Vincenzo Vitelli

Curriculum vitæ

Contact information

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Postal Address:
University of Chicago
929 East 57th Street
Chicago, Illinois 60637
United States of America

Email: vitelli@uchicago.edu
Phone: 773-834-8829
Homepage: http://home.uchicago.edu/~vitelli/

Professional experience

Professor 2017 – present
Department of Physics and James Franck Institute, University of Chicago

Professor, Chair of Condensed Matter Theory 2015 – 2017
Instituut–Lorentz for Theoretical Physics, Leiden University

Associate Professor 2013 – 2015
Instituut–Lorentz for Theoretical Physics, Leiden University

Assistant Professor 2010 – 2013
Instituut–Lorentz for Theoretical Physics, Leiden University

Post-doctoral Fellow 2006 – 2009
University of Pennsylvania
Advisors: Andrea Liu and Randall Kamien

Education

PhD in Physics September 2000 – June 2006
Harvard University
Thesis Advisor: David R. Nelson.
Thesis title: Crystals, Liquid Crystals and Superfluid He on Curved Surfaces.

Visiting Undergraduate Student Fall 1999
Massachusetts Institute of Technology

BSc in Theoretical Physics October 1997 – July 2000
First Class Honours
Imperial College London

Visiting Positions and Awards

Fellow of the American Physical Society for *theoretical contributions to the field of topological mechanics*, 2018.

Kavli Frontiers of Science Fellow selected by the National Academy of Sciences USA, 2015

Invited Professor Laboratoire de Physique Théorique, École Normale Supérieure Paris, 2015

Nomination for *Discoverer of the year* at Leiden University, 2015

Student Nomination for Faculty of Science Award for Education, Leiden University, 2015

Invited Professor Laboratoire de Physico-Chimie Théorique, ESPCI - ParisTech, 2014

Visiting Research Scholar to the Initiative for the Theoretical Sciences, CUNY, 2014

Student Nomination for Faculty of Science Award for Education, Leiden University, 2014

Invited Professor of the Joliot-Curie Chair ESPCI - ParisTech, 2013

NWO Vidi Laureate Netherlands Organization for Scientific Research, 2012

Professeur Invité Université Paris VII, 2009

Feinberg Foundation Fellow Weizmann Institute, 2009

Herbert Callen Prize for *"his insightful work on the interplay between geometry and superfluid order"*, 2007

Harold T. White Prize for *Excellence in Teaching*, Harvard Physics Department, 2005

Certificate of Distinction for *Excellence in Teaching*, Harvard Bok Center, 2005

Nuffield Foundation Award for *undergraduate research* carried out at MIT and Imperial College, 1999

Teaching Experience

Lecturer, **Advanced Statistical Physics**, University of Chicago, Fall 2019

Lecturer, **Graduate Classical Mechanics**, University of Chicago, Fall 2018

Lecturer, **Graduate Soft Matter Physics**, University of Chicago, Spring 2018, 2019, 2020

Lecturer, **Statistical Field Theory**, Leiden University, Autumn 2013, 2014, 2015 and 2016

Lecturer, **Advanced Statistical Physics**, Leiden University, Autumn 2011, 2012, 2013, 2014, 2015 and 2016

Lecturer, **Relativistic Electrodynamics**, Leiden University, Spring 2015

Lecturer, **Topological Mechanics**, ESPCI ParisTech, June 2014

Lecturer, **Topological Mechanics**,7^{th} FAPERJ School, Rio de Janeiro, April 2014

Lecturer, **Topological Methods in Theoretical Physics**, Leiden University - Delta Institute, Spring 2014

Habilitation to teach in Dutch universities, **BKO Certificate**, January 2011

Lecturer, **Renormalization Group Methods**, Leiden University - Delta Institute, Spring 2011

Lecturer, **Fluid Dynamics**, Master in Physics, Leiden University, Fall 2010

Lecturer, **Elasticity and Geometry**, Dutch Research School of Theoretical Physics, Spring 2010

Lecturer, **Econophysics** Bachelor in Physics, Leiden University, Winter 2010

I was a non-resident tutor at Elliott House in Harvard in the academic years 2002-2004. I served as a teaching assistant in the following courses taught at Harvard:

