

ALLEGATO B

UNIVERSITÀ DEGLI STUDI DI MILANO

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Riccardo Rota

CURRICULUM VITAE

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

COGNOME	ROTA
NOME	RICCARDO
DATA DI NASCITA	21 LUGLIO 1982

WORK POSITIONS

Postdoctoral researcher <i>École Polytechnique Fédérale de Lausanne</i>	January 2018 - present <i>Lausanne, Switzerland</i>
Postdoctoral researcher <i>Université Paris Diderot - Paris 7</i>	January 2015 - December 2017 <i>Paris, France</i>
Postdoctoral researcher <i>Università degli Studi di Trento and INO-CNR BEC Center</i>	January 2012 - January 2015 <i>Trento, Italy</i>

EDUCATION

Ph. D. in Applied and Computational Physics <i>at Universitat Politècnica de Catalunya</i>	2007 - 2011 <i>Barcelona, Spain</i>
Graduation Date: 20 th December 2011	
Thesis title: Path Integral Monte Carlo and Bose-Einstein condensation in quantum fluids and solids	
PhD Tutor: Prof. J. Boronat	
Degree: excellent cum laude	
M. Sc. in Physics (<i>Laurea Magistrale in Fisica</i>) <i>at Università degli Studi di Milano</i>	2004 - 2007 <i>Milan, Italy</i>
Graduation Date: 23 rd April 2007	
Thesis title: <i>Studio di grain boundaries in sistemi di ⁴He solido con metodi Quantum Monte Carlo</i> (Study of grain boundaries in solid ⁴ He systems by means of Quantum Monte Carlo methods)	
Supervisors: Dott. D. E. Galli and Prof. L. Reatto	
Degree: 110/110 cum laude	
B. Sc. in Physics (<i>Laurea Triennale in Fisica</i>) <i>at Università degli Studi di Milano</i>	2001 - 2004 <i>Milan, Italy</i>
Graduation date: 15 th December 2004	
Thesis title: <i>Proprietà statiche e dinamiche di un condensato di Bose-Einstein in trappola toroidale</i> (Static and dynamic properties of a Bose-Einstein condensate in a toroidal trap)	
Supervisors: Prof. L. Reatto and Dott. L. Salasnich	
Degree: 110/110 cum laude	

GRANTS AND AWARDS

- **Ph. D. Grant** *UPC-RECERCA* from Universitat Politècnica de Catalunya (2007-2011)

SCIENTIFIC INTERESTS

- Theoretical Condensed Matter Physics
- Quantum many-body theories
- Quantum Optics
- Quantum Monte Carlo methods
- Quantum Information

RESEARCH EXPERIENCE

- Postdoctoral research at École Polytechnique Fédérale de Lausanne, under the supervision of **Prof. Vincenzo Savona** (January 2018 - present).
 - Study of the emergent behavior in open quantum many-body systems, aimed at the proposal of novel quantum simulators.
 - Study of non-classical states of light and matter in photonic systems.
- Postdoctoral research at Université Paris Diderot - Paris 7, under the supervision of **Prof. Cristiano Ciuti** (January 2015 - December 2017).
 - Development and analysis of numerical methods for the study of many-body correlations in open quantum systems.
 - Study of the collective behavior of quantum systems out-of-equilibrium.
- Postdoctoral research at Università degli Studi di Trento and INO-CNR BEC Center, under the supervision of **Prof. Stefano Giorgini** (January 2012 - January 2015).
 - Study of dynamic properties of ultracold gases with Quantum Monte Carlo: analysis of numerical methods for the solution of inverse problems.
 - Study of topological defects in ultracold gases with Quantum Monte Carlo methods.
- Ph. D. research at Universitat Politècnica de Catalunya under the supervision of **Prof. Jordi Boronat** (November 2007 - December 2011)
 - Deep Analysis of Path Integral Monte Carlo (PIMC) methods: Development and optimization of PIMC codes, both at finite and zero temperature.
 - Investigation of superfluidity and Bose-Einstein condensation properties in quantum fluids and solids (liquid helium, solid helium, molecular para-hydrogen).
- Undergraduate research at Università degli Studi di Milano under the supervision of Dott. D.E. Galli and Prof. L. Reatto (July 2006 - April 2007)
 - Study of ^4He crystal presenting grain boundaries by means of Quantum Monte Carlo methods.
- Undergraduate research at Università degli Studi di Milano under the supervision of Dott. L. Salasnich and Prof. L. Reatto (October 2004 - December 2004)
 - Study of a Bose-Einstein condensate with toroidal geometry within the mean-field Gross-Pitaevskij formalism.

