Curriculum Vitae of Luca Salasnich

Born in Padua, Italy: 14-05-1967. Italian citizen.
Office Address: CNR-INFM, c/o Dipartimento di Fisica, Via Marzolo 8, 35122 Padua, Italy. Phone: +39-049-8754900. E-Mail: salasnich@pd.infn.it
Web-page: www.padova.infm.it/salasnich

1 Academic Degrees

⋆ M.Sc. in Physics with full marks (110/110), University of Padua, 23-07-1991. Advisor: Prof. V.R. Manfredi.

⋆ Ph.D. in Theoretical Physics with honors, University of Florence, 16-11-1995. Advisor: Prof. M. Rosa-Clot.

2 Present Positions

From 01-11-2003: research scientist (III level) of the Italian National Research Council (CNR). Tenure from 17-02-2009. On leave of absence from CNR at CNISM, Department of Physics of the University of Padua.

From 2007: adjunct professor of *Macroscopic Quantum Phenomena* at the Graduate School of Physics, University of Padua. One-year faculty appointment from 2007 to present.

From 2006: adjunct professor of *Physics* at the Faculty of Medicine and Surgery, University of Padua. One-year faculty appointments from 2006 to present.

From 1997: adjunct professor of both *Mathematics* and *Physics* at the Faculty of Agriculture, University of Padua. One-year faculty appointments from 1997 to present.

3 Previous Positions

2008-2998: adjunct professor of *Historical and Epistemologogical Foundations of Physics* at the University Ca Foscari of Venice. One-year faculty appointment in the academic year 2008-2009.

2001-2004: adjunct professor of *Epistemology of Physics* and *Laboratory of New Technologies for Teaching Mathematics* at the Faculty of Education of the Free University of Bozen-Bolzano. One-year faculty appointment in the academic years 2001-2002 and 2003-2004.

1997-2003: postdoctoral reseach associate in the group of Prof. L. Reatto at the Department of Physics of the University of Milan.

2000-2001: adjunct professor of *General Physics II*, at the Reggio-Emilia Faculty of Engeenering of the University of Modena and Reggio Emilia. One-year faculty appointment in the academic year 2000-2001.

1996-1997: postdoctoral fellow in the group of Prof. M. Morandi-Cecchi, at the Department of Pure and Applied Mathematics of the University of Padua.

1996: postdoctoral research associate in the group of Prof. M. Robnik at the Center for Applied Mathematics and Theoretical Physics of the University of Maribor.

1994-1995: visiting researcher in the group of Prof. J.M.G. Gomez, at the Department of Physics of Complutense University of Madrid.

4 Awards/Prizes/Academic membership

△ Prize "Prof. Italo Filosofo" of the Istituto Veneto di Scienze, Lettere ed Arti di Venezia (1500 Euro). June 1994.

△ Prize "Young Scientists" of the Fondazione "Ing. Aldo Gini" (2000 Euro). February 1995.

△ Prize "Young Scientists" of the Società Italiana di Physics (SIF) (1000 Euro). October 1997.

△ *Associate Member* of the Center for Applied Mathematics and Theoretical Physics (CAMTP) of the University of Maribor (Slovenia), from June 2003.

△ *Associate Member* of the Gruppo Nazionale di Fisica Matematica (GNFM) of the Istututo Nazionale di Alta Matematica "Francesco Severi" (INdAM - Italy), from 2005.

5 Reseach Activity

Statistical and mathematical physics and many-body theory are my fields of research. In particular I worked on:
i) Bose-Einstein condensation and BCS superfluidity in ultracold atoms with thermal quantum field theory and macroscopic equations of quantum hydrodynamics;
ii) dark and bright solitons with atomic Bose-Einstein condensates in optical lattices;
iii) numerical methods for classical fluids with generalized Navier-Stokes equations;

iv) classical and quantum chaos in atoms and nuclei (WKB and energy-level statistics).

In my theoretical research activity I always try to combine, if possible, mathematical rigour and comparison with experiments.

I worked in the following research centers:
– Department of Physics of the University of Florence (3 years);
– Department of Physics of the Universidad Complutense de Madrid (1 year and 2 months);
– Center for Applied Mathematics and Theoretical Physics of the University of Maribor (10 months);
– Department of Matematica Pura ed Applicata of the Università di Padua (2 years);
– Department of Physics of the University of Milan (9 years);
– CNISM Research Unit at at the Department of Physics "G. Galilei" of the University of Padua (3 years).

Up to now I have published 112 scientific papers (34 single-authored) in refereed ISI-indexed journals (see my List of Publications). According to ISI Web of Science of the Thomson Corporation, my papers got more than 1400 citations. My Hirsch index is $h = 22$, i.e. I wrote 22 papers which have at least 22 citations each (for further details see my full list of Publications). My m-index ($m = h/$(years from first publication)) is $m = 1.2$ and my cumulative impact factor is more than 200.