Electromagnetism, Summer 2005, Spring 2005, Spring 2001

Quantum Theory of Solids, Fall 2003

Topics in Soft Matter and Biophysics, Spring 2003

Graduate Statistical Physics, Fall 2002, Spring 2001

Applied Mathematics, Spring 2002

Mechanics, Fall 2000

Service

Chair of the JFI Appointment Committee, University of Chicago, 2018-2020

Chair of the Undergraduate Physics Curriculum Committee, University of Chicago, 2018-2020

Colloquium Committee, University of Chicago, 2017-2018

Coordination Team Leiden Institute of Physics, 2014-2015

Teaching Committee Leiden Institute of Physics, 2013-2014

Co-organizer of the Ehrenfest Colloquium Leiden Institute of Physics, 2013-2014

Co-organizer of the Physics Café Leiden Institute of Physics, 2013-2014

Member of faculty search committee for *Soft Condensed Matter Theory and Statistical Physics*, Universiteit van Amsterdam, 2014

Member of faculty search committee for *Condensed Matter Theory*, Delta Institute of Theoretical Physics and Universiteit van Amsterdam, 2013

Member of faculty search committee for *Condensed Matter Theory*, Delta Institute of Theoretical Physics and Utrecht University, 2012

Professional Activities

Co-organizer, Workshop on *Dualities from theoretical physics to engineering*, Kadanoff Center for Theoretical Physics, University of Chicago, 2020

Co-organizer, Workshop on *Hydrodynamics across all scales*, Kadanoff Center for Theoretical Physics, University of Chicago, 2019

Co-organizer, Workshop on *Topological Protection in Messy Matter*, GeorgiaTech, 2018

Co-organizer, Lorentz Center Workshop, *Topology in Complex Fluids*, 2018

Co-organizer, Topological Metamaterials and Beyond, Aspen Center of Physics, 02-01-2016

Guest Editor for *New Journal of Physics* special issue on *Topological Mechanics*, 2016.

Co-organizer, Lorentz Center Workshop, *Topological Materials at $\hbar = 0$: optical, mechanical and acoustic analogues of topological insulators*, 2016.

Organizing committee, FOM Veldhoven Meeting, Dutch Physics Society, 2016.

Co-organizer, Boulder School in Condensed Matter Physics, *Soft matter in and out of equilibrium*, 2015.

Co-organizer, Lorentz Center Workshop, *Topological mechanics: from metamaterials to robots*, 2014.

Participant, KITP program, *Complexity in mechanics: Intermittency and collective phenomena in disordered solids*, Santa Barbara, 2014.

Co-organizer, Statistical Physics and Theoretical Condensed Matter School, Dutch Research School Theoretical Physics , 2012, 2013 and 2014.

Guest Editor for *Soft Matter* special issue on *Geometry and Topology of Soft Materials*, 2013 .

Chairperson, for *Granular Materials and Jamming*, 7^{th} IDMRCS Conference, 2013.

Co-organizer, Lorentz Center Workshop, *Modern Perspectives on Thin Sheets*, 03-09-2012.

Member of user committee, for *Vici Grant*, awarded to Prof. S. Luding, 2012-2016.

Co-organizer, 21^{st} International Materials Research Congress, *Soft Responsive Materials*, Cancun, 13-08-2012.

Co-organizer, Aspen Center for Physics, *Condensed Matter Winter Conference*, 03-01-2011.

Co-organizer, Lorentz Center Workshop, *Capillary shaping of solutes*, 17-05-2010.

Member, Institute of Complex Adaptive Matter, *Fellows Committee*.

Chair of session on *Statistical and Soft Condensed Matter Physics*, FOM Meeting, Veldhoven, 20-01-2010.

Chair of symposium on *Jamming at nonzero temperature and stress*, APS Meeting, Pittsburgh, 03-17-2009.

Participant, Institute for Mathematics and its Applications, *Geometrical Singularities*, July 2008.

Co-organizer, University of Pennsylvania, *Mid-Atlantic Soft Matter Workshop*, 06-08-2008.

Participant, Aspen Center for Physics, *Interfaces, Topological Defects and Flexible Packings*, June 2008.

Participant, Aspen Center for Physics, *Frontiers in Condensed Matter Physics*, February 2008.

