

Vincenzo Vitelli

Curriculum Vitae

Instituut-Lorentz
Universiteit Leiden
Postbus 9506, 2300 RA
Leiden, The Netherlands
+31-71-527-5501
vitelli@lorentz.leidenuniv.nl
<http://www.ilorentz.org/~vitelli>

Education

Harvard University,

PhD in Physics, September 2000 - June 2006.

Thesis advisor: David R. Nelson

Thesis title: Crystals, Liquid Crystals and Superfluid He on Curved Surfaces.

Massachusetts Institute of Technology,

Visiting Undergraduate Student, Fall 1999.

Imperial College London,

Bsc in Theoretical Physics, First Class Honours, October 1997 - July 2000.

Professional Experience

Instituut-Lorentz, Leiden University,

Assistant Professor, 2010 - .

Weizmann Institute,

Feinberg Foundation Fellow , 2009 .

Université Paris VII - ESPCI,

Professeur Invité 2009 .

University of Pennsylvania,

Post-doctoral Fellow, 2006 - 2009 .

Harvard University,

Research Assistant, 2001-2006.

Awards

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).

Invited Talks and Colloquia

The Fate of the Sonic Vacuum, Physics Colloquium, Utrecht, 27-05-2011.

The fate of the sonic vacuum, Trends in Theory, Dalfsen, 20-05-2011.

From Soft Matter to Dark Matter: the Statistical Physics of Lensing, Theoretical Physics Colloquium, UvA, Amsterdam, 12-09-2010.

Frustrated Crystal and Liquid Crystal Order in Complex Geometries, Complexity and Patterns Meeting, Enschede, 16-10-2010.

From Soft Matter to Dark Matter: the Statistical Physics of Lensing, Colloquium Ehrenfestii, Leiden, 03-10-2010.

Energy Propagation and Localization in Jammed Sphere Packings, Euromech, Lisbon, 09-09-2009.

Heat conduction in amorphous solids, Physics Colloquium, McGill, Montreal, 03-12-2009.

Heat conduction in amorphous solids, Physics Colloquium, Brandeis, Waltham, 02-26-2009.

Columnar and crystalline monolayers on curved substrates, APS March Meeting, New Orleans, 03-10-2008.

The mixed character of the jamming transition, Statistical Physics Conference 23, Genoa, 07-13-2007.

Energy transport in model jammed systems, Granular physics and colloids conference, Naples, 07-05-2007.

Contributed Talks

The Fate of the Sonic Vacuum, Nonlinear response of soft matter workshop, Konstanz, 02-29-2011.

Heat conduction in amorphous solids, American Physical Society Meeting, Pittsburgh, 03-18-2009.

Energy transport in jammed sphere packings, 99 Statistical Mechanics Conference, Rutgers University, 05-12-2008.

Energy transport in model jammed systems, XI International Workshop on Complex Systems, Andalo, 03-19-2008.

Columnar order on curved substrates, Frontiers in Condensed Matter Physics, Aspen, 02-07-2008.

Crystallography on a curved substrate, American Physical Society Meeting, Denver, 03-07-2007.

Liquid Crystal Order on Curved Substrates, International Liquid Crystal Conference, Keystone, 07-04-2006.

Nematic Double Emulsions, New England Complex Fluids Workgroup, Harvard, 12-15-2005.

Seminars

The fate of the Sonic Vacuum, Forschungszentrum, Juelich, 21-07-2011.

The fate of the Sonic Vacuum, Casimir School, Delft, 25-05-2011.

The fate of the Sonic Vacuum, University of Pennsylvania, 16-05-2011.

The fate of the Sonic Vacuum, University of Chicago, 09-05-2011.

The fate of the Sonic Vacuum, New York University, 04-05-2011.

Non linear sound in amorphous solids, California institute of Technology, 26-04-2011.

Non linear sound in amorphous solids, University of California San Diego, 25-04-2011.

Frustrated crystal and liquid crystal order, University of Twente, 11-04-2011.

The Fate of the Sonic Vacuum, University of Eindhoven, 02-11-2011.

Can one hear the shape of a jammed solid?, University of Twente, 20-08-2010.

Sound Attenuation in Jammed Solids, Soft Matter Day, Wageningen, 14-04-2010.

The stochastic geometry of the cosmic shear, Weizmann Institute, 14-12-2009.

Columnar order on a curved substrate, Hebrew University of Jerusalem, 25-11-2009.