LINGUISTIC SKILLS

Mother tongue:

ITALIAN

Other languages(*):	Understanding		Speaking		Writing
	Listening	Reading	Spoken Interaction	Spoken Production	
ENGLISH	C1 Proficient User	C1 Proficient User	C1 Proficient User	C1 Proficient User	C1 Proficient User
SPANISH	C1 Proficient User	C1 Proficient User	C1 Proficient User	C1 Proficient User	C1 Proficient User
FRENCH	B2 Independent User	B2 Independent User	B2 Independent User	B2 Independent User	B2 Independent User

(*) Self-assessment according to Common European Framework of Reference (CEFR) level

COMPUTER AND COMPUTING SKILLS

- Object-oriented programming: Large experience in developing and optimizing codes for scientific computing
- Deep knowledge of Monte Carlo methods: Path Integral Monte Carlo, Variational Monte Carlo, Diffusion and Reptation Monte Carlo, Wave Function Monte Carlo
- Programming languages: Fortran, MatLab, C, C++, Wolfram Mathematica
- Parallel programming: Good knowledge of MPI and OpenMP libraries
- Operating systems: Unix and Linux, Windows, Mac OS X

SCHOOLS AND COURSES

- *Quantum Monte Carlo and the CASINO program*
Cambridge University International Summer School, attended in Vallico Sotto (Italy) from 3rd to 10th August 2008
- *Advanced School on High Performance and Grid Computing*
Abdus Salam International Center for Theoretical Physics, attended in Miramare - Trieste (Italy), from 11th to 22nd April 2011
- *ICAP (International Conference on Atomic Physics) Summer School*
École Normale Supérieure, attended in Paris (France), from 16th to 21st July 2012

CONFERENCES AND SYMPOSIA

- *20th International Conference on Recent Progress in Many-Body Theories*
Toulouse, France, 9th- 13th September 2019
Contributed talk:
Emergent quantum criticality in driven-dissipative cavity arrays
- *Conference on Taming Non-Equilibrium Systems: from Quantum Fluctuation to Decoherence*
Trieste, Italy, 29th July- 1st August 2019
Contributed talk:
Emergent quantum criticality in quadratically driven-dissipative cavity arrays
- *Workshop on Quantum Mixtures*
Trento, Italy, 15th-17th July 2019
- *NCCR "QSIT - Quantum Science and Technology" General meeting*
Arosa, Switzerland, 6th - 8th February 2019
INVITED TALK:
Simulating quantum magnets with quadratically driven photonic lattices
- *Workshop on Quantum Science Implementation*
Benasque, Spain, 24th June - 6th July 2018
INVITED TALK:
Criticalities in dissipative quantum systems: the case of quadratically driven photonic lattices
- *Workshop on Numerical Methods for Open Quantum Systems*
Garching, Germany, 25th- 26th January 2018
- *FisMat2017: Italian National Conference of Physics of Matter*
Trieste, Italy, 1st- 5th October 2017
Contributed talk:
Critical behavior of 2D dissipative spin lattices
- *QFLM2017: Quantum Fluids of Light and Matter*
Cargèse, France, 8th- 12th May 2017
Contributed talk:
Critical behavior of 2D dissipative spin lattices
- *Workshop on Numerical Methods in Quantum Optics*
Madrid, Spain, 26th- 27th January 2017
INVITED TALK:
Dissipative phase transitions in 2D lattices studied via the corner-space renormalization method
- *BEC2016: Quantum Gases and Quantum Coherence*
Salerno, Italy, 31st August - 3rd September 2016
Poster presentation:
Probing photon correlations in the dark sites of geometrically frustrated cavity lattices
- *NEQFLUIDS2016: Classical and Quantum Fluids Out of Equilibrium*
Grenoble, France, 13th- 16th July 2016
Poster presentation:
Probing photon correlations in the dark sites of geometrically frustrated cavity lattices
- *Workshop on quantum simulations and many-body physics with light*
Chania, Greece, 4th- 11th June 2016
Poster presentation:
Probing photon correlations in the dark sites of geometrically frustrated cavity lattices