Participant, Aspen Center for Physics, *Jamming Workshop*, July 2007.

Participant, International School of Physics "Enrico Fermi", *The Physics of Complex Systems*, July 2003.

Participant, Boulder School in Condensed Matter Physics, *Physics of Soft Condensed Matter*, 2002.

Participant, Boulder School in Condensed Matter Physics, *Non-equilibrium Statistical Physics*, 2001.

Participant, Summer School in *Biomathematics*, Propriano, 2000.

Referee for Science, Physical Review Letters, Nature Physics, Proceedings of the National Academy of Sciences, Reviews of Modern Physics, Physical Review E and B, Europhysics Letters, Nanophysics Letters, Journal of Statistical Physics, Journal of Chemical Physics, Journal of Materials Chemistry, Soft Matter, European Journal Physics E, Philosophical Magazine, Physica A.

Referee of condensed matter physics books for Taylor & Francis, Chapman & Hall and CRC Press.

Grant Reviewer for the Netherlands Foundation for Fundamental Research (FOM), the German Research Foundation (DFG), the Israel Science Foundation (ISF) and the Swiss National Science Foundation (SNSF).

Group Members

Postdoctoral Fellows: Dr. M. Fruchart, Dr. M. Han, Dr. B. Vansaders

PhD students: H. Abbaszadeh, C. Scheibner, T. Khain, J. Colen

Undergraduate students: L. Braverman, S. Ni, C. Yao

Former Group Members

PhD Students

Richard Green 03-07-2018
Thesis title: Geometry and topology in active and driven systems
next *private sector*

Yujie Zhou 17-10-2017
Thesis title: Wave propagation in mechanical metamaterials
next *postdoctoral fellow at OIST*

Benjamin C. van Zuiden 27-09-2017
Thesis title: Topology and Geometry in Chiral Liquids
next *private sector*

Thomas H. Beuman 08-12-2015
Thesis title: The Stochastic Geometry of non-Gaussian Fields
next *postdoctoral fellow at Leiden University*

Vincenz Koning 26-11-2014
Thesis title: On the geometry of fracture and frustration
currently *Assistant Professor, Utrecht University*

Nitin Upadhyaya 04-11-2013
Thesis title: Solitary waves and fluctuations in fragile matter
next *Lecturer in Applied Mathematics, Harvard University*

Postdoctoral Fellows

Dr. A. Souslov, currently *Lecturer, Department of Physics, University of Bath*

Dr. Debarghya Banerjee, next *Post doctoral fellow, MPIDS, Göttingen*

Dr. Jayson Paulose, currently *Assistant Professor, University of Oregon*

Dr. Bryan Chen, currently *Post doctoral fellow, University of Pennsylvania, Philadelphia*

Dr. Nitin Upadhyaya, currently *Faculty, Flame University, India*

Dr. Stephan Ulrich, next *private sector*

Dr. Leopoldo Gomez, next *faculty member at Universidad Nacional del Sur*

Master Students

G. Baardink, next *Master student* at Kyushu University
H. Abbaszadeh, next *PhD student* at the Instituut-Lorentz
A. Meeussen, next *PhD student* at AMOLF, Amsterdam
F. Milan, next *PhD student* in Physics at Rome University
F. M. G. J. Coppens, *PhD student* at IRSAMC Institute, Toulouse
B. C. van Zuiden, next *PhD student* at the Instituut-Lorentz
S. C. F. van Opheusden, next *Phd student* in Neuroscience at New York University
S. Kozhuharov, next *private sector*
V. Koning, next *PhD student* at the Instituut-Lorentz
T. H. Beuman, next *PhD student* at the Instituut-Lorentz
A. Tichler, next *Reservoir Engineer* at Shell

Publications

[89] J. Colen, M. Han, R. Zhang, S. A. Redford, L. M. Lemma, L. Morgan, P. V. Ruijgrok, R. Adkins, Z. Bryant, Z. Dogic, M. L. Gardel, J. J. D. Pablo, and V. Vitelli, *Machine learning active-nematic hydrodynamics*, (2020) arXiv:2006.13203.

[88] M. Fruchart, R. Hanai, P. B. Littlewood, and V. Vitelli, *Phase transitions in non-reciprocal active systems*, (2020) arXiv:2003.13176.

