotational, except on nodal lines of the wave function that represent non-singular vortex filaments.
Attractive Bose-Einstein condensates: The atoms are trapped in an isotropic potential, described by the GPE, we demonstrated the presence of a saddle-node bifurcation where the stable (elliptic) and unstable (hyperbolic) solutions meet. We determined the lifetime of the condensate associated with macroscopic quantum tunneling, thermal fluctuations and inelastic collisions.
Superfluid flow around a cylinder: This system has a saddle-node bifurcation followed by secondary pitchfork bifurcation where the unstable branch gives rise to non-symmetric solutions that involve a single vortex. We have characterized the influence of the ratio of the coherence length of the diameter of the disc on the bifurcation diagram. The influence of the stretching of vortices on the bifurcation diagram has also been characterized, which has required three-dimensional calculations. These results have been widely quoted by the experimentalists.
Superfluid turbulence: A new method of preparation of initial data allows minimizing the emission of acoustic waves in order to study numerically vortex flows. This method (as well as other novel techniques) allowed us to characterize a regime where the superfluid turbulence follows Kolmogorov scaling. Subsequently P. Tabeling has also observed this in experiments in superfluid helium. This work has been widely cited and our new methods have been fairly widely used, particularly in the group of M. Tsubota, in Osaka.
More recently, we have generalized our results on the case of the spectrally truncated Gross-Pitaeveskii equation. We were able to show that the truncated Gross-Pitaevskii equation is a simple model of superfluids at finite temperature.

Recent Results

Since 2013, I have continued to work on turbulence in classical and quantum fluids. In collaboration with R.Pandit (IISc, Bangalore) and P. Mininni (UBA, Buenos Aires) several new results have been published on helicity and Kelvin waves dynamics in quantum turbulence (with P. Clark di Leoni) and on the motion of active particle in quantum flows (with V. Shukla). I have also worked on the classical turbulence (in collaboration with S. Fauve). Finally, I must mention that I have been involved in a new line of research: the theory of quantum walks (in collaboration with F. Debbasch).

Former PhD Students and Postdocs

PhD Theses:

1. Etude numérique des instabilités tridimensionnelles de jets axisymétriques: Malek Abid, 1993.
2. Simulation numérique directe d'un modèle de superfluide: Caroline Nore, 1995.
3. Analyse statistique des grandes déviations de données turbulentes: Jean-Marcel Tcheou, 1997.
4. Bifurcations et instabilités dans les condensats de Bose-Einstein et les écoulements superfluides: Cristian Huepe, 1999.
5. Stabilité et dynamique d'écoulements de fluides parfaits barotropes autour d'un obstacle en présence de dispersion: Chi-Tuong Pham, 2003.
6. Equation d'Euler tronquée: de la dynamique des singularités complexes à la relaxation turbulente: Cyril Cichowlas, 2005.
7. Dynamique Eulerienne-Lagrangienne généralisée et caractérisation de la reconnexion diffusive: Carlos Cartes, 2008.
8. Galerkin-truncated dynamics of ideal fluids and superfluids: cascades, thermalization and dissipative effects: Giorgio Krstulovic, 2010.
9. Discrete time quantum walks: from synthetic gauge fields to spontaneous equilabration, Giuseppe Di Molfetta, 2015.
10. Effets de grande échelle en turbulence, Alexandre Cameron, 2017.
11. Discrete-time quantum walks and gauge theories, Pablo Arnaud, 2017.

Postdocs

1. S. Metens, 1998 – 1999.
2. M. Bustamante, 2004 – 2006.

Publications

1. Brachet ME, Tirapegui E., Interaction of Classical Fields and Particles. Nuovo Cimento Della Societa Italiana di Fisica A-Nuclei Particles and Fields 1978; 47(2):210-230.
2. Brachet ME, Tirapegui E., Functional Integral and Operator Formalisms for a Modified Langevin Equation. Physics Letters A 1979; 71(2-3): 179-182.
3. Brachet ME, Tirapegui E., On the Critical-Behavior of the Schlogl Model. Physics Letters A 1981; 81(4): 211-214
4. Gauthier S, Brachet ME, Fournier JD. Testing Field-Theoretical Methods on a Classical Cubic Equation with Stochastic Driving. Journal of Physics A-Mathematical and General 1981;14(11):2969-2980.
5. Brachet ME., Intégration numérique des équations de Navier-Stokes en régime de turbulence développée, C.R.A.S II 294, 537, 1982.
6. Brachet ME, Meiron DI, Orszag SA, Nickel BG, Morf RH, Frisch U. Small-Scale Structure of the Taylor-Green Vortex. Journal of Fluid Mechanics 1983; 130: 411-452.

