

ALLEGATO B

UNIVERSITÀ DEGLI STUDI DI MILANO

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[Lorenzo Zanelli] CURRICULUM VITAE

INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)

COGNOME	ZANELLI
NOME	LORENZO
DATA DI NASCITA	[02, 05, 1979]

Data

16/03/2021

Luogo

Padova

Lorenzo Zanelli - Curriculum Vitae

PERSONAL DATA

- ◇ Italian citizenship.
 - ◇ Born: 02/05/1979, Brescia (BS), Italy.
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PROFESSIONAL ADDRESS

- ◇ Department of Mathematics “Tullio Levi-Civita”, University of Padova.
Via Trieste 63, cap 35131, Padova (Italy).
Office 431.
 - ◇ Email: ljanelli@math.unipd.it
 - ◇ Web page: <http://www.math.unipd.it/~ljanelli/home.html>
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EDUCATION

- ◇ Master Degree in Physics 110/110 Cum Laude, 13/10/2003,
University of Padova.
 - ◇ PhD in Mathematics, 03/04/2007, University of Padova.
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PROFESSIONAL ACTIVITY

- ◇ October 2018 - October 2021: RTDA.
Department of Mathematics, University of Padova.
 - ◇ June 2018 – July 2018 (2 months): Research contract,
Department of Mathematics, University of Padova.
 - ◇ May 2016 – April 2018 (24 months): Postdoc position,
Department of Mathematics, University of Padova.
 - ◇ May 2015 – April 2016 (12 months): Research contract,
Department of Industrial Engineering, University of Padova.
 - ◇ October 2013 – September 2014 (12 months): Postdoc position,
Department of Mathematics, University of Padova.
 - ◇ May 2013 – September 2013 (5 months): Research contract,
Ecole Normale Supérieure, 45 - rue d'Ulm, Paris.
 - ◇ November 2012 – April 2013 (6 months): Research contract,
CMLS, Ecole Polytechnique, Palaiseau.
 - ◇ October 2012 – November 2012 (1 month): Research contract,
Ecole Normale Supérieure, 45 - rue d'Ulm, Paris.
 - ◇ February 2012 – July 2012 (6 months): Visiting position,
CMLS, Ecole Polytechnique, Palaiseau.
 - ◇ October 2010 – September 2012 (2 years): Postdoc position,
Department of Mathematics, University of Bologna.
 - ◇ October 2008 – September 2010 (2 years): Postdoc position,
Department of Mathematics, University of Bologna.
 - ◇ February – May 2008 (4 months): Research contract,
Department of Mathematics, University of Padova.
 - ◇ January 2007 - December 2007 : Research contract,
Department of Mathematics, University of Padova.
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RESEARCH ACTIVITY

Phase space Analysis of Wick operators

- ◇ Many body operators on Bargmann space and related mean field asymptotics
- ◇ Anti-Wick operators and invariant measures for DNLS

The semiclassical Analysis of periodic Schrödinger operators.

- ◇ Inverse spectral problem for periodic Schrödinger operators and Homogenization theory.
- ◇ The Schrödinger spectra of Schrödinger operators on the flat torus and the effective Hamiltonian of the weak KAM theory. On the generalization of the Bohr-Sommerfeld quantization rules beyond integrable and quasi-integrable settings.
- ◇ The microlocal study (i.e. Wigner transform, FBI transform, semiclassical Wave Front Set) of quasimodes and eigenfunctions for Schrödinger operators on the flat torus. Quasimodes and eigenfunctions associated to flow invariant and Action minimizing measures, Mather sets, Aubry sets and the graph of weak KAM solutions of the stationary Hamilton-Jacobi equation.
- ◇ Optimal transport theory and semiclassical measures. The study of optimal transference plans of probability measures given by the canonical projection on the flat torus of the time dependent semiclassical measures linked to Schrödinger's evolutive problems.

Global FIO and Schrödinger's equation.

- ◇ The Schrödinger's propagator written as a semiclassical series of global Fourier Integral Operators.
- ◇ Multivalued WKB semiclassical approximations outside resonant times.

Symplectic geometry.