[87] M. Han, M. Fruchart, C. Scheibner, S. Vaikuntanathan, W. Irvine, J. de Pablo, and V. Vitelli, *Statistical mechanics of a chiral active fluid*, (2020) arXiv:2002.07679.

[86] H. Abbaszadeh, M. Fruchart, W. van Saarloos, and V. Vitelli, *Liquid-crystal-based topological photonics*, (2020) arXiv:2005.02476.

[85] D. Banerjee, A. Souslov, and V. Vitelli, *Hydrodynamic correlation functions of chiral active fluids*, (2020) arXiv:2005.00621.

[84] D. Banerjee, V. Vitelli, F. Jülicher, and P. Surówka, *Active viscoelasticity of odd materials*, (2020) arXiv:2002.12564.

[83] C. Scheibner, W. T. M. Irvine, and V. Vitelli, *Non-hermitian band topology in active and dissipative mechanical metamaterials*, (2020) arXiv:2001.04969.

[82] M. Fruchart and V. Vitelli, *Symmetries and dualities in the theory of elasticity*, **Physical Review Letters** *124*, 248001 (2020), arXiv:1912.02384.

[81] R. Zhang, S. A. Redford, P. V. Ruijgrok, N. Kumar, A. Mozaffari, S. Zemsky, A. R. Dinner, V. Vitelli, Z. Bryant, M. L. Gardel, and J. J. de Pablo, *Structuring stress for active materials control*, (2019) arXiv:1912.01630.

[80] A. Souslov, A. Gromov, and V. Vitelli, *Anisotropic odd viscosity via a time-modulated drive*, **Physical Review E** *101*, 052606 (2020), arXiv:1909.08505.

[79] Z. Liao, M. Han, M. Fruchart, V. Vitelli, and S. Vaikuntanathan, *A mechanism for anomalous transport in chiral active liquids*, **The Journal of Chemical Physics** *151*, 194108 (2019), arXiv:1909.03132.

[78] G. Duclos, R. Adkins, D. Banerjee, M. S. E. Peterson, M. Varghese, I. Kolvin, A. Baskaran, R. A. Pelcovits, T. R. Powers, A. Baskaran, F. Toschi, M. F. Hagan, S. J. Streichan, V. Vitelli, D. A. Beller, and Z. Dogic, *Topological structure and dynamics of three-dimensional active nematics*, **Science** *367*, 1120–1124 (2020), arXiv:1909.01381.

[77] M. Fruchart, Y. Zhou, and V. Vitelli, *Dualities and non-abelian mechanics*, **Nature** *577*, 636–640 (2020), arXiv:1904.07436.

[76] C. Scheibner, A. Souslov, D. Banerjee, P. Surówka, W. T. M. Irvine, and V. Vitelli, *Odd elasticity*, **Nature Physics** *16*, 475–480 (2020), arXiv:1902.07760.

[75] A. Souslov and V. Vitelli, *Geometry for mechanics*, **Nature Physics** *15*, 623–624 (2019).

[74] M. X. Lim, A. Souslov, V. Vitelli, and H. M. Jaeger, *Cluster formation by acoustic forces and active fluctuations in levitated granular matter*, **Nature Physics** *15*, 460–464 (2019), arXiv:1808.03862.

[73] M. Fruchart and V. Vitelli, *Metamaterials: the effective way*, **Nature Materials** *17*, 292–293 (2018).

[72] M. Fruchart and V. Vitelli, *Waves cornered*, **Nature** *555*, 318–319 (2018).

[71] R. P. Pedro, J. Paulose, A. Souslov, M. Dresselhaus, and V. Vitelli, *Topological protection can arise from thermal fluctuations and interactions*, **Physical Review Letters** *122*, 118001 (2019), arXiv:1803.04951.

[70] A. Souslov, K. Dasbiswas, M. Fruchart, S. Vaikuntanathan, and V. Vitelli, *Topological waves in fluids with odd viscosity*, **Phys. Rev. Lett.** *122*, 128001 (2019), arXiv:1802.09649.

[69] D. Z. Rocklin, V. Vitelli, and X. Mao, *Folding mechanisms at finite temperature*, (2018) arXiv:1802.02704.