7. Brachet ME, Meiron D, Orszag S, Nickel B, Morf R, Frisch U., The Taylor-Green Vortex and Fully-Developed Turbulence. Journal of Statistical Physics 1984; 34(5-6):1049-1063.

8. Brachet ME, Fried HM., An Approximate Representation Of Su(2) Ordered Exponentials in the Stochastic Limit. Physics Letters A 1984; 103(6-7):309-311.

9. Brachet ME, Meneguzzi M, Sulem PL., Small-Scale Dynamics of High-Reynolds-Number Two-Dimensional Turbulence. Physical Review Letters 1986; 57(6):683-686.

10. Metcalfe RW, Orszag SA, Brachet ME, Menon S, Riley JJ. Secondary Instability Of A Temporally Growing Mixing Layer. Journal of Fluid Mechanics 1987; 184:207-243.

11. Fauve S, Bolton EW, Brachet ME., Nonlinear Oscillatory Convection - A Quantitative Phase Dynamics Approach. Physica D 1987; 29(1-2):202-214.

12. Brachet ME, Coullet P, Fauve S., Propagative Phase Dynamics in Temporally Intermittent Systems. Europhysics Letters 1987; 4(9):1017-1022.

13. Elphick C, Tirapegui E, Brachet ME, Coullet P, Iooss G., A Simple Global Characterization for Normal Forms of Singular Vector-Fields. Physica D 1987; 29(1-2):95-127.

14. Brachet ME, Fried HM., Approximate Representations of Su(2) Ordered Exponentials in the Adiabatic and Stochastic Limits. Journal of Mathematical Physics 1987; 28(1):15-27.

15. Brachet ME, Meneguzzi M, Politano H, Sulem PL., The Dynamics of Freely Decaying Two-Dimensional Turbulence. Journal of Fluid Mechanics 1988; 194:333-349.

16. Brachet ME. Géométrie des structures à petite échelle dans le vortex de Taylor-Green, C.R.A.S II, 311, 775-780, 1990.

17. Brachet ME., Direct Simulation of 3-Dimensional Turbulence in The Taylor-Green Vortex. Fluid Dynamics Research 1991; 8(1-4):1-8.

18. Douady S, Couder Y, Brachet ME., Direct Observation of the Intermittency of Intense Vorticity Filaments in Turbulence. Physical Review Letters 1991; 67(8):983-986.

19. Brachet ME, Meneguzzi M, Vincent A, Politano H, Sulem PL., Numerical Evidence of Smooth Self-Similar Dynamics and Possibility of Subsequent Collapse for 3-Dimensional Ideal Flows. Physics of Fluids A-Fluid Dynamics 1992; 4(12):2845-2854.

20. Nore C, Brachet ME, Fauve S., Numerical Study of Hydrodynamics Using the Nonlinear Schrödinger-Equation. Physica D 1993; 65(1-2):154-162.

21. Abid M, Huerre P, Brachet M., Linear Hydrodynamic Instability of Circular Jets With Thin Shear Layers. European Journal of Mechanics B-Fluids 1993; 12(5):683-693.

22. Price T, Brachet M, Pomeau Y., Numerical Characterization of Localized Solutions In Plane Poiseuille Flow. Physics of Fluids A-Fluid Dynamics 1993; 5(3):762-764.

23. Domaradzki JA, Liu W, Brachet ME., An Analysis of Subgrid-Scale Interactions In Numerically Simulated Isotropic Turbulence. Physics of Fluids A-Fluid Dynamics 1993; 5(7):1747-1759.

24. Abid M. et Brachet ME., Mecanisme de génération "jets latéraux" dans les jets axisymétriques forcés, C.R. Acad.Sci. 311, II, 1673-1678, 1993.

25. Abid M, Brachet ME., Numerical Characterization of The Dynamics of Vortex Filaments in Round Jets. Physics Of Fluids A-Fluid Dynamics 1993; 5(11):2582-2584.

26. Nore C, Brachet ME, Cerda E, Tirapegui E. Scattering Of 1st Sound by Superfluid Vortices. Physical Review Letters 1994; 72(16):2593-2595. ERRATA; 72(24):3919-3919.

