Curriculum vitae of GIULIANO BENENTI

Personal details:

- Date of birth: 7 November 1969.
- Place of birth: Voghera (PV), Italy.
- Nationality: Italian.
- Work address:
Dipartimento di Scienza e Alta Tecnologia,
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- Family status: married, two children.

Education and professional experience:

- 1989-1993: Degree in physics at the Università di Pavia, Italy.
Thesis dissertation: 19 March 1993.
Title of the thesis: *Microscopic quasi–deuteron model for one–nucleon photoemission.*
Supervisor: Prof. Franco Davide Pacati.
Final grade: 110/110 *cum laude.*
- 1995-1998: Ph.D in Physics at the Università di Milano, Italy.
Thesis dissertation: 9 February 1998.
Title of the thesis: *Quantum localization in Rydberg atoms.*
Supervisor: Prof. Giulio Casati.
- 1998-2000: Post-doc at the CEA, Centre d'Etudes de Saclay, France, within the European Union TMR network *Phase Coherent Dynamics of Hybrid Nanostructures.*
- 2000-2002: Post-doc at the Istituto Nazionale per la Fisica della Materia, Unità di Como and the Università degli Studi dell'Insubria, Sede di Como, Italy, within the INFM Advanced Project: *Quantum Transport and Classical Chaos.*
- 2002: Researcher at the Istituto Nazionale per la Fisica della Materia, Unità di Como and the Università degli Studi dell'Insubria, Sede di Como, Italy, within the INFM Advanced Project: *Weak Chaos: Theory and Applications.*

- From 31 December 2002: Researcher at Univesità degli Studi dell'Insubria, Sede di Como, Italy.
- From 1 April 2015: Associate Professor at Univesità degli Studi dell'Insubria, Sede di Como, Italy.

Qualifications:

- Italian national scientific qualification as full professor of theoretical physics (fundamental interactions): from 08/01/2014.
- Italian national scientific qualification as full professor of theoretical physics (condensed matter): from 07/10/2014.

Scientific acknowledgements:

- The scientific papers evaluated for the Italian *Valutazione della Qualita della Ricerca* i (VQR 2004-2010 and VQR 2011-2014) were all quoted with the best mark (1, excellent).

Institutions visited for temporary research periods:

- CNRS, Université Paul Sabatier, Toulouse, France: 1997, 1998, 2000 ("poste rose", three months), 2001, 2002 ("poste rose", three months), 2003, 2004.
- Institute of Theoretical Physics, University of California at Santa Barbara, USA: 2001.
- Institut Henri Poincaré, Paris, France: 2006.
- University of Ljubljana, Slovenia: 2007-2011.
- Waseda University, Tokyo, Japan: 2008, 2009.
- University of Tokyo, Japan: 2009-2011.
- National University of Singapore: 2009, 2012.
- Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, 2010.
- CEA, Saclay, France: 2011-2013.
- Comisión Nacional de Energía Atómica, Buenos Aires, Argentina: 2012.
- Weizmann Institute of Science, Rehovot, Israel, 2013.
- University of Science and Technology of China, Hefei, China, 2016.
- Xiamen University, China, 2016.
- Singapore University of Technology and Design: 2017.

Main research interests:

- Thermoelectric transport;
- Heat transport and thermal rectifiers;
- Far from equilibrium quantum systems
- Quantum computation and quantum information;
- Open quantum systems;
- Many-body quantum systems;
- Disordered systems;
- Nonlinear and complex systems.

Main scientific results:

- Thermoelectric efficiency for systems with broken time-reversal symmetry;
- Thermoelectric efficiency of interacting systems with momentum conservation;
- Thermoelectric efficiency of multi-terminal systems;
- Negative differential conductivity in far-from-equilibrium quantum spin chains;
- Hidden entanglement recovery by local operations (demonstrated in all-optical experiments by the group of P. Mataloni and F. Sciarrino, Rome);
- Quantum algorithm for the simulation of a chaotic map (later implemented using NMR techniques by the group of D. Cory, MIT);
- Quantum capacity of dephasing channels with memory;
- Enhancement of transmission rates in quantum memory channels with damping;
- Entanglement across a transition to chaos in spin lattices;
- Stability borders for bipartite and multipartite entanglement in quantum computers with imperfections;
- Phase-space measures of the complexity of quantum motion;
- Quantum phase between the Fermi glass and the Wigner crystal for two-dimensional electron gases;
- Ferromagnetic phase induced by disorder and interactions for electrons in two dimensions;

- Superconductor to insulator transition induced by attractive interactions in the disordered three-dimensional Hubbard model;
- Proposal for the observation of a quantum ratchet by means of cold atoms in optical lattices;
- Interaction-induced quantum ratchet in a Bose-Einstein condensate;
- Steering Bose-Einstein condensates despite time symmetry;
- Transition from wave packet "collapse" to "explosion" in a dissipative chaotic system;
- Proposal for the implementation of a chaotic map by means of superconducting nanocircuits;
- Quantum Poincaré recurrences for Rydberg atoms in a microwave field;
- Quantum fractal fluctuations in dynamically localized quantum systems.

Summary of scientific publications:

- Author of more than 120 scientific publications, including 1 Scientific Reports, 16 Phys. Rev. Lett. and 40 Phys. Rev. papers, 1710 citations, h-index=24 (ISI Web of Science, May 2017), 3030 citations, h-index=30 (Google Scholar, May 2017).
- Author of a two–volume textbook on *Principles of Quantum Computation and Information* (2004-2007) [the book has 410 citations (Google Scholar, January 2016)].
- Editor of a volume of the E. Fermi School on *Quantum Computers, Algorithms and Chaos* (2006).

Books:

1. G. Benenti, G. Casati and G. Strini, *Principles of quantum computation and information*, Volume I: Basic concepts (World Scientific, Singapore, 2004).
2. G. Casati, D.L. Shepelyansky, P. Zoller and G. Benenti (Eds.), *Quantum computers, algorithms and chaos*, Proceedings of the "E. Fermi" Varenna School, Course CLXII, Varenna, Italy, 5-15 July 2005 (IOS Press and SIF, Bologna, 2006).
3. G. Benenti, G. Casati and G. Strini, *Principles of quantum computation and information*, Volume II: Basic tools and special topics (World Scientific, Singapore, 2007).

Publications on international journals:

1. G. Benenti, C. Giusti and F.D. Pacati, *Meson–exchange current effects in nucleon photoemission*, Nucl. Phys. **A574**, 716 (1994).

2. G. Benenti, G. Casati and D.L. Shepelyansky, *Chaotic enhancement of hydrogen atoms excitation in magnetic and microwave fields*, Phys. Rev. A **56**, 3297 (1997).

3. G. Benenti, G. Casati and D.L. Shepelyansky, *Hundred photon microwave ionization of Rydberg atoms in a static electric field*, Phys. Rev. A **57**, 1987 (1998).

4. G. Benenti, G. Casati and D.L. Shepelyansky, *Chaotic enhancement in microwave ionization of Rydberg atoms*, Eur. Phys. J. D **5**, 311 (1999).

5. G. Benenti, G. Casati and I. Guarneri, *Chaotic dynamics of a classical radiant cavity*, Europhys. Lett. **46**, 307 (1999).

6. G. Benenti, X. Waintal and J.–L. Pichard, *New quantum phase between the Fermi glass and the Wigner crystal in two dimensions*, Phys. Rev. Lett. **83**, 1826 (1999).

7. X. Waintal, G. Benenti and J.–L. Pichard, *Delocalized Coulomb phase in two dimensions*, Europhys. Lett. **49**, 466 (2000).