[68] M. Fruchart, S.-Y. Jeon, K. Hur, V. Cheianov, U. Wiesner, and V. Vitelli, *Soft self-assembly of weyl materials for light and sound*, **Proceedings of the National Academy of Sciences**, 201720828 (2018), arXiv:1711.11019.

[67] K. Bertoldi, V. Vitelli, J. Christensen, and M. van Hecke, *Flexible mechanical metamaterials*, **Nature Reviews Materials** *2*, 17066 (2017).

[66] G. Baardink, A. Souslov, J. Paulose, and V. Vitelli, *Localizing softness and stress along loops in 3d topological metamaterials*, **Proceedings of the National Academy of Sciences** *115*, 489–494 (2017), arXiv:1707.08928.

[65] Y. Hadad, V. Vitelli, and A. Alu, *Solitons and propagating domain walls in topological resonator arrays*, **ACS Photonics** *4*, 1974–1979 (2017).

[64] A. Souslov, B. C. van Zuiden, D. Bartolo, and V. Vitelli, *Topological sound in active-liquid metamaterials*, **Nature Physics** *13*, 1091–1094 (2017), eprint: 1610.06873.

[63] D. Banerjee, A. Souslov, A. G. Abanov, and V. Vitelli, *Odd viscosity in chiral active fluids*, **Nature Communications** *8* (2017), eprint: 1702.02393.

[62] Y. Zhou, B. G. Chen, N. Upadhyaya, and V. Vitelli, *Kink-antikink asymmetry and impurity interactions in topological mechanical chains*, **Phys. Rev. E** *95*, 022202 (2017), eprint: 1608.02127.

[61] N. P. Mitchell, V. Koning, V. Vitelli, and W. T. M. Irvine, *Fracture in sheets draped on curved surfaces*, **Nature Materials** *16*, 89–93 (2017), eprint: 1512.04061, See also Elastic sheets: Cracks by design, by Ken Kamrin, Nature Materials 16, 8–9 (2017).

[60] H. Abbaszadeh, A. Souslov, J. Paulose, H. Schomerus, and V. Vitelli, *Sonic landau levels and synthetic gauge fields in mechanical metamaterials*, **Physical Review Letters** *119* (2017), eprint: 1610.06406.

[59] B. C. van Zuiden, J. Paulose, W. T. M. Irvine, D. Bartolo, and V. Vitelli, *Spatiotemporal order and emergent edge currents in active spinner materials*, **Proceedings of the National Academy of Sciences** *113*, 12919–12924 (2016), eprint: 1606.03934, See Spin City, by A. Klopper, Nature Physics 12, 1090 (2016).

[58] A. S. Meeussen, J. Paulose, and V. Vitelli, *Geared topological metamaterials with tunable mechanical stability*, **Phys. Rev. X** *6*, 041029 (2016), eprint: 1602.08769.

[57] M. Pelliccia, P. Andreozzi, J. Paulose, M. D'Alicarnasso, V. Cagno, M. Donalisio, A. Civra, R. M. Broeckel, N. Haese, P. J. Silva, R. P. Carney, V. Marjomäki, D. N. Streblow, D. Lembo, F. Stellacci, V. Vitelli, and S. Krol, *Additives for vaccine storage to improve thermal stability of adenoviruses from hours to months*, **Nature Communications** *7*, 13520 (2016).

[56] R. Green, J. Toner, and V. Vitelli, *Geometry of thresholdless active flow in nematic microfluidics*, **Physical Review Fluids** *2* (2017), eprint: 1602.00561.

[55] V. Koning and V. Vitelli, "Crystals and liquid crystals confined to curved geometries," in *Fluids, colloids and soft materials: an introduction to soft matter physics* (John Wiley & Sons, Inc, Apr. 2016), pp. 369–386, eprint: 1401.4957.

[54] M. M. Driscoll, B. G. Chen, T. H. Beuman, S. Ulrich, S. R. Nagel, and V. Vitelli, *The role of rigidity in controlling material failure*, **Proceedings of the National Academy of Sciences** *113*, 10813–10817 (2016), eprint: 1501.04227.