27. C. Nore , M. Abid and ME Brachet, Simulation numérique d'écoulements cisaillés tridimensionnels à l'aide de l'équation de Schrödinger non linéaire, C.R.Acad.Sci. Paris, 319 II, 7, p. 733, 1994.

28. Debbasch F, Brachet ME. Relativistic Hydrodynamics of Semiclassical Quantum Fluids. Physica D 1995; 82(3):255-265.

29. Tcheou JM, Brachet ME. Multifractal Scaling of Probability Density Function: a Tool for Turbulent Data Analysis. Journal de Physique II 1996; 6(6):937-943.

30. Debbasch F, Brachet M. Non-Linear Acoustics in Galilean and Relativistic Barotropic Fluids. Physica D 1997; 108(1-2):135-146.

31. Nore C, Abid M, Brachet ME. Kolmogorov Turbulence in Low-temperature Superflows. Physical Review Letters 1997;78(20):3896-3899.

32. Nore C, Abid M, Brachet ME. Decaying Kolmogorov Turbulence in a Model of Superflow. Physics of Fluids 1997;9(9):2644-2669.

33. Nore C, Brachet ME, Politano H, Pouquet A. Dynamo Action in the Taylor-Green Vortex Near Threshold. Physics of Plasmas 1997; 4(1):1-3.

34. C. Huepe and M. Brachet Solutions de nucléation tourbillonnaires dans un modèle d'écoulement superfluide, C. R. Acad. Sci. Paris 325 , II, pp. 195-20, 1997.

35. Abid M, Brachet ME. Direct Numerical Simulations of the Batchelor Trailing Vortex by a Spectral Method. Physics of Fluids 1998; 10(2):469-475.

36. Huepe C, Metens S, Dewel G, Borckmans P, Brachet ME. Decay Rates in Attractive Bose-Einstein Condensates. Physical Review Letters 1999; 82(8):1616-1619.

37. Tcheou JM, Brachet ME, Belin F, Tabeling P, Willaime H. Multifractal Asymptotic Modeling of the Probability Density Function of vVelocity Increments in Turbulence. Physica D-Nonlinear Phenomena 1999; 129(1-2):93-114.

38. Y. Pomeau, ME Brachet, S. Metens et S. Rica, Théorie cinétique d'un gaz de Bose dilué avec condensat C. R. Acad. Sci. Paris, t. 327, Série II b, p.791-798, 1999.

39. Huepe C, Brachet ME. Scaling Laws for Vortical Nucleation Solutions in a Model of Superflow. Physica D-Nonlinear Phenomena 2000; 140(1-2):126-140.

40. Brachet ME, Taflin E, Tcheou JM. Scaling Transformation and Probability Distributions for Financial Time Series. Chaos Solitons & Fractals 2000; 11(14):2343-2348.

41. Huepe C, Brachet ME, Debbasch F. Generic Inflationary and Noninflationary Behavior in Toy-cosmology. Physica D 2000; 144(1-2):20-36.

42. Nore C, Huepe C, Brachet ME. Subcritical Dissipation in Three-dimensional Superflows. Physical Review Letters 2000; 84(10):2191-2194.

43. Pham CT, Brachet M. Dynamical Scaling Laws in Two types of Extended Hamiltonian Systems at Dissipation Onset. Physica D-Nonlinear Phenomena 2002; 163(3-4):127-149.

44. Huepe C, Tuckerman LS, Metens S, Brachet ME. Stability and Decay Rates of Nonisotropic Attractive Bose-Einstein Condensates. Physical Review A 2003; 68(2).

45. Abid M, Huepe C, Metens S, Nore C, Pham CT, Tuckerman LS, et al. Gross-Pitaevskii Dynamics of Bose-Einstein Condensates and Superfluid Turbulence. Fluid Dynamics Research 2003; 33(5-6):509-544.

46. Pham CT, Nore C, Brachet ME. Boundary Layers in Gross-Pitaevskii Superflow Around a Disk. Comptes Rendus Physique 2004;5(1):3-8.

47. Cichowlas C, Brachet ME. Evolution of Complex Singularities in Kida-Pelz and Taylor-Green Inviscid Flows. Fluid Dynamics Research 2005; 36(4-6):239-248.

48. Pham CT, Nore C, Brachet ME. Boundary Layers and Emitted Excitations in Nonlinear Schrödinger Superflow Past a Disk. Physica D-Nonlinear Phenomena 2005; 210(3-4):203-226.