8. G. Benenti, G. Casati, G. Maspero and D.L. Shepelyansky, *Quantum Poincaré recurrences for a hydrogen atom in a microwave field*, Phys. Rev. Lett. **84**, 4088 (2000).

9. G. Benenti, X. Waintal and J.–L. Pichard, *Signatures of an intermediate* $2d$ *Coulomb phase at low temperatures*, Europhys. Lett. **51**, 89 (2000).

10. G. Benenti, X. Waintal, J.–L. Pichard and D.L. Shepelyansky, *Compressibility crossover and quantum opening of a gap for two dimensional disordered clusters with Coulomb repulsion*, Eur. Phys. J. B **17**, 515 (2000).

11. J. Lages, G. Benenti and D.L. Shepelyansky, *Disordered Hubbard model with attraction: the coupling energy of Cooper pairs in small clusters*, Phys. Rev. B **63**, 214516 (2001).

12. G. Benenti, G. Caldara and D.L. Shepelyansky, *Spin polarized ground state for interacting electrons in two dimensions*, Phys. Rev. Lett. **86**, 5333 (2001).

13. G. Benenti and D.L. Shepelyansky, *Magnetic field effect for two electrons in a two dimensional random potential*, Phys. Rev. B **63**, 235103 (2001).

14. G. Benenti, G. Casati, I. Guarneri and M. Terraneo, *Quantum fractal fluctuations*, Phys. Rev. Lett. **87**, 014101 (2001).

15. G. Benenti, G. Casati and D.L. Shepelyansky, *Emergence of Fermi-Dirac thermalization in the quantum computer core*, Eur. Phys. J. D **17**, 265 (2001).

16. G. Benenti, G. Casati, S. Montangero and D.L. Shepelyansky, *Efficient quantum computing of complex dynamics*, Phys. Rev. Lett. **87**, 227901 (2001) [Fig. 1 in on the cover page of Phys. Rev. Lett. of 26 Nov. 2001].

17. G. Benenti and G. Casati, *Quantum-classical correspondence in perturbed chaotic systems*, Phys. Rev. E **65**, 066205 (2002).

18. G. Benenti, G. Casati, S. Montangero and D.L. Shepelyansky, *Eigenstates of an operating quantum computer: hypersensitivity to static imperfections*, Eur. Phys. J. D **20**, 293 (2002).

19. B. Srinivasan, G. Benenti and D.L. Shepelyansky, *Transition to an insulating phase induced by attractive interactions in the disordered three-dimensional Hubbard model*, Phys. Rev. B **66**, 172506 (2002).

20. G. Benenti, G. Casati, S. Montangero and D.L. Shepelyansky, *Statistical properties of eigenvalues for an operating quantum computer with static imperfections*, Eur. Phys. J. D. **22**, 285 (2003).

21. G. Benenti, G. Casati and G. Veble, *Stability of classical chaotic motion under a system's perturbations*, Phys. Rev. E **67**, 055202(R) (2003).

22. G. Benenti, G. Casati, S. Montangero and D.L. Shepelyansky, *Dynamical localization simulated on a few-qubit quantum computer*, Phys. Rev. A **67**, 052312 (2003).

23. B. Srinivasan, G. Benenti and D.L. Shepelyansky, *Delocalizing effect of the Hubbard repulsion for electrons on a two-dimensional disordered lattice*, Phys. Rev. B **67**, 205112 (2003).

24. G. Benenti, G. Casati and G. Veble, *Decay of the classical Loschmidt echo in integrable systems*, Phys. Rev. E. **68**, 036212 (2003).

25. S. Montangero, G. Benenti and R. Fazio, *Dynamics of entanglement in quantum computers with imperfections*, Phys. Rev. Lett. **91**, 187901 (2003).

26. G.G. Carlo, G. Benenti and G. Casati, *Teleportation in a noisy environment: A quantum trajectories approach*, Phys. Rev. Lett. **91**, 257903 (2003).

27. D. Rossini, G. Benenti and G. Casati, *Entanglement echoes in quantum computation*, Phys. Rev. A **69**, 052317 (2004).

28. G. Benenti, G. Casati and S. Montangero, *Quantum computing and information extraction for dynamical quantum systems*, Quantum Information Processing **3**, 273 (2004).

29. G.G. Carlo, G. Benenti, G. Casati and C. Mejía-Monasterio, *Simulating noisy quantum protocols with quantum trajectories*, Phys. Rev. A **69**, 062317 (2004).

30. D. Rossini, G. Benenti and G. Casati, *Classical versus quantum errors in quantum computation of dynamical systems*, Phys. Rev. E. **70**, 056216 (2004).

31. S. Montangero, A. Romito, G. Benenti and R. Fazio, *Chaotic dynamics in superconducting nanocircuits*, Europhys. Lett. **71**, 893 (2005).

32. G.G. Carlo, G. Benenti, G. Casati and D.L. Shepelyansky, *Quantum ratchets in dissipative chaotic systems*, Phys. Rev. Lett. **94**, 164101 (2005).

33. G. Benenti and G. Casati, *Quantum computers: Where do we stand?*, Europhysics News **36/1**, 16 (2005).

34. C. Mejía-Monasterio, G. Benenti, G.G. Carlo and G. Casati, *Entanglement across a transition to quantum chaos*, Phys. Rev. A **71**, 062324 (2005).

35. J.W. Lee, D.V. Averin, G. Benenti and D.L. Shepelyansky, *Model of a deterministic detector and dynamical decoherence*, Phys. Rev. A **72**, 012310 (2005).

36. G.G. Carlo, G. Benenti and D.L. Shepelyansky, *Dissipative quantum chaos: transition from wave packet collapse to explosion*, Phys. Rev. Lett. **95**, 164101 (2005).

37. G. Benenti, S. Felloni and G. Strini, *Effects of single-qubit quantum noise on entanglement purification*, Eur. Phys. J. D **38**, 389 (2006).

38. G.G. Carlo, G. Benenti, G. Casati, S. Wimberger, O. Morsch, R. Mannella and E. Arimondo, *Chaotic ratchet dynamics with cold atoms in a pair of pulsed optical lattices*, Phys. Rev. A **74**, 033617 (2006).

39. D. Rossini, G. Benenti and G. Casati, *Conservative chaotic map as a model of quantum many-body environment*, Phys. Rev. E **74**, 036209 (2006).

40. V.V. Sokolov, G. Benenti and G. Casati, *Quantum dephasing and decay of classical correlation functions in chaotic systems*, Phys. Rev. E **75**, 026213 (2007).

41. G. Benenti and G.M. Palma, *Reversible and irreversible dynamics of a qubit interacting with a small environment*, Phys. Rev. A **75**, 052110 (2007).

42. G. Benenti and G. Strini, *A bird's eye view of quantum computers*, Quantum Biosystems **1**, 21 (2007).

43. D. Poletti, G. Benenti, G. Casati and B. Li, *Interaction-induced quantum ratchet in a Bose-Einstein condensate*, Phys. Rev. A **76**, 023421 (2007).

44. A. D'Arrigo, G. Benenti and G. Falci, *Quantum capacity of dephasing channels with memory*, New J. Phys. **9**, 310 (2007).

45. M. Žnidarič, T. Prosen, G. Benenti and G. Casati, *Detecting entanglement of random states with an entanglement witness*, J. Phys. A.: Math. Theor. **40**, 13787 (2007).

46. L. Wang, G. Benenti, G. Casati and B. Li, *Ratchet effect and the transporting islands in the chaotic sea*, Phys. Rev. Lett. **99**, 244101 (2007).