[53] V. Koning, T. Lopez-Leon, A. Darmon, A. Fernandez-Nieves, and V. Vitelli, *Spherical nematic shells with a threefold valence*, **Physical Review E** *94*, 012703 (2016), eprint: 1502.03742.

[52] M. Ceriotti and V. Vitelli, *Vitrification: machines learn to recognize glasses*, **Nature Physics** *12*, 377–378 (2016).

[51] D. Z. Rocklin, B. G. Chen, M. Falk, V. Vitelli, and T. C. Lubensky, *Mechanical weyl modes in topological maxwell lattices*, **Physical review letters** *116*, 135503 (2016), eprint: 1510.04970, Editors' Suggestion.

[50] B. G. Chen, B. Liu, A. A. Evans, J. Paulose, I. Cohen, V. Vitelli, and C. D. Santangelo, *Topological mechanics of origami and kirigami*, **Physical review letters** *116*, 135501 (2016), eprint: 1508.00795, Synopsis.

[49] C. Brito, V. Vitelli, and O. Dauchot, *Orientational order at finite temperature on curved surfaces*, **Journal of Statistical Mechanics: Theory and Experiment** *2016*, 033208 (2016), eprint: 1510.03745.

[48] J. Paulose, A. S. Meeussen, and V. Vitelli, *Selective buckling via states of self-stress in topological metamaterials*, **Proceedings of the National Academy of Sciences** *112*, 7639–7644 (2015), eprint: 1502.03396.

[47] L. M. Nash, D. Kleckner, A. Read, V. Vitelli, A. M. Turner, and W. T. M. Irvine, *Topological mechanics of gyroscopic metamaterials*, **Proceedings of the National Academy of Sciences** *112*, 14495–14500 (2015), eprint: 1504.03362, See News and Views by P. Ball, Nature Materials, (2016).

[46] A. Ward, F. Hilitski, W. Schwenger, D. Welch, A. W. C. Lau, V. Vitelli, L. Mahadevan, and Z. Dogic, *Solid friction between soft filaments*, **Nature materials** *14*, 583–588 (2015), eprint: 1503.01202.

[45] L. R. Gómez, N. A. García, V. Vitelli, J. Lorenzana, and D. A. Vega, *Phase nucleation in curved space*, **Nature communications** *6* (2015).

[44] J. Paulose, B. G. Chen, and V. Vitelli, *Topological modes bound to dislocations in mechanical metamaterials*, **Nature Physics** *11*, 153–156 (2015), eprint: 1406.3323, Cover, See News and Views by T. Witten, Nature Physics, (2015).

[43] V. Vitelli, N. Upadhyaya, and B. G. Chen, *Topological mechanisms as classical spinor fields*, **arXiv:1407.2890** (2014), eprint: 1407.2890.

[42] B. G. Chen, N. Upadhyaya, and V. Vitelli, *Nonlinear conduction via solitons in a topological mechanical insulator*, **Proceedings of the National Academy of Sciences** *111*, 13004–13009 (2014), eprint: 1404.2263, See Inner workings: Legos in the Lab by S. Ornes, Proc. Natl. Acad. Sci. USA, 112 (42) 12901, (2015), and Edging into the spotlight, by S. Ornes, Physics World, 28, 6 (2015).

[41] J.-B. Caussin, A. Solon, A. Peshkov, H. Chaté, T. Dauxois, J. Tailleur, V. Vitelli, and D. Bartolo, *Emergent spatial structures in flocking models: a dynamical system insight*, **Phys. Rev. Lett.** *112*, 148102 (2014), eprint: 1401.1315, Highlighted in Physics Synopsis.

[40] T. H. Beuman, A. M. Turner, and V. Vitelli, *Geometrical detection of weak non-gaussianity upon coarse-graining*, **Journal of Statistical Physics** *157*, 571–581 (2014), eprint: 1402.6931.

[39] V. Koning, B. C. van Zuiden, R. D. Kamien, and V. Vitelli, *Saddle-splay screening and chiral symmetry breaking in toroidal nematics*, **Soft Matter** (2014), eprint: 1312.5092.

[38] V. Vitelli and W. Irvine, *The geometry and topology of soft materials*, **Soft Matter** *9*, 8086–8087 (2013).