- *Workshop on advances in transport and response properties of strongly interacting systems*
Trento, Italy, 2nd- 6th May 2016
INVITED TALK:
Quantum Monte Carlo estimation of complex-time correlations for the study of ground-state spectral functions
- *Workshop on numerical methods for open quantum many-body systems*
Wien, Austria, 27th- 28th January 2016
- *IFRAF Meeting on Cold atoms: fundamental concepts and applications*
Paris, France, 5th- 6th November 2015
Poster presentation:
Variational Monte Carlo study of soliton excitations in hard-sphere Bose gases
- *International Winter School and Workshop on Strongly Correlated fluids of light and matter*
Trento, Italy, 12th- 23rd January 2015
- *EXS2014 - Workshop on Probing and Understanding Exotic Superconductors*
Trieste, Italy, 27th- 31st October 2014
Poster presentation:
Variational Monte Carlo study of the effective mass of soliton excitation in a Bose gas
- *BEC2014: Theory of Quantum Gases and Quantum Coherence*
Levico Terme, Italy, 28th- 31st May 2014
- *17th International Conference on Recent Progress in Many-Body Theories*
Rostock, Germany, 8th- 13th September 2013
Poster presentation:
Quantum Monte Carlo study of dynamic properties of ultracold gases
- *INT Program 13-2a: Advances in quantum Monte Carlo techniques for non-relativistic many-body systems*
Seattle, U.S.A., 1st- 12th July 2013
INVITED TALK:
Quantum Monte Carlo study of the dynamic structure factor of Bose hard-sphere systems
- *ICAP 2012: The 23rd International Conference on Atomic Physics*
Palaiseau, France, 23rd- 27th July 2012
Poster presentation:
Bose-Einstein condensation in quantum crystals: the quest of supersolidity
- *BEC2012: Theory of Quantum Gases and Quantum Coherence*
Lyon, France, 5th- 8th June 2012
Poster presentation:
Bose-Einstein condensation in quantum crystals: the quest of supersolidity
- *Supersolidity 2011*
New York, U.S.A., 7th-10th June 2011
Poster presentation:
Onset temperature of Bose-Einstein condensation in incommensurate solid ^4He
- *III Jornadas de Jóvenes Investigadores en Física Atomica y Molecular (III Meeting of Young Researchers in Atomic and Molecular Physics)*
Santiago de Compostela, Spain, 3rd-4th February 2011
Contributed Talk:
A metastable superglass phase in molecular para-hydrogen at low temperature

- *XXVI Mediterranean Scientific Workshop: Correlations in Quantum Gases*
Mahon, Spain, 30th September - 2nd October 2010
- *QFS2010: International Symposium on Quantum Fluids and Solids*
Grenoble, France, 1st-7th August 2010
Poster presentation:
Path Integral Monte Carlo calculation of momentum distribution in solid ^4He
- *II Jornadas de Jóvenes Investigadores en Física Atómica y Molecular* (II Meeting of Young Researchers in Atomic and Molecular Physics)
Barcelona, Spain, 21st-22nd January 2010
Contributed Talk:
Path Integral Monte Carlo simulation of ^4He at zero temperature
- *High-order actions and their application in many-body, few-body, classical problems*
Barcelona, Spain, 24th-26th March 2009

INVITED TALKS AT UNIVERSITIES AND SCIENTIFIC INSTITUTIONS

- November 28th 2016: *Critical behavior of open quantum systems*, at Laboratoire de Physique et Modélisation des Milieux Condensés, Grenoble (France)
- November 17th 2016: *Critical behavior of open quantum systems*, at École Normale supérieure, Lyon (France)
- October 24th 2014: *Variational Monte-Carlo study of the effective mass of soliton excitations in a Bose gas*, at Goethe Universität, Frankfurt am Main (Germany)
- June 10th 2014: *Quantum Monte Carlo approach to dynamic properties of ultracold Bose systems*, at Università degli Studi di Trieste, Trieste (Italy)
- March 5th 2014: *Quantum Monte Carlo approach to dynamic properties of ultracold Bose systems*, at Universitat Politècnica de Catalunya, Barcelona (Spain)
- February 6th 2014: *Dynamic properties of hard-sphere Bose systems: from ultracold gases to superfluid helium*, at Los Alamos National Laboratory, Los Alamos (U.S.A.)
- November 23rd 2011: *Supersolidity in ^4He : a Path Integral Monte Carlo study*, at Universitat de Barcelona, Barcelona (Spain)
- May 19th 2011: *Microscopic approach to the supersolid state of matter*, at Università degli Studi di Trento, Trento (Italy)