- ◇ Global generating functions weakly quadratic at infinity for the graph of Hamiltonian flows in non-compact settings and related equivalence results.
 - ◇ The Minimax solutions of evolutive Hamilton-Jacobi equations for non-compact settings.
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PREPRINTS AND PUBLICATIONS

- 21. L. Zanelli: *Hamilton-Jacobi homogenization and the isospectral problem*.
Preprint at <http://www.math.unipd.it/~lzanelli/home.html>
Submitted to Minimax Theory and its Applications.
- 20. L. Zanelli: *Mean Field asymptotics and invariant measures for discrete NLS equation*.
Preprint at <http://www.math.unipd.it/~lzanelli/home.html>
Submitted to SIAM Journal on Mathematical Analysis.
- 19. L. Zanelli, F. Mandreoli, F. Cardin: *A weak KAM approach to the periodic stationary Hartree equation*.
Preprint at <http://www.math.unipd.it/~lzanelli/home.html>
Submitted to Nonlinear Differential Equations and Applications.
- 18. E. Picari, A. Ponno, L. Zanelli: *Mean Field derivation of DNLS from the Bose-Hubbard model*.
Preprint at <http://www.math.unipd.it/~lzanelli/home.html>
To appear on Annales Henri Poincaré.
- 17. *Periodic coherent states decomposition and quantum dynamics on the flat torus*. Proceedings of IWOTA 2019 - International Workshop on Operator Theory and its Applications. Operator Theory: Advances and Applications, Birkhäuser.
- 16. A. Parmeggiani, L. Zanelli: *An exact version of the Egorov Theorem for Schrödinger operators in $L^2(\mathbb{T})$* . Journal of Fourier Analysis and Applications, (2019) 25:1759–1781.
- 15. L. Zanelli, A. Montanaro, E.L. Carniel, P.G. Pavan, A. Natali. On the determination of constitutive parameters in a hyperelastic model for a soft tissue. Russian Journal of Biomechanics, vol. 22, p. 95-117 (2018)
- 14. F. Cardin, L. Zanelli: *The semiclassical Wave Front Set for Schrödinger eigenfunctions on the torus*.
Mathematical Physics, Analysis and Geometry, online first 11 march 2017, June 2017, 20:10.
- 13. L. Zanelli, S. Todros, E.L. Carniel, P.G. Pavan, A.N. Natali: *Mechanical properties variation and constitutive modelling of biomedical polymers*. Acta of Bioengineering and Biomechanics, Vol. 19, N. 3 (2017)

12. L. Zanelli, A. Montanaro, E.L. Carniel, P.G. Pavan, A.N. Natali: *The study of equivalent material parameters in a hyperelastic model*. International Journal of Non-Linear Mechanics, Volume 89, March 2017, pp 142–150.
11. L. Zanelli: *Schrödinger spectra and the effective Hamiltonian of the weak KAM theory on the flat torus*. J. Math. Phys. 57 (2016), no. 8, 081507, 12 pp.
10. L. Zanelli: *On the optimal transport of semiclassical measures*. Applied Mathematics and Optimization, Appl. Math. Optim. 74 (2016), no. 2, 325–342.
9. T. Paul, L. Zanelli: *On the dynamics of WKB wave functions whose phase are weak KAM solutions of H-J equation*. Journal of Fourier Analysis and Applications, Vol. 20, Issue 6, pp 1291-1327 (2014).
8. A. Parmeggiani, L. Zanelli: *Wigner measures supported on weak KAM tori*. Journal D'Analyse Mathématique, Vol. 123, Issue 1, pp 107-137 (2014).
7. L. Zanelli: *Mather measures in semiclassical Analysis*. Hyperbolic problems: theory, numerics, applications, 1059–1066, AIMS Ser. Appl. Math., 8, Am. Inst. Math. Sci. (AIMS), Springfield, MO, 2014.
6. O. Bernardi, A. Parmeggiani, L. Zanelli: *Mather measures associated with a class of Bloch wave functions*. Annales Henri Poincaré. Volume 13, Issue 8 (2012), Page 1807-1839.
5. S. Graffi, L. Zanelli: *The geometric approach to the Hamilton-Jacobi equation and global parametrices for the Schrödinger propagator*. Reviews in Mathematical Physics, vol. 23, issue 9, 969-1008, 2011.
4. S. Graffi, L. Zanelli: *Global parametrices for the Schrödinger equation and geometric approach to the Hamilton-Jacobi equation*. Rendiconti Lincei Matematica e Applicazioni, n. 22, 17-28, 2011.
3. P. Guiotto, L. Zanelli: *The Geometry of Generating Functions for a class of Hamiltonian flows in the non compact case*, Journal of Geometry and Physics, vol. 60, 1381-1401, 2010.
2. O. Bernardi, M. Guzzo, F. Cardin, L. Zanelli: *A PDE approach to finite time indicators in Ergodic Theory*, Journal of Nonlinear Mathematical Physics, vol. 16, issue 2, 195-206, 2009.
1. P. Guiotto, F. Cardin, L. Zanelli: *Integral Representations of the Schrödinger Propagator*, Reports on Mathematical Physics, vol. 62, issue 1, 19-56, 2008.