[37] S. Ulrich, N. Upadhyaya, B. van Opheusden, and V. Vitelli, *Shear shocks in fragile networks*, **Proceedings of the National Academy of Sciences** *110*, 20929–20934 (2013), eprint: 1307.7665.

[36] N. Upadhyaya, L. R. Gómez, and V. Vitelli, *Soliton attenuation and emergent hydrodynamics in fragile matter*, **Physical Review X** *4*, 011045 (2014), eprint: 1304.6692.

[35] N. Upadhyaya, A. M. Turner, and V. Vitelli, *Solitons and thermal fluctuations in strongly nonlinear solids*, **Phys. Rev. E** *88*, 052906 (2013), eprint: 1304.6684.

[34] A. M. Tichler, L. R. Gómez, N. Upadhyaya, X. Campman, V. F. Nesterenko, and V. Vitelli, *Transmission and reflection of strongly nonlinear solitary waves at granular interfaces*, **Phys. Rev. Lett.** *111*, 048001 (2013), eprint: 1303.5890, Editors' Suggestion and highlighted in Physics Synopsis.

[33] S. R. Waitukaitis, L. K. Roth, V. Vitelli, and H. M. Jaeger, *Dynamic jamming fronts*, **EPL (Europhysics Letters)** *102*, 44001 (2013).

[32] P. Strack and V. Vitelli, *Soft quantum vibrations of a pt-symmetric nonlinear ion chain*, **Phys. Rev. A** *88*, 053408 (2013), eprint: 1302.4453.

[31] E. Pairam, J. Vallamkondu, V. Koning, B. C. van Zuiden, P. W. Ellis, M. A. Bates, V. Vitelli, and A. Fernandez-Nieves, *Stable nematic droplets with handles*, **Proceedings of the National Academy of Sciences** *110*, 9295–9300 (2013), eprint: 1212.1771.

[30] A. Amir, J. J. Krich, V. Vitelli, Y. Oreg, and Y. Imry, *Emergent percolation length and localization in random elastic networks*, **Phys. Rev. X** *3*, 021017 (2013), eprint: 1209.2169.

[29] V. Koning, T. Lopez-Leon, A. Fernandez-Nieves, and V. Vitelli, *Bivalent defect configurations in inhomogeneous nematic shells*, **Soft Matter** *9*, 4993–5003 (2013), eprint: 1211.4622.

[28] T. H. Beuman, A. M. Turner, and V. Vitelli, *Extrema statistics in the dynamics of a non-gaussian random field*, **Phys. Rev. E** *87*, 022142 (2013), eprint: 1211.0993.

[27] T. H. Beuman, A. M. Turner, and V. Vitelli, *Critical and umbilical points of a non-gaussian random field*, **Phys. Rev. E** *88*, 012115 (2013).

[26] T. H. Beuman, A. M. Turner, and V. Vitelli, *Stochastic geometry and topology of non-gaussian fields*, **Proceedings of the National Academy of Sciences** *109*, 19943–19948 (2012), eprint: 1207.3892.

[25] V. Vitelli and M. van Hecke, *Shocks in fragile matter*, **Europhysics News** *43*, 36–39 (2012).

[24] L. R. Gómez, A. M. Turner, and V. Vitelli, *Uniform shock waves in disordered granular matter*, **Phys. Rev. E** *86*, 041302 (2012), eprint: 1208.0213.

[23] W. T. M. Irvine and V. Vitelli, *Geometric background charge: dislocations on capillary bridges*, **Soft Matter** *8*, 10123–10129 (2012).

[22] L. R. Gómez, A. M. Turner, M. van Hecke, and V. Vitelli, *Shocks near jamming*, **Phys. Rev. Lett.** *108*, 058001 (2012), eprint: 1108.5688.

[21] V. Vitelli, *Topological soft matter: kagome lattices with a twist*, **Proceedings of the National Academy of Sciences** *109*, 12266–12267 (2012).

[20] V. Vitelli and M. van Hecke, *Soft materials: marginal matters*, **Nature** *480*, 325–326 (2011).

[19] N. Upadhyaya and V. Vitelli, *Quantum buckling*, **Phys. Rev. E** *84*, 040601 (2011), eprint: 1106.4674.