REFeree ACTIVITY

- Referee for International Journals: Physical Review Letters, Physical Review A, Physical Review B, Review of Modern Physics, Journal of Physics: Conference Series, Journal of Low Temperature Physics, Condensed Matter - Open Access Journal, Journal of Physics B: Atomic, Molecular and Optical Physics, Entropy, Symmetry.

TEACHING ACTIVITY

- Academic Year 2019/2020: Supervisor of practical trainings and research projects for M. Sc. Students in Physics at École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland
- Academic Year 2018/2019: Supervisor of practical trainings and research projects for M. Sc. Students in Physics at École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland
- Academic Year 2017/2018: Supervisor of practical trainings and research projects for M. Sc. Students in Physics at École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland
- Academic Year 2015/2016: Teaching Assistant of the "Solid State Physics" course for B. Sc. Students in Material Science at Université Paris Diderot - Paris 7, Paris, France
- Academic Year 2013/2014: Teaching Assistant of the "Physics 1 - Classical Mechanics" course for B. Sc. Students in Industrial Engineering at Università degli Studi di Trento, Trento, Italy
- Academic Year 2013/2014: Teaching Assistant of the "Physics 2 - Electricity & Magnetism" course for B. Sc. Students in Electronics and Telecommunications Engineering at Università degli Studi di Trento, Trento, Italy
- Academic Year 2012/2013: Teaching Assistant of the "Physics 1 - Classical Mechanics" course for B. Sc. Students in Civil, Environmental and Mechanical Engineering at Università degli Studi di Trento, Trento, Italy
- Academic Year 2010/2011: Teaching Assistant of the "Laboratory of Physics" course for B. Sc. Students in Computer Science at Universitat Politècnica de Catalunya, Barcelona, Spain
- Academic Year 2009/2010: Teaching Assistant of the "Laboratory of Physics" course for B. Sc. Students in Computer Science at Universitat Politècnica de Catalunya, Barcelona, Spain
- Academic Year 2008/2009: Teaching Assistant of the "Laboratory of Physics" course for B. Sc. Students in Computer Science at Universitat Politècnica de Catalunya, Barcelona, Spain

PUBLICATIONS

24 Refereed Journal Papers
2 Refereed Conference Proceedings

Bibliometrics

Web of Science	ResearcherID:	G-4348-2011
	Total citations:	251
	h-index:	11
Scopus	Author ID:	56652670200
	Total citations:	256
	h-index:	11
Google Scholar	Total citations:	408
	h-index:	12