LECTURE NOTES

- ◇ L. Zanelli: *Lecture Notes on Fourier Integral Operators: from local to global theory*. Mathematical Physics Preprint Archive: 12-144.
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REFeree REPORTS

- ◇ Journal of Mathematical Physics
 - ◇ Journal of Physics A: Mathematical and Theoretical
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REVIEWS

- ◇ Mathematical Reviews - American Mathematical Society
 - ◇ Zentralblatt MATH
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ORGANIZATION OF WORKSHOPS

- School-Workshop “Recent advances in Hamiltonian dynamics and symplectic topology” 12-16 feb. 2018, Department of Mathematics “Tullio Levi-Civita” University of Padova.
Web page <http://events.math.unipd.it/hamschool2018>
 - 63ème Colloque International de Théories Variationnelles (CITV) 30 June – 5 July, 2019, Arpino, Italy
Web page <http://www.memocsevents.eu/wordpress/cossevita/souriau-colloquium/>
 - Workshop “A Thermodynamics Day”, 21 october 2019, Department of Mathematics “Tullio Levi-Civita” University of Padova.
Web page <https://events.math.unipd.it/ThermodynamicsDay/>
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FUNDINGS

- ◇ 2016: My Research Project “*Periodic Schrödinger operators and weak KAM theory*” has been financed by GNFM (National Group of Mathematical Physics) within the program “Progetto Giovani”.

- ◇ 2014: I participated to the Research Project “*weak KAM theory: dynamical aspects and applications*” financed by GNFM (National Group of Mathematical Physics) within the program “Progetto Giovani”.
 - ◇ 2012: I have received a financing by the “Marco Polo Program” of the Bologna University, in order to spend a 6 months visiting period at the Centre de Mathématiques Laurent Schwartz, École Polytechnique, Palaiseau.
 - ◇ 2008-2010, I participated to the PRIN Research Project “*Confronto qualitativo e quantitativo fra l’evoluzione classica e quella quantistica in dinamica molecolare*”.
 - ◇ 2008: I participated to the Research Project “*Tecniche Variazionali e Pde in topologia simplettica e applicazioni fisico-matematiche*” financed by GNFM (National Group of Mathematical Physics) within the program “Progetto Giovani”.
 - ◇ 2007: My Research Project “*Global representations of the Schrödinger Propagator*” has been financed by GNFM (National Group of Mathematical Physics) within the program “Progetto Giovani”.
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MEETINGS

- ◇ Conference Microlocal and Global Analysis, Interactions with Geometry University of Potsdam, February 15 - 19, 2021. Title of the Talk: *Mean Field asymptotics for Wick operators on Bargmann space*.
- ◇ Conference Microlocal and Global Analysis, Interactions with Geometry University of Potsdam, February 10 - 14, 2020. Title of the Talk: *Semiclassical estimates for eigenfunctions of toroidal Pseudodifferential operators*.
- ◇ Workshop Special Functions and Semi-Classical Approximation, 4 - 6 February 2020, CIRM Marseille. Title of the Talk: *Isospectrality and symplectic homogenization for periodic Schrödinger operators*.
- ◇ Workshop Asymptotic Analysis and Spectral Theory, University Paris-Sud, Orsay, september 30–october 4, 2019. Title of the Talk: *Isospectrality and symplectic homogenization for Schrödinger operators*.
- ◇ XXVIII International Fall Workshop on Geometry and Physics, Institute for the Mathematical Sciences (ICMAT), Madrid, September 2 - 6, 2019. Title of the Talk: *The Schroedinger spectral problem and weak KAM theory*.