47. D. Rossini and G. Benenti, *Robust and efficient generator of almost maximal multipartite entanglement*, Phys. Rev. Lett. **100**, 060501 (2008).

48. G. Gennaro, G. Benenti and G.M. Palma, *Entanglement dynamics and relaxation in a few qubit system interacting with random collisions*, Europhys. Lett. **82**, 20006 (2008).

49. G. Benenti and G. Strini, *Quantum simulation of the single-particle Schrödinger equation*, Am. J. Phys. **76**, 657 (2008).

50. V.V. Sokolov, O.V. Zhirov, G. Benenti and G. Casati, *Complexity of quantum states and reversibility of quantum motion*, Phys. Rev. E **78**, 046212 (2008).

51. G. Benenti, G. Casati, T. Prosen and D. Rossini, *Negative differential conductivity in far-from-equilibrium quantum spin chains*, Europhys. Lett. **85**, 37001 (2009).

52. G. Gennaro, G. Benenti and G.M. Palma, *Relaxation due to random collisions with a many-qudit environment*, Phys. Rev. A **79**, 022105 (2009).

53. G. Benenti and G. Casati, *How complex is quantum motion?*, Phys. Rev. E **79**, 025201(R) (2009).

54. G. Benenti, *Entanglement, randomness and chaos*, Riv. Nuovo Cimento **32**, 105 (2009).

55. D. Poletti, G. Benenti, G. Casati, P. Hänggi and B. Li, *Steering Bose-Einstein condensates despite time symmetry*, Phys. Rev. Lett. **102**, 130604 (2009).

56. G. Benenti and G. Strini, *Optimal purification of a generic n-qudit state*, Phys. Rev. A **79**, 052301 (2009).

57. G. Benenti and G. Strini, *Gaussian wave packets in phase space: The Fermi g_F function*, Am. J. Phys. **77**, 546 (2009).

58. G. Benenti, G. Casati, T. Prosen, D. Rossini and M. Žnidarič, *Charge and spin transport in strongly correlated one-dimensional quantum systems driven far from equilibrium*, Phys. Rev. B **80**, 035110 (2009).

59. G. Benenti, A. D'Arrigo and G. Falci, *Enhancement of transmission rates in quantum memory channels with damping*, Phys. Rev. Lett. **103**, 020502 (2009).

60. G. Benenti and G. Strini, *Simple representation of quantum process tomography*, Phys. Rev. A **80**, 022318 (2009).

61. G. Benenti and G. Strini, *Quantum mechanics in phase space: First order comparison between the Wigner and the Fermi function*, Eur. Phys. J. D **57**, 117 (2010).

62. M. Žnidarič, T. Prosen, G. Benenti, G. Casati and D. Rossini, *Thermalization and ergodicity in one-dimensional many-body open quantum systems*, Phys. Rev. E **81**, 051135 (2010).

63. G. Benenti, G. Casati, S. Denisov, S. Flach, P. Hänggi, B. Li and D. Poletti, *Comment on "Coherent Ratchets in Driven Bose-Einstein Condensates"*, Phys. Rev. Lett. **104**, 228901 (2010).

64. K. Saito, G. Benenti and G. Casati, *A microscopic mechanism for increasing thermoelectric efficiency*, Chem. Phys. **375**, 508 (2010).

65. G. Barreto Lemos and G. Benenti, *Role of chaos in quantum communication through a dynamical dephasing channel*, Phys. Rev. A **81**, 062331 (2010).

66. G. Benenti and G. Strini, *Computing the distance between quantum channels: usefulness of the Fano representation*, J. Phys. B: At. Mol. Opt. Phys. **43**, 215508 (2010).

67. V. Balachandran, G. Benenti, G. Casati and J. Gong, *Phase-space characterization of complexity in quantum many-body dynamics*, Phys. Rev. E **82**, 046216 (2010).

68. G. Benenti, K. Saito and G. Casati, *Thermodynamic bounds on efficiency for systems with broken time-reversal symmetry*, Phys. Rev. Lett. **106**, 230602 (2011).

69. K. Saito, G. Benenti, G. Casati and T. Prosen, *Thermopower with broken time-reversal symmetry*, Phys. Rev. B **84**, 201306(R) (2011).

70. G. Benenti, G.G. Carlo and T. Prosen, *Wigner separability entropy and complexity of quantum dynamics*, Phys. Rev. E **85**, 051129 (2012).

71. A. D'Arrigo, G. Benenti and G. Falci, *Transmission of classical and quantum information through a quantum memory channel with damping*, Eur. Phys. J. D **66**, 147 (2012).

72. V. Balachandran, R. Bosisio and G. Benenti, *Validity of Wiedemann Franz law in small molecular wires*, Phys. Rev. B **86**, 035433 (2012).

73. W. Wang, P. Qin, Q. Wang, G. Benenti and G. Casati, *Scaling behavior for a class of quantum phase transitions*, Phys. Rev. E **86**, 021124 (2012).

74. M. Horvat, T. Prosen, G. Benenti and G. Casati, *Railway switch transport model*, Phys. Rev. E **86**, 052102 (2012).

75. S. Siccardi, R. Pizzi and G. Benenti, *Entanglement computation in atoms and molecules*, International Journal of Computer Applications **60**, 43 (2012).

76. G. Benenti, G. Casati and W. Jiao, *Conservation laws and thermodynamic efficiencies*, Phys. Rev. Lett. **110**, 070604 (2013) [marked as an Editors' suggestion].

77. V. Balachandran, G. Benenti and G. Casati, *Efficiency of three-terminal thermoelectric transport under broken time-reversal symmetry*, Phys. Rev. B **87**, 165419 (2013).

78. G. Benenti, S. Siccardi and G. Strini, *Entanglement in helium*, Eur. Phys. J. D **67**, 83 (2013).

79. G. Benenti, S. Siccardi and G. Strini, *Non-perturbative interpretation of the Bloch vector's path beyond the rotating wave approximation*, Phys. Rev. A **88**, 033814 (2013).

80. A. D'Arrigo, G. Benenti, G. Falci and C. Macchiavello, *Classical and quantum capacities of a fully correlated amplitude damping channel*, Phys. Rev. A **88**, 042337 (2013).

81. G. Benenti, G. Casati and C. Mejía-Monasterio, *Thermoelectric efficiency in momentum-conserving systems*, New J. Phys. **16**, 015014 (2014).

82. M. Žnidarič, G. Benenti and G. Casati, *Translationally invariant conservation laws of local Lindblad equations*, J. Math. Phys. **55**, 021903 (2014).

83. P. Qin, W. Wang, G. Benenti and G. Casati, *Complexity and instability of quantum motion near a quantum phase transition*, Phys. Rev. E **89**, 032120 (2014).

84. G. Benenti, S. Siccardi and G. Strini, *Exotic states in the dynamical Casimir effect*, Eur. Phys. J. D **68**, 139 (2014).

85. A. D'Arrigo, R. Lo Franco, G. Benenti, E. Paladino and G. Falci, *Recovering entanglement by local operations*, Ann. Phys. **350**, 211 (2014).

86. F. Mazza, R. Bosisio, G. Benenti, V. Giovannetti, R. Fazio and F. Taddei, *Thermoelelctric efficiency of three-terminal quantum thermal machines*, New J. Phys. **16**, 085001 (2014).

87. S. Chen, J. Wang, G. Casati and G. Benenti, *Nonintegrability and the Fourier heat conduction law*, Phys. Rev. E **90**, 032134 (2014).