49. Pham CT, Nore C, Brachet ME. Critical Speed for Capillary-Gravity Surface Flows in the Dispersive Shallow Water Limit. Physics of Fluids 2005; 17(6).

50. Cichowlas C, Bonaiti P, Debbasch F, Brachet M. Effective Dissipation and Turbulence in Spectrally-truncated Euler Flows. Physical Review Letters 2005; 95(26).

51. Cartes C., Bustamante, M.D. and Brachet, M. E . Generalized Eulerian-Lagrangian Description of Navier-Stokes Dynamics. Physics of Fluids 19, 077101 (2007).

52. Krstulovic G, and Brachet ME. Two-fluid Model of the Truncated Euler Equations, Physica D Volume 237 Issue: 14-17 Pages: 2015-2019 (2008).

53. Giorgio Krstulovic, Marc Brachet, and Enrique Tirapegui Radiation and Vortex Dynamics in the Nonlinear Schrödinger Equation Phys. Rev. E 78, 026601 (2008).

54. Lee E., Brachet ME., Pouquet A., Mininni PD., and Rosenberg D., Paradigmatic flow for small-scale magnetohydrodynamics: Properties of the ideal case and the collision of current sheets, Phys. Rev. E 78, 066401 (2008).

55. Cartes C., Bustamante MD., Pouquet A. and Brachet ME., Capturing reconnection phenomena using generalized Eulerian–Lagrangian description in Navier–Stokes and resistive MHD, Fluid Dyn. Res. 41 011404 (2009).

56. Krstulovic K., Mininni P. D., Brachet M. E. and Pouquet A. Cascades, thermalization, and eddy viscosity in helical Galerkin truncated Euler Flows, Phys. Rev. E 79, 056304 (2009).

57. Krstulovic K., Cartes C., Brachet M. E. and Tirapegui E. Generation and Characterization of Absolute Equilibrium of Compressible Flows, International Journal of Bifurcation and Chaos, Vol. 19, No. 10, 3445-3459 (2009).

58. Lee E., Brachet ME., Pouquet A., Mininni PD., and Rosenberg D., Lack of universality in decaying magnetohydrodynamic turbulence, Phys. Rev E 81, 016318 (2010).

59. Pouquet A., Lee E., Brachet ME., Mininni PD., and Rosenberg D., The dynamics of unforced turbulence at high Reynolds number for Taylor-Green vortices generalized to MHD, Geophysical & Astrophysical Fluid Dynamics, 104: 2 (2010).

60. Giorgio Krstulovic and Marc Brachet, Comment on "Superfluid turbulence from quantum Kelvin wave to classical Kolmogorov cascades", Phys. Rev. Lett. 105, 129401 (2010).

61. Giorgio Krstulovic and Marc Brachet, Dispersive bottleneck delaying thermalization of turbulent Bose-Einstein condensates, Phys. Rev. Lett. 106, 115303 (2011).

62. Giorgio Krstulovic and Marc Brachet, Anomalous vortex-ring velocities induced by thermally excited Kelvin waves and counteFlow effects in supeFluids, Phys. Rev. B 83, 132506 (2011).

63. Giorgio Krstulovic and Marc Brachet, Energy cascade with small-scale thermalization, counteFlow metastability, and anomalous velocity of vortex rings in Fourier-truncated Gross-Pitaevskii equation, Phys. Rev. E 83, 066311 (2011).

64. Giorgio Krstulovic, Marc-Etienne Brachet and Annick Pouquet, Alfvén waves and ideal two-dimensional Galerkin truncated magnetohydrodynamics, Phys. Rev. E 84, 016410 (2011).

65. Giorgio Krstulovic, Gentien Thorner, Julien-Piera Vest, Stephan Fauve, and Marc Brachet, Axial dipolar dynamo action in the Taylor-Green vortex, Phys. Rev. E 84, 066318 (2011).

66. Miguel D. Bustamante and Marc Brachet, Interplay between the Beale-Kato-Majda theorem and the analyticity-strip method to investigate numerically the incompressible Euler singularity problem, Phys. Rev. E 86, 066302 (2012).

67. Marc Brachet, Gross-Pitaevskii description of superfluid dynamics at finite temperature: A short review of recent results, Comptes Rendus Physique Volume 13, Issues 9-10, Pages 954-965 (2012).