- ◇ 30th International Workshop on Operator Theory and its Applications (July 22-26, 2019 Instituto Superior Tecnico, Lisbon). Title of the Talk: *Periodic coherent states decomposition and quantum dynamics on the flat torus.*
- ◇ Communication at the Workshop Assemblea Scientifica GNFM 2018, Montecatini Terme, 04 - 06 october 2018. Title of the Talk: *Inverse spectral problem of periodic Schrödinger operators.*
- ◇ Workshop Mathematical Challenges in Quantum Mechanics, University Roma Sapienza, February 19-24, 2018. Title of the Talk: *An homogenization approach for the inverse spectral problem of periodic Schrödinger operators.*
- ◇ XVII Italian Meeting on Hyperbolic Equations, University of Pavia, 06 - 08 september 2017. Title of the Talk: *Schrödinger dynamics and optimal transport problems.*
- ◇ Workshop Assemblea Scientifica GNFM 2017, Montecatini Terme, 04 - 06 may 2017. Title of the **Invited Talk**: *Schrödinger spectra and the effective Hamiltonian of the weak KAM theory.*
- ◇ Workshop Assemblea Scientifica GNFM 2015, Montecatini Terme, 22 - 24 october 2015. Title of the Communication: *Schroedinger dynamics and optimal transport of measures on the torus.*
- ◇ Workshop Problemi attuali in teoria dei Sistemi Dinamici, Department of Mathematics, Milano-Bicocca University, 22 - 23 may 2014. Title of the **Invited Talk**: *On the dynamics of WKB wave functions whose phase are weak KAM solutions of H-J equation.*
- ◇ Workshop Assemblea Scientifica GNFM 2014, Montecatini Terme, 15 - 17 may 2014. Title of the Talk: *On the localization of the semiclassical Wave Front Set for Schroedinger eigenfunctions on the flat torus.*
- ◇ Workshop Assemblea Scientifica GNFM 2012, Montecatini Terme, 4 - 6 october 2012. Title of the Talk: *Wigner measures supported on weak KAM tori.*
- ◇ 14 th International Conference on Hyperbolic Problems: Theory, Numerics and Applications, Padova, 24 - 29 june 2012. Title of the Talk: *Mather measures in semiclassical Analysis.*
- ◇ Workshop Mathematical Methods in Quantum Mechanics, Bressanone, 14 - 19 february 2011. Title of the Talk: *Global Fourier Integral Operators and quantum dynamics.*

- ◇ Workshop “Classical and weak KAM theorem: the Aubry-Mather sets, a break-through in the study of dynamical systems” Montegrotto 14-19 febbraio 2010. Title of the Talk: *The Geometry of Generating Functions for a class of Hamiltonian flows in the non compact case.*
 - ◇ Workshop Assemblea Scientifica GNFM 2007, Montecatini Terme, 11–13 october 2007. Title of the Talk: *Rappresentazioni Globali del Propagatore di Schrödinger.*
 - ◇ Workshop Mathematical Modeling, Mechanics and Materials, Bressanone, 19 marzo 2007. Title of the Talk: *On the Evolution Operator of the Fokker-Planck equation.*
 - ◇ Workshop Mathematical Methods in Quantum Mechanics, Bressanone, 26 february - 3 march 2007. Title of the Talk: *The Schrödinger Propagator.*
 - ◇ Workshop Problemi Matematici in Meccanica Quantistica, Università di Modena, 05-07 october 2006. Title of the Talk: *Integral representations of the Schrödinger Propagator.*
 - ◇ Workshop Mathematical Problems in Quantum Mechanics, Università di Modena, 19-21 december 2003. Title of the Talk: *Rappresentazione Integrale Finita Esatta del Propagatore di Schrödinger e di Fokker Planck.*
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SEMINARS