88. G. Benenti, A. D'Arrigo, S. Siccardi and G. Strini, *Dynamical Casimir effect in quantum-information processing*, Phys. Rev. A **90**, 052313 (2014).

89. G. Benenti and G. Strini, *Dynamical Casimir effect and minimal temperature in quantum thermodynamics*, Phys. Rev. A **91**, 020502(R) (2015).

90. A. Orieux, A. D'Arrigo, G. Ferranti, R. Lo Franco, G. Benenti, E. Paladino, G. Falci, F. Sciarrino and P. Mataloni, *Experimental on-demand recovery of entanglement by local operations within non-Markovian dynamics*, Sci. Rep. **5**, 8575 (2015).

91. R. Bosisio, S. Valentini, F. Mazza, G. Benenti, R. Fazio, V. Giovannetti and F. Taddei, *Magnetic thermal switch for heat management at the nanoscale*, Phys. Rev. B. **91**, 205420 (2015) [marked as an Editors' suggestion].

92. F. Mazza, S. Valentini, R. Bosisio, G. Benenti, V. Giovannetti, R. Fazio and F. Taddei, *Separation of heat and charge currents for boosted thermoelectric conversion*, Phys. Rev. B. **91**, 245435 (2015).

93. S. Chen, J. Wang, G. Casati and G. Benenti, *Thermoelectricity of interacting particles: A numerical approach*, Phys. Rev. E **92**, 032139 (2015).

94. A. D'Arrigo, G. Benenti, G. Falci and C. Macchiavello, *Information transmission over an amplitude damping channel with an arbitrary degree of memory*, Phys. Rev. A **92**, 062342 (2015).

95. W. Weiss, G. Benenti, G. Casati, I. Guarneri, T. Calarco, M. Paternostro and S. Montangero, *Violation of Bell inequalities in larger Hilbert spaces: robustness and challenges*, New J. Phys. **18**, 013121 (2016).

96. G. Benenti, G. Casati, C. Mejía-Monasterio and M. Peyrard, *From thermal rectifiers to thermoelectric devices*, preprint arXiv:1512.06889 [cond-mat.stat-mech], in Springer Lecture Notes in Physics vol. 921 *Thermal transport in low dimensions: from statistical physics to nanoscale heat transfer*, edited by S. Lepri (2016).

97. C. Goupil, H. Ouerdane, E. Herbert, G. Benenti, Y. D'Angelo and Ph. Lecoeur, *Closed-loop approach to thermodynamics*, Phys. Rev. E **94**, 032136 (2016).

98. F. Angaroni, G. Benenti and G. Strini, *Reconstruction of electromagnetic field states by a probe qubit*, Eur. Phys. J. D **70**, 225 (2016).

99. G. Benenti, H. Ouerdane and C. Goupil, *The thermoelectric working fluid: Thermodynamics and transport*, C. R. Physique **17**, 1072 (2016).

100. G. Benenti, G. Casati, K. Saito and R.S. Whitney, *Fundamental aspects of steady state conversion of heat to work at the nanoscale*, preprint arXiv:1608.05595 [cond-mat.mes-hall], to be published in Phys. Rep..

101. U. Bissbort, C. Teo, C. Guo, G. Casati, G. Benenti and D. Poletti, *Minimal motor for powering particle motion from spin imbalance*, preprint arXiv:1609.02916 [cond-mat.stat-mech].

102. P.A. Erdman, F. Mazza, R. Bosisio, G. Benenti, R. Fazio and F. Taddei, *Thermoelectric properties of an interacting quantum dot-based heat engine*, preprint arXiv:1702.06042 [cond-mat.mes-hall].

103. F. Hoeb, F. Angaroni, J. Zoller, T. Calarco, G. Strini, S. Montangero and G. Benenti, Optimal amplification of the dynamical Casimir effect in a parametrically driven system. preprint.

Contribution to encyclopedias:

1. G. Casati and G. Benenti, *Quantum computation and chaos*, in *Enciclopedia of Condensed Matter Physics*, edited by G. Bassani, G. Liedl and P. Wyder (Elsevier Science, Oxford, United Kingdom, 2005).

2. G. Benenti and G. Casati, *Quantum computation of complex systems*, in *Reference Module in Materials Science and Materials Engineering*, edited by S. Hashmi (Elsevier Science, United Kingdom, 2016).

Publications on conference proceedings:

1. G. Benenti, C. Giusti and F.D. Pacati, *Meson–exchange currents in one– and two– nucleon emission induced by electromagnetic probes*, in Proceedings of the Seventh International Conference on *Nuclear Reaction Mechanisms*, Varenna, Italy, 6-11 June 1994, edited by E. Gadioli (Ricerca Scientifica ed Educazione Permanente, Milano, 1994), p. 718.

2. G. Benenti, X. Waintal and J.–L. Pichard, *A new quantum phase in two dimesions*, in Proceedings of the XXXIVth Rencontres de Moriond *Quantum Physics at mesoscopic scale*, Les Arcs, France, 23-30 January 1999, edited by C. Glattli, M. Sanquer and J. Trân Thanh Vân (EDP Sciences, Les Ulis, 2000), p. 63.

3. X. Waintal, G. Benenti and J.–L. Pichard, *Metallic phase between the Fermi glass and the Wigner crystal in two dimensions*, Ann. Phys. (Leipzig) **8**, 691 (1999), Proceedings of *Localisation 1999*, Hamburg, Germany, 29 July - 3 August 1999, edited by M. Schreiber.

4. G. Benenti and G. Casati, *Quantum Poincaré recurrences in microwave ionization of Rydberg atoms*, in Proceedings of the Conference *Atoms, molecules and quantum dots in laser fields: fundamental processes*, Pisa, Italy, 12-16 June 2000, edited by N. Bloembergen, N. Rahman and A. Rizzo (Editrice Compositori, Bologna, 2001), p. 269.

5. J.-L. Pichard, G. Benenti, G. Katomeris, F. Selva and X. Waintal, *From the Fermi liquid towards the Wigner solid in two dimensions*, in Proceedings of the EU School *Exotic states in quantum nanostructures*, Windsor, United Kingdom, 16-29 August 1999, edited by S. Sarkar (Kluwer Academic Publishers, Dordrecht, 2003).

6. G. Benenti and G. Casati, *Effects of static imperfections for quantum computing*, in Proceedings of the Solvay Conference *The physics of communication*, Delphi, Greece, 24-29 november 2001, edited by I. Antoniou, V.A. Sadovnichy, and H. Walther (World Scientific, Singapore, 2003), p. 176.

7. G. Benenti, G. Casati and S. Montangero, *Stability of quantum computing in the presence of imperfections*, Int. J. Mod. Phys. B **17**, 3932 (2003), in Proceedings of *Dynamics Days Asia-Pacific (DDAP): The Second International Conference on Nonlinear Science*, edited by Y.-S. Sun, X.-T. He and Z.-M. Sheng.

8. G. Benenti and G. Casati, *Quantum chaos, decoherence and quantum computation*, in Proceedings of the "E. Fermi" Varenna School on *Quantum computers, algorithms and chaos*, Varenna, Italy, 5-15 July 2005, edited by G. Casati, D.L. Shepelyansky, P. Zoller and G. Benenti (IOS Press and SIF, Bologna, 2006); reprinted in Riv. Nuovo Cimento **30**, 449 (2007).