68. Marc Brachet, Miguel Bustamante, Giorgio Krstulovic, Pablo Mininni, Annick Pouquet and Duane Rosenberg, Ideal evolution of magnetohydrodynamic turbulence when imposing Taylor-Green symmetries, Phys. Rev. E 87, 013110 (2013).

69. Giuseppe Di Molfetta, Marc Brachet and Fabrice Debbasch, Quantum walks as massless Dirac fermions in curved space-time, Phys. Rev. A 88, 042301 (2013).

70. Vishwanath Shukla, Marc Brachet and Rahul Pandit, Turbulence in the two-dimensional Fourier-truncated Gross–Pitaevskii equation, New J. Phys. 15 113025 (2013).

71. Giuseppe Di Molfetta, Marc Brachet and Fabrice Debbasch, Quantum walks in artificial electric and gravitational fields, Physica A 397, 157-168 (2014).

72. Natalia G. Berloff, Marc Brachet, and Nick P. Proukakis, Modeling quantum fluid dynamics at nonzero temperatures, PNAS 111: 4675-4682 (2014).

73. Giorgio Krstulovic, Marc E. Brachet, and Annick Pouquet, Forced magnetohydrodynamic turbulence in three dimensions using Taylor-Green symmetries, Phys. Rev. E 89, 043017 (2014).

74. Srinivasa Gopalakrishnan Ganga Prasath, Stéphan Fauve and Marc Brachet, Dynamo action by turbulence in absolute equilibrium, EPL, 106, 29002 (2014).

75. Giuseppe Di Molfetta, Giorgio Krstlulovic and Marc Brachet, Self-truncation and scaling in Euler-Voigt-α and related fluid models, PRE 92, 013020 (2015).

76. Giuseppe Di Molfetta, Fabrice Debbasch and Marc Brachet, Nonlinear optical Galton board: Thermalization and continuous limit, PRE 92, 042923 (2015).

77. Patricio Clark Di Leoni, Pablo D. Mininni, and Marc E. Brachet, Spatiotemporal detection of Kelvin waves in quantum turbulence simulations, PRA 92, 063632 (2015).

78. Pablo Arnault, Giuseppe Di Molfetta, Marc Brachet and Fabrice Debbasch, Quantum walks and non-Abelian discrete gauge theory, PRA 94, 012335 (2016).

79. P. Clark di Leoni, P. D. Mininni, and M. E. Brachet, Helicity, topology, and Kelvin waves in reconnecting quantum knots, PRA 94, 043605 (2016).

80. Alexandre Cameron, Alexandros Alexakis, and Marc-Etienne Brachet, Large-scale instabilities of helical flows, PRF 1, 063601 (2016).

81. Vishwanath Shukla, Marc Brachet and Rahul Pandit, Sticking transition in a minimal model for the collisions of active particles in quantum fluids, PRA 94, 041602(R) (2016).

82. Vishwanath Shukla, Stephan Fauve, and Marc Brachet, Statistical theory of reversals in two-dimensional confined turbulent flows, PRE 94, 061101(R) (2016).

83. P. Clark di Leoni, P. D. Mininni, and M. E. Brachet, Dual cascade and dissipation mechanisms in helical quantum turbulence, PRA 95, 053636 (2017).

84. R. Pandit, D. Banerjee, A. Bhatnagar, M. Brachet, A. Gupta, D. Mitra, N. Pal, P. Perlekar, S. S. Ray, V. Shukla, and D. Vincenzi, An overview of the statistical properties of two-dimensional turbulence in fluids with particles, conducting fluids, fluids with polymer additives, binary-fluid mixtures, and superfluids, PHYSICS OF FLUIDS 29, 111112 (2017).

85. A. Cameron, A. Alexakis, and M. Brachet, Effect of helicity on the correlation time of large scales in turbulent flows, PRF 2, 114602 (2017).

86. Patricio Clark Di Leoni, Pablo D. Mininni, and Marc E. Brachet, Dynamics of partially thermalized solutions of the Burgers equation, PRF 3, 014603 (2018).

87. Vishwanath Shukla, Rahul Pandit, and Marc Brachet, Particles and fields in superfluids: Insights from the two-dimensional Gross-Pitaevskii equation, PRA 97, 013627 (2018).

88. Patricio Clark Di Leoni, Pablo D. Mininni, and Marc E. Brachet, Finite-temperature effects in helical quantum turbulence, PRA 97, 043629 (2018).