Refereed Journal Papers

1. W. Verstraelen, R. Rota, V. Savona and M. Wouters, Phys. Rev. Res. **2**, 022037(R) (2020)
Gaussian trajectory approach to dissipative phase transitions: the case of quadratically driven photonic lattices
2. K. Seibold, R. Rota and V. Savona, Phys. Rev. A **101**, 033839 (2020)
A dissipative time crystal in an asymmetric non-linear photonic dimer
3. R. Rota and V. Savona, Phys. Rev. A **100**, 013838 (2019)
Simulating frustrated antiferromagnets with quadratically driven QED cavities
4. R. Rota, F. Minganti, C. Ciuti and V. Savona, Phys. Rev. Lett. **112**, 110405 (2019)
Quantum critical regime in a quadratically-driven nonlinear photonic lattice
5. R. Rota, J. Boronat, Crystals **8**, 344 (2018)
Temperature Dependence of the Vacancy Formation Energy in Solid ^4He
6. R. Rota, F. Minganti, A. Biella, C. Ciuti, New J. Phys. **20**, 045003 (2018)
Dynamical properties of dissipative XYZ Heisenberg lattices
7. F. Vicentini, F. Minganti, R. Rota, G. Orso, C. Ciuti, Phys. Rev. A **97**, 013853 (2018)
Critical slowing down in driven-dissipative Bose-Hubbard lattices
8. R. Rota, W. Casteels and C. Ciuti, Eur. Phys. J. - Special Topics, **226** 2805 (2017)
On the robustness of strongly correlated multi-photon states in frustrated driven-dissipative cavity lattices
9. R. Rota, F. Storme, N. Bartolo, R. Fazio and C. Ciuti, Phys. Rev. B, **95** 134431 (2017)
Critical behavior of dissipative two-dimensional spin lattices
10. G. Ferré, R. Rota and J. Boronat, J. Low Temp. Phys., **187**, 390 (2017)
Momentum distribution of liquid ^4He across the normal-superfluid phase transition
11. W. Casteels, R. Rota, F. Storme and C. Ciuti, Phys. Rev. A, **93**, 043833 (2016)
Probing photon correlations in the dark sites of geometrically frustrated cavity lattices
12. R. Rota and S. Giorgini, Phys. Rev. A, **92**, 043635 (2015)
Variational Monte Carlo study of soliton excitations in hard-sphere Bose gases
13. R. Rota, J. Casulleras, F. Mazzanti, and J. Boronat, J. Chem. Phys. **142**, 114114 (2015)
Quantum Monte Carlo estimation of complex-time correlations for the study of the ground-state dynamic structure function
14. R. Rota, F. Tramonto, D.E. Galli and S. Giorgini, Phys. Rev. B **88**, 214505 (2013)
Quantum Monte Carlo study of the dynamic structure factor in the gas and crystal phase of hard-sphere bosons.
15. O.N. Osychenko, R. Rota and J. Boronat, Phys. Rev B, **85**, 224513 (2012)
Superfluidity of metastable bulk glassy para-hydrogen at low temperature
16. S.O. Diallo, R.T. Azuah, D.L. Abernathy, R. Rota, J. Boronat and H.R. Glyde, Phys. Rev. B, **85**, 140505 (R) (2012)
Bose-Einstein condensation in liquid ^4He near the liquid-solid transition line
17. R. Rota, Y. Lutsyshyn, C. Cazorla and J. Boronat, J. Low Temp. Phys., **168**, 150 (2012)
A microscopic description of vacancies in solid ^4He
18. R. Rota and J. Boronat, Phys. Rev. Lett., **108**, 045308 (2012)
Onset temperature of Bose-Einstein condensation in incommensurate solid ^4He

19. R. Rota and J. Boronat, J. Low Temp. Phys., **166**, 21 (2012)
Condensate fraction of liquid ^4He at zero temperature
20. R. Rota and J. Boronat, Mol. Phys., **109**, 2963 (2011)
Microscopic approach to the bcc phase of solid ^4He
21. Y. Lutsyshyn, R. Rota, and J. Boronat, J. Low Temp. Phys., **162**, 455 (2011)
On the stability of small vacancies clusters in solid ^4He
22. R. Rota and J. Boronat, J. Low Temp. Phys. **162**, 146 (2011)
Path Integral Monte Carlo calculation of momentum distribution in solid ^4He
23. R. Rota, J. Casulleras, F. Mazzanti and J. Boronat, Phys. Rev. E, **81**, 016707 (2010)
High-order time expansion path integral ground state
24. A. Parola, L. Salasnich, R. Rota and L. Reatto, Phys. Rev. A, **72**, 063612 (2005)
Quantum phases of attractive matter waves in a toroidal trap

Refereed Conference Proceedings

1. R. Rota, F. Tramonto, D. E. Galli and S. Giorgini, J. Phys.: Conf. Ser. **529**, 012022 (2014)
Many-body Bose systems and the hard-sphere model: dynamic properties from the weak to the strong interaction regime
2. M. Rossi, R. Rota, E. Vitali, D.E. Galli and L. Reatto, in Series on Advances in Quantum-Many Body Theory, vol 11, 300 (World Scientific, Ed. J. Boronat, G.E. Astrakharchik and F. Mazzanti, 2008)
Microscopic studies of solid ^4He with Path Integral Projector Monte Carlo.

Data

14 / 09 / 2020

Luogo

Losanna