9. A. D'Arrigo, G. Benenti and G. Falci, *Memory effects in quantum information transmission across a Hamiltonian dephasing channel*, preprint arXiv:0710.3472 [quant-ph], Proceedings of the 14$^{\text{th}}$ Central European Workshop on Quantum Optics, Palermo, Italy, 1-5 June 2007, edited by V. Bužek, A. Napoli and A. Messina, Eur. Phys. J. Special Topics **160**, 83 (2008).

10. A. D'Arrigo, E. De Leo, G. Benenti and G. Falci, *Memory effects in a Markov chain dephasing channel*, preprint arXiv:0802.4172 [quant-ph], Proceedings of the workshop on *Noise, information and complexity at quantum scale*, Erice, Italy, 4-10 November 2007, International Journal of Quantum Information **6**, 651 (2008).

11. G. Gennaro, G. Benenti and G.M. Palma, *Ergodicity in randomly colliding qubits*, Proceedings of the workshop *Advances in foundations of quantum mechanics and quantum information with atoms and photons*, Torino, Italy, 19-23 May 2008, International Journal of Quantum Information **7**, 163 (2009).

12. A. D'Arrigo, G. Benenti and G. Falci, *A semiclassical model for a memory dephasing channel*, Proceedings of the 15$^{\text{th}}$ Central European Workshop on Quantum Optics, Belgrade, 30 May - 3 June 2008, Phys. Scr. **T135**, 014052 (2009).

13. V.V. Sokolov, O.V. Zhirov, G. Benenti and G. Casati, *Quantum chaos: Degree of reversibility of quantum dynamics of classically chaotic systems*, in *Topics on Chaotic Systems: Selected Papers from CHAOS 2008 International Conference*, edited by C.H. Skiadas, L. Dimoticalis and C. Skiadas (World Scientific, Singapore, 2009), pp. 314-322.

14. G. Benenti and G. Casati, *Increasing thermoelectric efficiency: dynamical models unveil microscopic mechanisms*, Phil. Trans. R. Soc. A **369**, 466 (2011), contribution to the theme issue *Nonlinear dynamics in meso and nanoscales: fundamental aspects and applications*, XI Latin American Workshop on Nonlinear Phenomena, Rio de Janeiro, Brazil, 5-9 October, 2009.

15. G. Benenti and G. Strini, *Quantum operations: A Fano-representation approach*, Proceedings of the workshop *Advances in foundations of quantum mechanics and quantum information with atoms and photons*, Torino, Italy, 23-29 May 2010. International Journal of Quantum Information **9**, 73 (2011).

16. A. D'Arrigo, G. Benenti and G. Falci, *Hamiltonian models of quantum memory channels*, Proceedings of the workshop *Advances in foundations of quantum mechanics and quantum information with atoms and photons*, Torino, Italy, 23-29 May 2010, International Journal of Quantum Information **9**, 625 (2011).

17. A. D'Arrigo, R. Lo Franco, G. Benenti, E. Paladino and G. Falci, *Hidden entanglement in the presence of random telegraph dephasing noise*, Proceedings of the *Central European Workshop on Quantum Optics*, Sinaia, Romania, 2-6 July 2012, Phys. Scr. **T153**, 014014 (2013).

18. A. D'Arrigo, G. Benenti, R. Lo Franco, G. Falci and E. Paladino, *Hidden entanglement, system-environment information flow and non-Markovianity*, Proceedings of the 6th *Italian Quantum Information Science Conference*, Como, Italy, 24-26 September 2013, International Journal of Quantum Information **12**, 1461005 (2014).

Organization of Conferences:

In the organizing committee of the following international conferences:

- *Quantum Computers and Quantum Chaos*, Como, 28-30 June, 2001.
- "Enrico Fermi" School on *Quantum Computers, Algorithms and Chaos*, Varenna, Italy, 5-15 July, 2005.
- *Noise and Instabilities in Quantum Mechanics*, ICTP, Trieste, Italy, 3-7 October, 2005.
- *New Trends in Nonlinear Dynamics: Heat Control and Thermoelectric Efficiency*, Erice, Italy, 23-28 October, 2010.

Talks at Conferences, Schools and Meetings:

1. *Mixing of chaotic states by a perturbation and delocalization: Rydberg atoms in magnetic and microwave fields*, at Second TMR Meeting *Phase–Coherent Dynamics of Hybrid Nanostructures*, Ioannina, Greece, 25-31 May 1998.
2. *From the Fermi glass towards the Wigner crystal in two–dimensional disordered systems*, at XXXIVth Rencontres de Moriond *Quantum Physics at Mesoscopic Scale*, Les Arcs, France, 23-30 January 1999.
3. *New quantum phase between the Fermi glass and the Wigner crystal in two dimensions*, at International Workshop *Artificial Atoms*, Trento, Italy, 19-30 April 1999 (invited talk).
4. *A new quantum phase in two dimensions*, at TMR Meeting and School *Phase–Coherent Dynamics of Hybrid Nanostructures*, Bad Herrenalb, Germany, 24-29 May 1999.
5. *Coulomb metal in two dimensions?*, at *Journée de Physique Statistique 2000*, Paris, France, 27-28 January 2000.
6. *New quantum phase between the Fermi glass and the Wigner crystal in two dimensions*, at *XX Convegno di Fisica Teorica e Struttura della Materia*, Fai della Paganella, Italy, 26-29 March 2000 (invited talk).
7. *Quantum Poincaré recurrences in microwave ionization of Rydberg atoms*, at International Conference *Atoms, Molecules and Quantum Dots in Laser Fields: Fundamental Processe*, Pisa, Italy, 12-16 June 2000 (invited talk).
8. *Quantum computers and quantum chaos*, at *VI Convegno Nazionale di Fisica Statistica e dei Sistemi Complessi*, Parma, Italy, 29-31 May, 2001.
9. *Quantum computation with imperfections*, at International Conference *Quantum Computers and Quantum Chaos*, Como, Italy, 28-30 June, 2001.

10. *Efficient quantum computing of complex dynamics*, at GdR Colloque thématique *Aspects Théoriques de l'Information Quantique*, Paris, France, 8-9 November, 2001 (invited talk).

11. *Stability of quantum computing in the presence of imperfections*, at *Meeting Quantum Computing*, Dipartimento di Scienze dell'Informazione, Milano, Italy, 21-22 March, 2002 (invited talk).

12. *Conductivity and localization in quantum systems with disorder and chaos*, at *EU Network QTRANS - Mid-term review meeting*, Palermo, Italy, 20-22 June, 2002.

13. *Efficient quantum computing of complex dynamics*, at *INFM Meeting*, Bari, Italy, 24-28 June, 2002 (invited talk).

14. *Efficient quantum computing of complex dynamics*, at *QUANTWARE Workshop*, Toulouse, France, 1-14 July, 2002 (invited talk).

15. *Quantum computers and quantum chaos*, at INFM School *Quantum Computation and Information*, Torino, Italy, 8-21 September, 2002 (invited talk).

16. *Quantum computation of complex dynamics: dynamical localization, entanglement and chaos*, at the annual meeting of the MIUR project *Fault tolerance, control and stability in quantum information processing*, Como, Italy, 16-17 October, 2003.

17. *Localization and entanglement in quantum computing of complex systems*, at International Conference *Quantum Information*, Tokyo University of Science, Tokyo, Japan, 1-3 November, 2003 (invited talk).

18. *Stability of quantum computation in a noisy environment: a quantum trajectories approach*, at International Conference *Quantum Information*, International Institute for Advanced Studies, Kyoto, Japan, 5-7 November, 2003 (invited talk).

19. *Effects of decoherence and imperfections for quantum information processing*, at the annual review meeting of the EU IST-FET-QIPC EDIQIP project, Bratislava, Slovakia, 16-18 February, 2004.