Energy transport, localization and anharmonicity in model amorphous solids, Technion, Haifa, 14-11-2009.

Energy transport, localization and anharmonicity in model amorphous solids, Weizmann Institute, 04-11-2009.

Heat transport, localization and anharmonicity in model amorphous solids, Tel Aviv University, 02-11-2009.

Energy transport, localization and anharmonicity in model amorphous solids, Université Paris VI, 12-10-2009.

Energy transport, localization and anharmonicity in model amorphous solids, ESPCI, Paris, 12-10-2009.

Heat transport, localization and anharmonicity in model amorphous solids, Université Lyon I , 07-10-2009.

Heat conduction in amorphous solids, University of North Carolina, Chapel Hill, 12-02-2009.

Heat conduction in amorphous solids, MRSEC talk, UPenn, Philadelphia, 06-02-2009.

Heat conduction in amorphous solids, University of California Santa Barbara, Santa Barbara, 29-01-2009.

Heat conduction in amorphous solids, California Institute of Technology, Pasadena, 23-01-2009.

Heat conduction in amorphous solids, University of California Los Angeles, Los Angeles, 12-01-2009.

Condensed matter order on curved surfaces: concepts and methods, Aspen Center of Physics, 06-25-2008.

Energy transport in amorphous solids, Georgia Institute of Technology, Atlanta, 06-03-2008.

Energy transport in amorphous solids, Lorentz Institute, Leiden, 05-07-2008.

Crystallography on Curved Substrates, Condensed Matter Seminar, Syracuse University, 11-17-2006.

Crystallography on Curved Substrates, MRSEC Chalk Talk, University of Pennsylvania, 06-02-2006.

Crystallography on Curved Substrates, Material Research Lab Seminars, Santa Barbara, 05-15-2006.

Crystallography on Curved Substrates, Condensed Matter Theory Group Meeting, Boston University, 01-26-2006.

Condensed matter order on a curved surface, Widely Applied Math Seminar, DEAS, Harvard, 10-05-2005.

Theory of topological defects in curved space, Condensed Matter Seminar, MIT, 04-13-2005.

Theory of topological defects in curved space, Condensed Matter Seminar, UPenn, 01-18-2005.

Theory of liquid crystals textures on curved substrates, Theoretical Chemistry Seminar, Cornell, 12-05-2004.

Defect textures in thin films on a curved surface, Condensed Matter Seminar, Syracuse University, 10-15-2004.

Interaction between topological defects and curvature, Nanophysics Seminar, Dartmouth College, 04-29-2004.

Poster Presentations

A geometric theory of columnar phases on a curved substrate, Institute for Mathematics and its Applications, Minneapolis, 07-21-2008.

Energy transport in model jammed systems, Frontiers in Condensed Matter Physics, Aspen, 02-06-2008.

Energy transport in model jammed systems, Statistical Physics 23, Genoa, 07-2007.

Defect generation and deconfinement on corrugated topographies, Gordon Conference, New London, June 2006.

Colloids and Order on curved surfaces, Frontiers in Materials and Nanoscience conference, Harvard, 05-20-2005.

Aspects of curved space crystallography, Bioengineering and Medicine conference, Harvard, 04-27-2005.

Defect generation and deconfinement on corrugated topographies, APS Meeting, Montreal, 03-24-2004.

Professional Activities

Referee for Physical Review Letters, Nature 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, Reviews of Modern Physics, Philosophical Magazine, Physica A, Proceedings of the National Academy of Sciences.

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

Grant Reviewer for the Netherlands Foundation for Fundamental Research (FOM) and the German Research Foundation (DFG).

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

Co-organizer, Statistical Physics and Theoretical Condensed Matter School, DRSTP, Utrecht, 19-03-2012.

Co-organizer, 21st 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.

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.

Teaching Experience

Lecturer, **Statistical Physics**, Leiden University, Fall 2011.

Lecturer, **Renormalization Group Methods**, Delta Institute for Theoretical Physics, Spring 2011.

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

Lecturer, **Geometry and Elasticity**, 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.

Grants

FOM Project Grant, *From soft matter to dark matter: the statistical physics of lensing*, **392,000 Euro** awarded by the Netherlands Foundation for Fundamental Research (FOM) in 2010.

Current Group Members

Postdoctoral Fellows: Dr. Leopoldo Gomez and Dr. Stephan Ulrich.