My paper [Top1] with Alberto Parola and Luciano Reatto has been quoted by many theoretical and experimental groups. In fact, according to the ISI 'Essential Science Indicators', the paper [Top-1] is a *"highly cited article"*, being in the top 1% of its sector (period 2000-2004). In this paper, starting from the 3D Gross-Pitaevskii equation (GPE), which very accurately describes the dynamics of dilute Bose-Einstein condensates, we introduced effective nonpolynomial Schrödinger equations (NPSEs) to investigate the 1D→3D crossover of cigar-shaped condensates (1D NPSE) and the 2D→3D crossover of disk-shaped condensates (2D NPSE). The 1D NPSE and 2D NPSE are very reliable and give rise to meaningful analytical rigorous results concerning stability and solitonic solutions. Moreover 1D NPSE can be much easier implemented numerically with respect to the 3D GPE, giving very close results. We stress that the 1D NPSE was derived for the first time in the single-author paper [Top9].

In the paper [Top2], which got *the cover of The Physical Review Letters*, by using the GPE and the 1D NPSE we simulated the formation of a train of bright solitons (attractive scattering length), as reported by the experimental group of Randall Hulet (the first experimental observation of bright solitons in Bose condenateres). Moreover, in the paper there is a reliable analytical formula which explains the number of solitons in the train obtained by modulational instability.

In the paper [Top3] we studied the effect of transverse harmonic confinement in the properties of bright solitons in a Bose condensate. We found that 3D bright solitons collapse if the nonlinear strength exceeds a critical value, and we derived from 1D

NPSE an analytical formula for this critical strength, which is in good agreement with the 3D GPE numerical results and also with recent experimental data.

My recent paper [Top4] with Nicola Manini has been the first to predict the beyond-mean-field frequencies of breathing modes for a dilute two-components superfluid Fermi gas of atoms in the BCS-BEC crossover. In the paper we have introduced a new nonlinear Schrödinger equation (NLSE), the superfluid NLSE, which is fully equivalent to the zero-temperature quantum hydrodynamics equations of Fermi superfluids (i.e. Euler equations with gradient corrections). Our calculations of the breathing frequencies of the fermionic superfluid in a harmonic trap have been confirmed very recently by the experiments of Rudolf Grimm's group.

Beside the study of BEC and superfluidity, in the last 10 years I investigated other issues. In particular, I gave recognized contributions on the fluid-dynamics modeling of the geophysical problem of the shar flow around a rigid object by numerically solving extended Navier-Stokes equations [Top6], and also on the multi-parameter generalization of the nonextensive statistical mechanics (see the paper [Top7] with Fabio Sattin).

I want to stress that in the first years of my research activity I obtained interesting results in the study of *quantum chaos*. In particular, I was one of the first to analyze chaos in quantum field theories, see the two single-authored papers:

[c1] L. Salasnich,
"Chaos suppression in the SU(2) Yang-Mills-Higgs System",
Physical Review D **52**, 6189 (1995).
ISI Web of Science Citations: 20.

[c2] L. Salasnich,
"Quantum Chaos in a Yang-Mills-Higgs System",
Modern Physics Letters A **12**, 1473 (1997).
ISI Web of Science Citations: 21.

Recently, in collaboration with the groups of Jose Maria Gomez and Marko Robnik, I have found original and unexpected results: spectral fluctuations of energy levels of quantum systems follow a power law, whose exponent critically depends on the classical chaoticity of the system. The results described are in the paper [Top8].

My collaboration with Marko Robnik has produced interesting rigorous results on the WKB expansion ($\hbar$-expansion) for the linear Schrödinger equation both in 1D and 3D problems.

[wkb1] M. Robnik and L. Salasnich,
"WKB to All Orders and the Accuracy of the Semiclassical Approximation",
Journal of Physics A: Math. Gen., vol. **30**, 1711-1718 (1997).
ISI Web of Science Citations: 22.

[wkb2] M. Robnik and L. Salasnich,
"WKB Expansion for the Angular Momentum and the Kepler Problem: from the

Torus Quantization to the Exact One", *Journal of Physics A: Math. Gen.*, vol. **30**, 1719-1729 (1997).
ISI Web of Science Citations: 20.

Another frequently cited paper of mine which cointains mathematically rigorous results is the following:

[QG1] L. Salasnich,
"Ideal Quantum Gases in D-dimensional Space and Power-law Potentials",
Journal of Mathematical Physics, vol. **41**, 8016-8024 (2000).
ISI Web of Science Citations: 24.

This single-author paper analyzes the thermodynamics of ideal Bose and Fermi gas in a generic power-law trapping potential.

My *strong scientific independence* is proven, beside the number of single-authored papers, by the fact that during my career I founded myself mainly with individual scientific projects: first as a postdoc and then as a research scientist.

In the years of my reseach activity I have taken the responsibility of tutoring students: from 1997 I am adjunct professor of both Mathematics and Physics at the University of Padua, teaching in undergraduate and graduate courses. I thought also at the University of Milan, at the University of Modena-Reggio Emilia, and at the Free University of Bozen-Bolzano. I am the advisor of several M.Sc. and Ph.D. theses. Usually I involve directly the students in my research activity and often they appear as coauthors of my scientific papers. I have written 2 text-books of Mathematics and 1 text-book of Physics for undergraduate students of the University of Padua:

[b1] L. Salasnich,
PRECORSO DI MATEMATICA CON ELEMENTI DI CALCOLO DIFFERENZIALE.
CLEUP Editore, Padova, 2005.