20. *Quantum computing of dynamical quantum systems: Information extraction and noise effects*, at the conference *Problemi Attuali di Fisica Teorica*, Vietri sul Mare, Italy, 2-7 April, 2004.

21. *Quantum computing of dynamical quantum systems: Information extraction and noise effects*, at the annual meeting of the Italian Physical Society, Brescia, Italy, 20-25 September, 2004 (invited talk).

22. *Quantum ratchets in dissipative chaotic systems*, at the annual meeting of the MIUR project *Fault tolerance, control and stability in quantum information processing*, Torino, Italy, 11-12 November, 2004.

23. *Quantum computation and information transfer in dissipative systems*, at the annual review meeting of the EU IST-FET-QIPC EDIQIP project, Innsbruck, Austria, 14-16 February, 2005.

24. *Quantum simulation of dissipative chaotic systems: Quantum ratchets and Ehrenfest explosion*, at the conference *Quantum Mechanics and Quantum Computation*, Vietri sul Mare, Italy, 18-20 March, 2005.

25. *Quantum chaos, decoherence and quantum computation*, lectures given at the "Enrico Fermi" School on *Quantum Computers, Algorithms and Chaos*, Varenna, Italy, 5-15 July, 2005.

26. *Quantum simulation of dissipative chaotic systems*, at the annual review meeting of the EU IST-FET-QIPC EDIQIP project, Paris, France, 13-15 February, 2006.

27. *Quantum chaos and quantum computing*, lectures given at the program *Quantum information, computation and complexity*, Institut Henri Poincaré, Paris, France, 4 January - 7 April, 2006 (invited talk).

28. *Quantum ratchets and wave packet collapse in dissipative chaotic systems*, at *XI Convegno Nazionale di Fisica Statistica e dei Sistemi Complessi*, Parma, Italy, 21-23 June, 2006.

29. *Quantum ratchets and wave packet collapse in dissipative chaotic systems*, at the Heraeus workshop *At the Interface of Cold Atoms and Statistical Physics*, Schloss Reisensburg, Günzburg, Germany 3-6 September, 2006 (invited talk).

30. *Quantum chaos, decoherence and quantum computation*, at the annual meeting of the Italian Physical Society, Torino, Italy, 18-23 September, 2006 (invited talk).

31. *Quantum ratchets for periodically kicked cold atoms and Bose-Einstein condensates*, at *Dynamics Days Europe*, Crete, Greece, 25-29 September, 2006 (invited talk).

32. *Quantum ratchets for periodically kicked cold atoms and Bose-Einstein condensates*, at the conference *Quantum mechanics: from fundamental problems to applications*, Bertinoro, Italy, 3-8 December, 2006.

33. *Quantum capacity of dephasing channels with memory*, at the workshop *Quantum information and many-body quantum systems*, Centro de Giorgi, Scuola Normale Superiore, Pisa, Italy, 26-30 April, 2007.

34. *Quantum capacity of dephasing channels with memory*, at the conference *Quantum Mechanics and Quantum Computation*, Vietri sul Mare, Italy, 30 March - 1 April, 2007.

35. *Quantum teleportation*, lecture given at the School on *Meccanica Quantistica: Logica, Fondamenti e Computazione*, Cesena, Italy, 17-22 September 2007 (invited talk).

36. *Quantum ratchets for periodically kicked cold atoms and Bose-Einstein condensates*, at the focus meeting on *Theoretical and experimental aspects of quantum transport*, Institut Henri Poincaré, Paris, France, 10-14 December, 2007 (invited talk).

37. *Entanglement, randomness and chaos*, at the conference *Problemi Attuali di Fisica Teorica*, Vietri sul Mare, Italy, 14-19 March, 2008.

38. *Entanglement, randomness and chaos*, at the workshop *Quantum Computing*, Dipartimento di Informatica, Sistemistica e Comunicazione, Università di Milano Bicocca, Italy, 27 March, 2008 (invited talk).

39. *Quantum traffic jam in far from equilibrium spin chains*, at the workshop *Quantum information, quantum coherence and related topics*, Department of Physcs, Waseda University, Tokyo, Japan, 16-19 September, 2008.

40. *Quantum capacity of memory channels*, at the *Italian Quantum Information Science* conference, Camerino, Italy, 24-29 October, 2008 (invited talk).

41. *How complex is quantum motion?*, at the conference *Problemi Attuali di Fisica Teorica*, Vietri sul Mare, Italy, 3-8 April, 2009.

42. *Quantum memory channels*, at the summer school and advanced workshop on *Trends and Developments in Linear Algebra*, Trieste, Italy, 22 June - 10 July, 2009 (invited talk).

43. *Quantum traffic jam in far-from-equilibrium quantum systems*, at the *Italian Quantum Information Science* conference, Pisa, Italy, 5-8 November, 2009.

44. *Quantum traffic jam in far-from-equilibrium quantum systems*, at the meeting *Quantum Technologies: Information and Communication*, Waseda University, Tokyo, 9-11 December, 2009.

45. *Quantum process tomography and distance between quantum channels: A Fano-representation approach*, at the workshop *Quantum 2010: Advances in Foundations of Quantum Mechanics and Quantum Information with atoms and photons*, Torino, Italy, 23-29 May, 2010.

46. *Microscopic mechanism for increasing thermoelectric efficiency*, at the workshop *New Trends in Ninlinear Dynamics: Heat Control and Thermoelectric Efficiency (HEAT2010)*, Erice, Italy, 23-28 October, 2010.

47. *Increasing thermoelectric efficiency: Dynamical models unveil microscopic mechanisms*, at the workshop *Noise in Non-Equilibrium Systems: From Physics to Biology*, Dresden, Germany, 11-14 April, 2011 (invited talk).

48. *Coupled particle and energy transport: a dynamical system's perspective*, at the workshop *Thermodynamics: Can macro learn from nano?*, Snogeholm Castle, Sweden, 22-25 May, 2011 (invited talk).

49. *Complexity of quantum motion: A phase-space approach*, at the workshop *Quantum 2012: Advances in Foundations of Quantum Mechanics and Quantum Information with atoms and photons*, Torino, Italy, 21-25 May, 2012 (invited talk).

50. *Recovering entanglement by local operations*, at the 5th *Italian Quantum Information Science Conference*, Padova, Italy, 26-28 September, 2012 (invited talk).

51. *Introduction to a few basic concepts in thermoelectricity*, at the workshop on "Thermoelectric Transport", Cargèse, France, 21-27 October 2012 (invited talk).

52. *Thermopower and thermoelectric efficiency in systems with broken time-reversal symmetry*, at the workshop on "Thermoelectric Transport", Cargèse, France, 21-27 October 2012 (invited talk).

53. *Complexity of quantum motion: A phase-space approach*, at the conference *Problemi Attuali di Fisica Teorica*, Vietri sul Mare, Italy, 23-26 March, 2013.

54. *Coupled particle and energy transport: a dynamical system's perspective*, at *XVIII Convegno Nazionale di Fisica Statistica e dei Sistemi Complessi*, Parma, Italy, 24-26 June, 2013.

55. *Coupled particle and energy transport: a dynamical system's perspective*, at *FisMat2013: Italian National Conference on Condensed Matter Physics*, Milano, Italy, 9-13 September, 2013.

56. *Recovering entanglement by local operations*, at the 6th *Italian Quantum Information Science Conference*, Como, Italy, 24-26 September, 2013 (invited talk).