PhD students: Nitin Upadhyaya, Thomas Beuman and Vinzenz Koning.

Master thesis student: Svilen Khozuharov, Alexander Tichler, Bas van Opheusden and Frans Coppens.

Publications

- 1) L. Gomez, A. Turner, M. van Hecke, V. Vitelli, *Shocks near Jamming*, arXiv:1108.5688, under review in **PRL**.
- 2) N. Upadhyaya and V. Vitelli, *Quantum buckling*, **Phys. Rev. E Rapid**, 84, 040601(R), (2011).
- 3) T. Lopez Leon, V. Koning, V. Vitelli, A. Fernandez Nieves, *Frustrated Nematic Order in Spherical Geometries*, **Nature Physics**, 7, 391 (2011).
- 4) W. Irvine, V. Vitelli, P. Chaikin, *Pleats in Crystals on Curved Surfaces*, **Nature**, 468, 947 (2010).
See *News and Views* by F. Stellacci and A. Mortensen, **Nature**, 468, 906 (2010).
See *Thesis* by M. Buchanan, **Nature Physics**, 7, 95 (2011).
- 5) V. Vitelli, *Attenuation of shear sound waves in jammed solids*, **Soft Matter**, 6, 3007 (2010).
- 6) N. Xu, V. Vitelli, A. J. Liu, S. R. Nagel, *Anharmonic and quasi-localized vibrations in jammed solids - modes for mechanical failure*, **Europhys. Lett.** 90, 56001 (2010).
- 7) V. Vitelli, N. Xu, M. Wyart, A. J. Liu, S. R. Nagel, *Heat transport in model jammed solids*, **Phys. Rev. E** 81, 021301 (2010).
- 8) A. M. Turner, V. Vitelli and D. R. Nelson, *Vortices on Curved Substrates*, **Rev. Mod. Phys.** 82, 1301 (2010).
- 9) R. D. Kamien, D. R. Nelson, C. Santangelo and V. Vitelli. *Extrinsic Curvature, Geometric Optics, and Lamellar Order on Curved Substrates*, **Phys. Rev. E** 80, 051703 (2009).
- 10) V. Vitelli, B. Jain, R. D. Kamien, *Topological Defects in Gravitational Lensing Shear Fields*, **J. Cosmol. Astropart. Phys.** 09034 (2009).
- 11) N. Xu, V. Vitelli, M. Wyart, A. J. Liu, S. R. Nagel, *Energy transport in jammed sphere packings*, **Phys. Rev. Lett.** 102, 038001 (2009).
- 12) A. Fernandez-Nieves, V. Vitelli, A. Utada, D. R. Link, D. R. Nelson and D. A. Weitz, *Novel defect structures in nematic shells*, **Phys. Rev. Lett.** 99, 157801 (2007). **Cover**.
- 13) A. Hexemer, V. Vitelli, E. J. Kramer and G. H. Fredrickson, *A Monte Carlo study of crystalline order and defects on weakly curved surfaces*, **Phys. Rev. E** 76, 051604 (2007)
- 14) C. Santangelo, V. Vitelli, R. D. Kamien and D. R. Nelson, *A geometric theory of columnar phases on a curved substrate*, **Phys. Rev. Lett.** 99, 017801 (2007). **Editors' Suggestion**.
- 15) V. Vitelli, J. B. Lucks and D. R. Nelson, *Crystallography on a curved substrate*, **Proc. Natl. Acad. Sci. USA** 103, 12323 (2006). (*Selected for "In this Issue" choice of PNAS.*)
- 16) V. Vitelli and D. R. Nelson, *Nematic textures in spherical shells*, **Phys. Rev. E** 74, 021711, (2006).
- 17) V. Vitelli and A. Turner, *Anomalous coupling between topological defects and curvature*, **Phys. Rev. Lett.** 93, 215301 (2004).
- 18) V. Vitelli and D.R. Nelson, *Defect generation and deconfinement on corrugated topographies*, **Phys. Rev. E** 70, 051105 (2004).
- 19) M. B. Plenio and V. Vitelli, *The physics of forgetting: Landauer's erasure principle and information theory*, **Contemporary Physics** 42, 25 (2001). **Cover**.
- 20) M. P. Blencowe and V. Vitelli, *Universal quantum limits on single-channel information, entropy and heat flow*, **Phys. Rev. A** 62, 052104 (2000).