- ◇ Dipartimento di Matematica, Università di Padova, 29 sept. 2016. Title of the Seminar: *Il problema spettrale di Schrödinger ed il legame con la teoria KAM debole.*
- ◇ Dipartimento di Matematica, Università di Padova, 03 may 2014. Title of the Seminar: *On the localization of the semiclassical Wave Front Set for Schrödinger eigenfunctions on the flat torus.*
- ◇ Henri Poincaré Institute, Paris, 16 november 2012. **Invited Talk** at Séminaire “Symplectix” series. Title of the Seminar: *Some applications of the Aubry-Mather theory in semiclassical Analysis.*
- ◇ Summer School of Mathematical Physics, Ravello, 25 september 2012. Title of the Seminar: *Schrödinger dynamics and geometrical solutions of Hamilton-Jacobi equation.*
- ◇ Dipartimento di Matematica, Università di Padova, 13 december 2011. Title of the Seminar: *The weak KAM theory in semiclassical Analysis.*

- ◇ Dipartimento di Matematica, Università di Bologna, 23 november 2009. Title of the Seminar: *Operatori Integrali di Fourier globali e Propagatore di Schrödinger*.
 - ◇ Dipartimento di Matematica, Università di Bologna, 29 september 2008. Title of the Seminar: *Funzioni generatrici quadratiche all'infinito di flussi Hamiltoniani*.
 - ◇ Dipartimento di Matematica, Università di Padova, 17 january 2007. Title of the Seminar: *Rappresentazioni Integrali del Propagatore di Schrödinger*.
 - ◇ Dipartimento di Fisica, Università di Roma III, 24 june 2005. Title of the Seminar: *Rappresentazione integrale finita-esatta del propagatore di Schrödinger*.
 - ◇ Summer School of Mathematical Physics, Ravello, 21 september 2005. Title of the Seminar: *Forze di Contatto e di Bulk*
 - ◇ Summer School of Mathematical Physics, Ravello, 14 september 2004. Title of the Seminar: *A lower bound for Von Karman Energy Functional*.
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TEACHING

- ◇ Rational Mechanics, master degree course of Aerospace Engineering, a.a. 2020/21, Dept. of Industrial Engineering, University of Padova.
- ◇ Analysis 1, master degree course of Energy Engineering, a.a. 2020/21, Dept. of Industrial Engineering, University of Padova.
- ◇ Rational Mechanics, master degree course of Aerospace Engineering, a.a. 2019/20, Dept. of Industrial Engineering, University of Padova.
- ◇ Analysis 1, master degree course of Energy Engineering, a.a. 2019/20, Dept. of Industrial Engineering, University of Padova.
- ◇ Rational Mechanics, master degree course of Aerospace Engineering, a.a. 2018/19, Dept. of Industrial Engineering, University of Padova.
- ◇ Analysis 1, master degree course of Energy Engineering, a.a. 2018/19, Dept. of Industrial Engineering, University of Padova.
- ◇ Rational Mechanics, master degree course of Mechanical Engineering, a.a. 2017/18, Dept. of Industrial Engineering, University of Padova.

- ◇ Rational Mechanics, master degree course of Aerospace Engineering, a.a. 2016/17, Dept. of Industrial Engineering, University of Padova.
- ◇ Rational Mechanics, master degree course of Mechanical Engineering, a.a. 2016/17, Dept. of Industrial Engineering, University of Padova.
- ◇ Mathematical Physics, master degree course, a.a. 2015/16, Department of Mathematics, University of Padova.
- ◇ Rational Mechanics, master degree course of Aerospace Engineering, a.a. 2015/16, Dept. of Industrial Engineering, University of Padova.
- ◇ Rational Mechanics, master degree course of Mechanical Engineering, a.a. 2015/16, Dept. of Industrial Engineering, University of Padova.
- ◇ Analysis, summer course 2014 held in Bressanone (15 hours, first week) organized by University of Padova.
- ◇ Mathematical Physics, master degree course, a.a. 2010/11, Department of Mathematics, University of Bologna.
- ◇ Analysis 1, master degree course, a.a. 2009/10, Department of Chemistry, University of Bologna.
- ◇ Analysis 1, master degree course, a.a. 2007/08, Department of Biotechnology, University of Padova.
- ◇ Analysis 2, master degree course, a.a. 2006/07, Department of Statistics, University of Padova.
- ◇ Analysis 1, master degree course, a.a. 2005/06, Department of Physics, University of Padova.
- ◇ Mathematical Physics, master degree course, a.a. 2005/06, Department of Mathematics, University of Padova.

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