57. *Exotic states in the dynamical Casimir effect*, at the conference *Problemi Attuali di Fisica Teorica*, Vietri sul Mare, Italy, 11-16 April, 2014.

58. *Increasing thermoelectric efficiency: Dynamical models unveil microscopic mechanisms*, at the symposium *Phonons and fluctuations in low dimensional structures*, European Materials Research Society 2014 Spring Meeting, Lille, France, 26-30 May, 2014 (invited talk).

59. *Increasing thermoelectric efficiency: Dynamical models unveil microscopic mechanisms*, at the workshop *Controlled charge and heat transport at the molecular scale*, Konstanz, Germany, 29 September - 1 October, 2014 (invited talk).

60. *Increasing thermoelectric efficiency: Dynamical models unveil microscopic mechanisms*, at the conference *Eurotherm 103: Nanoscale and microscale heat transfer IV*, Lyon, France, 15 October - 17 October, 2014.

61. *Fundamental aspects of steady state heat to work conversion*, at the symposium *Nanoscale heat transport: From fundamentals to devices*, Materials Research Society 2015 Spring Meeting, San Francisco, USA, 6-10 April, 2015 (invited talk).

62. *Fundamental aspects of steady state heat to work conversion*, at the workshop on *Nanoscale heat transport*, School of Physics, IPM, Tehran, Iran, 15-16 April, 2015 (invited talk).

63. *Fundamental aspects of steady state heat to work conversion*, at the CECAM workshop on *Advanced thermoelectrics at nanoscale: from materials to devices*, Paris, France, 7-10 July, 2015 (invited talk).

64. *Nonintegrability and the Fourier heat conduction law*, at the CECAM workshop on *Hot nanostructures: thermal transport and radiation at the nanoscale*, Mainz, Germany, 30 September - 2 October, 2015 (invited talk).

65. *Fundamental aspects of steady state heat to work conversion*, at the *QUANTUM 2016* metting, ICTP, Trieste, Italy, 22-24 March, 2016.

66. *Increasing thermoelectric efficiency: Dynamical models unveil microscopic mechanisms*, at *Dynamics Days Europe*, Corfu, Greece, 6-10 June, 2016 (invited talk).

67. *Fundamental aspects of steady state heat to work conversion*, at the conference on *New trends in quantum heat and thermoelectrics*, ICTP, Trieste, Italy, 22-26 August, 2016 (invited talk).

68. *Fundamental aspects of thermoelectricity*, at the school-workshop *Thermal and electronic transport in nanostructures*, International Institute of Physics, Natal, Brasil, 31 October-11 November, 2016 (invited lectures).

69. *Fundamentals of thermal rectification*, at the symposium *Computer modeling of thermal transport at the nanoscale*, European Materials Research Society 2017 Spring Meeting, Strasbourg, France, 22-26 May, 2017 (invited talk).

Posters at Conferences:

1. *Chaotic enhancement in microwave ionization of Rydberg atoms*, at International Conference *Classical Chaos and its Quantum Manifestations*, Toulouse, France, 16-18 July 1998.

2. *Emergence of Fermi-Dirac thermalization in the quantum computer core*, at International Workshop *Coherent Evolution in Noisy Environment*, Dresden, Germany, 21-25 May 2001.

Seminars:

1. *Chaotic dynamics of a classical radiant cavity*, Dipartimento di Fisica, Università di Milano, Italy, October 1995.

2. *Dynamical localization: hydrogen atoms in magnetic and microwave fields*, Dipartimento di Fisica, Università di Milano, Italy, October 1996.

3. *Dynamical localization for Rydberg atoms in magnetic and microwave fields*, Université Paul Sabatier, Toulouse, France, March 1997.

4. *Quantum localization in Rydberg atoms*, Dipartimento di Fisica, Università di Milano, Italy, February 1998.

5. *Signatures of an intermediate* 2*d Coulomb phase at low temperatures*, CEA, Saclay, France, November 1999.

6. *Coulomb metal in two dimensions?*, Université Louis Pasteur, Strasbourg, France, November 1999.

7. *Emergence of Fermi-Dirac thermalization in the quantum computer core*, Université Paul Sabatier, Toulouse, France, October 2000.

8. *Quantum computers, decoherence and chaos*, Università dell'Insubria, Como, Italy, January 2001.

9. *Spin polarized ground state for interacting electrons in two dimensions*, Université Paul Sabatier, Toulouse, France, April 2001.

10. *Stability of quantum computing in the presence of imperfections*, Dipartimento di Scienze dell'Informazione, Università di Milano, Italy, October 2001.

11. *Efficient quantum computing of complex dynamics*, Université Paul Sabatier, France, January 2002.

12. *Quantum computers, algorithms and chaos*, Université Paul Sabatier, France, November 2002.

13. *Quantum-classical correspondence in perturbed chaotic systems*, Scuola Normale Superiore, Pisa, Italy, December 2002.

14. *Quantum computers and quantum cryptography: where do we stand?*, Università dell'Insubria, Como, Italy, October 2004.

15. *Quantum ratchets in dissipative chaotic systems*, INFM-CNR-S3 National Research Center on nanoStructures and bioSystems at Surfaces, Modena, Italy, September 2005.

16. *Quantum ratchets and wave packet collapse in dissipative chaotic systems*, Institut für Physik, Universität Augsburg, Augsburg, Germany, November 2005.

17. *Effects of static imperfections on the stability of quantum computation*, Dipartimento di Metodologie Fisiche e Chimiche per l'Ingegneria, Universita' di Catania, Italy, July 2006.

18. *Quantum capacity of dephasing channels with memory*, Dipartimento di Fisica, Università di Milano, Italy, March 2007.

19. *Quantum ratchets for periodically kicked cold atoms and Bose-Einstein condensates*, CNR-INFM Research and Development Center on Bose-Einstein Condensation, Trento, Italy, May 2007.

20. *Entanglement, randomness and chaos*, INFM-CNR-S3 National Research Center on nanoStructures and bioSystems at Surfaces, Modena, Italy, February 2008.

21. *Thermalization and ergodicity in many-body open quantum systems*, Department of Physics, National University of Singapore, December 2009.

22. *Increasing thermoelectric efficiency: Dynamical models unveil microscopic mechanisms*, CEA, Saclay, France, January 2011.

23. *Coupled particle and heat transport: a dynamical system's perspective*, Laboratorio Tandar, Comisión Nacional de Energía Atómica, Buenos Aires, Argentina, April 2012.

24. *Thermopower and efficiency for systems with broken time-reversal symmetry*, School of Materials Science and Engineering, Nanyang Technological University, Singapore, June 2012.

25. *Coupled particle and heat transport: a dynamical system's perspective*, Scuola Normale Superiore, Pisa, Italy, December 2012.

26. *Bounds on thermodynamic efficiency at maximum power (Curzon-Ahlborn, and more modern developments)*, Department of Condensed Matter Physics, Weizmann Institute of Science, Rehovot, Israel, January 2013.

27. *Coupled particle and heat transport: a dynamical system's perspective*, Department of Condensed Matter Physics, Weizmann Institute of Science, Rehovot, Israel, January 2013.

28. *Coupled particle and heat transport: a dynamical system's perspective*, CEA, Saclay, France, May 2013.

29. *Fundamental aspects of steady state heat to work conversion*, Dipartimento di Fisica e Scienze della Terra, Università di Parma, Italy, May 2015.

30. *Increasing thermoelectric efficiency: a statistical mechanics approach*, Laboratoire Interdisciplinaire des Energies de Demain, Université Paris Diderot, France, July 2015.