[18] T. Lopez-Leon, V. Koning, K. B. S. Devaiah, V. Vitelli, and A. Fernandez-Nieves, *Frustrated nematic order in spherical geometries*, **Nature Physics** *7*, 391–394 (2011).

[17] W. T. M. Irvine, V. Vitelli, and P. M. Chaikin, *Pleats in crystals on curved surfaces*, **Nature** *468*, 947–951 (2010), See News and Views by F. Stellacci and A. Mortensen, Nature, 468, 906 (2010), and Thesis by M. Buchanan, Nature Physics, 7, 95 (2011).

[16] V. Vitelli, *Attenuation of shear sound waves in jammed solids*, **Soft Matter** *6*, 3007–3012 (2010), eprint: 1009.1541.

[15] A. M. Turner, V. Vitelli, and D. R. Nelson, *Vortices on curved surfaces*, **Rev. Mod. Phys.** *82*, 1301–1348 (2010).

[14] N. Xu, V. Vitelli, A. J. Liu, and S. R. Nagel, *Anharmonic and quasi-localized vibrations in jammed solids—modes for mechanical failure*, **EPL (Europhysics Letters)** *90*, 56001 (2010), eprint: 0909.3701.

[13] V. Vitelli, N. Xu, M. Wyart, A. J. Liu, and S. R. Nagel, *Heat transport in model jammed solids*, **Phys. Rev. E** *81*, 021301 (2010), eprint: 0908.2176.

[12] R. D. Kamien, D. R. Nelson, C. D. Santangelo, and V. Vitelli, *Extrinsic curvature, geometric optics, and lamellar order on curved substrates*, **Phys. Rev. E** *80*, 051703 (2009), eprint: 0908.4358.

[11] V. Vitelli, B. Jain, and R. D. Kamien, *Topological defects in gravitational lensing shear fields*, **Journal of Cosmology and Astroparticle Physics** *2009*, 034 (2009), eprint: 0906.0124.

[10] N. Xu, V. Vitelli, M. Wyart, A. J. Liu, and S. R. Nagel, *Energy transport in jammed sphere packings*, **Phys. Rev. Lett.** *102*, 038001 (2009), eprint: 0806.3265.

[9] A. Fernández-Nieves, V. Vitelli, A. S. Utada, D. R. Link, M. Márquez, D. R. Nelson, and D. A. Weitz, *Novel defect structures in nematic liquid crystal shells*, **Phys. Rev. Lett.** *99*, 157801 (2007), Cover.

[8] A. Hexemer, V. Vitelli, E. J. Kramer, and G. H. Fredrickson, *Monte carlo study of crystalline order and defects on weakly curved surfaces*, **Phys. Rev. E** *76*, 051604 (2007).

[7] C. D. Santangelo, V. Vitelli, R. D. Kamien, and D. R. Nelson, *Geometric theory of columnar phases on curved substrates*, **Phys. Rev. Lett.** *99*, 017801 (2007), eprint: cond-mat/0703206, Editors' Suggestion.

[6] V. Vitelli, J. B. Lucks, and D. R. Nelson, *Crystallography on curved surfaces*, **Proceedings of the National Academy of Sciences** *103*, 12323–12328 (2006), eprint: cond-mat/0604203.

[5] V. Vitelli and D. R. Nelson, *Nematic textures in spherical shells*, **Phys. Rev. E** *74*, 021711 (2006), eprint: cond-mat/0604293.

[4] V. Vitelli and A. M. Turner, *Anomalous coupling between topological defects and curvature*, **Phys. Rev. Lett.** *93*, 215301 (2004), eprint: cond-mat/0406329.

[3] V. Vitelli and D. R. Nelson, *Defect generation and deconfinement on corrugated topographies*, **Phys. Rev. E** *70*, 051105 (2004), eprint: cond-mat/0406328.

[2] M. B. Plenio and V. Vitelli, *The physics of forgetting: landauer's erasure principle and information theory*, **Contemporary Physics** *42*, 25–60 (2001), eprint: quant-ph/0103108, Cover.

[1] M. P. Blencowe and V. Vitelli, *Universal quantum limits on single-channel information, entropy, and heat flow*, **Phys. Rev. A** *62*, 052104 (2000), eprint: quant-ph/0001007.