31. *Fundamental aspects of steady state heat to work conversion*, Scuola Normale Superiore, Pisa, Italy, September 2015.

32. *From thermal rectifiers to thermoelectric devices*, Linnaeus Physics Colloquium, Linnaeus University, Kalmar, Sweden, November 2015.

33. *From thermal rectifiers to thermoelectric devices*, Dipartimento di Fisica, Università di Genova, Italy, March 2016.

34. *Fundamental aspects of steady state heat to work conversion*, lectures given at Scuola Normale Superiore, Pisa, Italy, May 2016.

35. *Fundamental aspects of steady-state conversion of heat to work*, Department of Modern Physics, University of Science and Technology of China, Hefei, China, November 2016.

36. *A minimalistic model for a quantum thermoelectric motor*, Department of Modern Physics, University of Science and Technology of China, Hefei, China, November 2016.

37. *Fundamental aspects of steady-state conversion of heat to work*, Department of Physics, Xiamen University, China, December 2016.

38. *Fundamental aspects of steady-state conversion of heat to work at the nanoscale*, Singapore University of Technology and Design, Singapore, April 2017.

Participation to funding programs:

- EU RTN network QTRANS, *Quantum Transport on an Atomic Scale*, contract HPRN-CT-2000-0156 (2000-2003).
- Italian MIUR project (COFIN 2002) *Fault Tolerance, Control and Stability in Quantum Information Processing* (2003-2004).
- USA ARO/NSA/ARDA project *Quantum Computing and the onset of Quantum Chaotic Motion*, contract No. DAAD19-02-1-0086 (2003-2005).
- EU FET-IST project EDIQIP, *Effects of Decoherence and Imperfections for Quantum Information Processing*, contract IST-2001-38869 (2003-2005).
- Italian MIUR project (COFIN 2005) *Quantum computation with trapped particle arrays, neutral and charged* (2006-2008).
- Bilateral project Italy-Japan on *Quantum information, computation and communication* (2008-2009).
- Italian MIUR project (COFIN 2008) *Efficiency of thermoelectric machines: A microscopic approach* (2010-2012).
- Bilateral project Italy-Japan on *Quantum Technologies: Information, Communication and Computation* (2010-2011).
- Regione Lombardia (funds fo International Scientific and Technological Cooperation), project on *Thermopower* (2010-2012).
- Italian MIUR project (PRIN 2011) *Collective quantum phenomena: From strongly correlated systems to quantum simulators* (2012-2015).
- Principal investigator of the project *Nanostructures for Heat Management and Thermoelectric Energy Conversion* for the ISCRA programme at the Italian CINECA (100000 hours of computational time hosted at CINECA, Italy) (2014).
- Local coordinator of the INFN research network *Finite and Infinite Quantum Systems (QUANTUM)* (2014-2019).

Scientific refereeing:

- Referee for scientific journals: Physical Review Letters, Physical Review A, Physical Review B, Physical Review E, Europhysics Letters, European Physical Journal B, European Physical Journal D, European Physicsl Journal Plus, Journal of Physics A, Journal of Physics B, Journal of Physics: Condensed Matter, Physics Letters A, Journal of Optics B, New Journal of Physics, Physica Scripta, International Journal of Quantum Information, Quantum Information and Computation, Journal of the Optical Society of America B, Electronic Journal of Theoretical Physics, Entropy, Chemical Physics, Chaos, Solitons and Fractals, Foundations of Physics, Canadian Journal of Physics, Communications in Nonlinear Science and Numerical Simulation, Beilstein Journal of Nanotechnology, Journal of Mathematical Physics, JSTAT, Applied Physics Letters, American Journal of Physics, Scientific Reports, Nature Communications.
- Referee for funding programs: Italian MIUR (COFIN-PRIN and FIRB projects), Italian CNR, Swiss National Science Foundation, French ANR, Ireland Science Foundation, Israel Science Foundation, National Council for Scientific and Technological Development Brasil, Binational Science Foundation United States - Israel.

Activity as editor:

- From 2016: in the editorial board of Heliyon (Elsevier).

Teaching activity:

- 1996-1997: *Classical Mechanics* (exercices), Corsi di Laurea in Fisica e Matematica, Università di Milano, Sede di Como.
- 2000-2001: *Classical Mechanics* (exercises), Corsi di Laurea in Fisica e Matematica, Università degli Studi dell'Insubria, Sede di Como.
- 2001-2003: *Quantum Information Theory*, Corso di Laurea in Fisica, Università degli Studi dell'Insubria, Sede di Como.
- 2003-2013: *Linear Algebra*, Corsi di Laurea in Fisica e Matematica, Università degli Studi dell'Insubria, Sede di Como.
- 2005-2013: *Quantum Information Theory II* (advanced course), Corso di Laurea in Fisica, Università degli Studi dell'Insubria, Sede di Como.
- 2006-2009: *Numerical Methods for Design* (exercises and mathematical laboratory), Facoltà del Design, Politecnico di Milano.
- 2010-2014: *Physics*, Facoltà di Ingegneria, Università Telematica eCampus.
- 2013-2015: *Physics*, Corso di Laurea in Ingegneria, Università degli Studi dell'Insubria, Sede di Varese.

- From 2013: *Quantum Mechanics I*, Corso di Laurea in Fisica, Università degli Studi dell'Insubria, Sede di Como.
- From 2015: *Quantum Mechanics II*, Corso di Laurea in Fisica, Università degli Studi dell'Insubria, Sede di Como.

Supervision of bachelor theses:

- Lucia Caspani, *Codici di correzione degli errori per il calcolo quantistico*, 2003.
- Matteo Clerici, *Tecniche di risonanza magnetica nucleare applicate al calcolo quantistico*, 2003.
- Pasquale Scopelliti, *Implementazione dell'algoritmo di Deutsch-Jozsa mediante trappola a ioni freddi*, 2003.
- Sofia Fusi, *Eco di Loschmidt e stabilità del moto quantistico*, 2004 (co-supervisor).
- Jader Colombo, *L'algoritmo di Shor*, 2007.
- Andrea Frattini, *Pacchetti d'onda gaussiani nello spazio delle fasi: la funzione di Fermi*, 2008.
- Matteo Wauters, *Limite di Curzon e Ahlborn per l'efficienza alla massima potenza di una macchina termica*, 2014.
- Giovanni Caiazzo, *L'effetto Zenone quantistico*, 2015.
- Gaia Pozzoli, *Decoerenza e passaggio dalla meccanica quantistica alla meccanica classica*, 2016.
- Andrea Bassi, *Il principio di Landauer*, 2017.

Supervision of master theses:

- Davide Rossini, *Stabilità ed entanglement echo nel calcolo quantistico*, 2003 (co-supervisor).
- Riccardo Bosisio, *Thermoelectric efficiency of 1D electronic lattices*, 2010.
- Gabriella Mosca, *Entanglement, chaos and complexity of quantum mechanics*, 2011.
- Andrea Frattini, *Quantum state transfer between two qubits via a resonant cavity*, 2012
- Elena Tagliabue, *Thermoelectric transport in topological insulators*, 2016.

Supervision of PhD theses:

- Fabrizio Angaroni, *Quantum information processing in the ultrastrong coupling regime*, from 2014.

Supervision of post-doc fellows:

- Gregor Veble (2002-2003),
- Gabriel Carlo (2003-2005),
- Carlos Mejía-Monasterio (2004-2005),
- Antonio D'Arrigo (2005),
- Vinitha Balachandran (2010-2012),
- Shunda Chen (2013-2015).

Languages:

- Italian (mother tongue), English (fluent) and French (fluent).