[b2] V.R. Manfredi and L. Salasnich,
ESERCIZI SVOLTI DI FISICA GENERALE.
Edizioni Libreria Progetto, Padova, 2008.

[b3] L. Salasnich,
ELEMENTI DI CALCOLO DIFFERENZIALE ED INTEGRALE.
CLEUP Editore, Padova, 2009.

In addition, recently I have written a quite successful divulgative book (in Italian) on chaos and quantum mechanics:

[b4] L. Maccone and L. Salasnich,
FISICA MODERNA. MECCANICA QUANTSTICA, CAOS E SISTEMI COMPLESSI.
Carocci Editore, Roma, 2008.

Top 10 publications of Luca Salasnich

[Top1] L. Salasnich, A. Parola, and L. Reatto,
"Effective wave equations for the dynamics of cigar-shaped and disk-shaped Bose condensates",
Physical Review A **65**, 043614 (2002).
ISI Web of Science Citations (excluding/including self-citations): 141/174.

[Top2] L. Salasnich, A. Parola, and L. Reatto,
"Modulational instability and complex dynamics of confined matter-wave solitons",
Physical Review Letters **91**, 080405 (2003).
ISI Web of Science Citations (excluding/including self-citations): 76/85.

[Top3] L. Salasnich, A. Parola, and L. Reatto,
"Condensate bright solitons under transverse confinement",
Physical Review A **66**, 043603 (2002).
ISI Web of Science Citations (excluding/including self-citations): 42/61.

[Top-4] N. Manini and L. Salasnich,
"Bulk and collective properties of a dilute Fermi gas in the BCS-BEC crossover",
Physical Review A, vol. **71**, 033625 (2005).
ISI Web of Science Citations (excluding/including self-citations): 41/55.

[Top-5] A. Parola, L. Salasnich, and L. Reatto,
"Structure and stability of bosonic clouds: alkaki-metal atoms with negative scattering length",
Physical Review A, vol. **57**, R3180 (1998).
ISI Web of Science Citations (excluding/including self-citations): 34/43.

[Top-6] G. Pennacchioni, L. Fasolo, M.M. Cecchi, and L. Salasnich,
"Finite-element modelling of simple shear flow in Newtonian and non-Newtonian fluids around a circular rigid particle", *Journal of Structural Geology*, vol. **22**, 683 (2000).
ISI Web of Science Citations (excluding/including self-citations): 28/28.

[Top-7] F. Sattin and L. Salasnich,
"Multiparameter generalization of nonextensive statistical mechanics",
Physical Review E, vol. **65**, 035106 (2002).
ISI Web of Science Citations (excluding/including self-citations): 27/27.

[Top-8] J.M.G. Gomez, A. Relano, J. Retamosa, E. Faleiro, L. Salasnich, M. Vranicar, and M. Robnik,
"$1/f^{\alpha}$ noise in spectral fluctuations of quantum systems",
Physical Review Letters, vol. **94**, 084101 (2005).
ISI Web of Science Citations (excluding/including self-citations): 23/24.

[Top-9] L. Salasnich,
"Pulsed quantum tunneling with matter waves ",
Laser Physics, vol. **198**, 1719 (2002).
ISI Web of Science Citations (excluding/including self-citations): 20/44.

[Top-10] L. Salasnich,
"Dynamics of a Bose-Einstein-condensate bright soliton in an expulsive potential",
Physical Review A, vol. **70**, 053617 (2004).
ISI Web of Science Citations (excluding/including self-citations): 20/27.

6 Funds and Managing

- April 1997: Proponent of the research project "Quantum Chaos in Many-Body Systems" to get for myself a Marie-Curie TMR Individual Grant for working at the Grand Accelerateur National d'Ions Lourdes (GANIL), Caen (France). Project approved and funded with *100 kEuro in two years*. I did NOT USED this grant in order to continue my research activity in Italy.

- June 1999: Proponent of the reseach project "Theoretical investigation of trapped Bose-Esintein condensates", to get for myself a 2-year postdoctoral fellowship from Section G of the Italian Institute for the Physics of Matter (INFM). Project approved and financed with *40 kEuro per 2 years*.

- May 2003: Proponent of the reseach project "Solitonic Matter Waves in Bose-Condensed Alkali-Metal Atoms", to get for myself a 2-year position of Researcher (III level) at the Italian National Reseach Council (CNR). Project approved and financed with *80 kEuro per 2 years*. The position of reseacher (III level) has been then extended to 5 years by CNR and then "stabilized" by an Italian Law of 2006.

- May 2007: Proponent and principal investigator of the 'project "Matter Wave Solitons in Optical Lattices" presented to the National Group of Mathematical Physics (GNFM) of the "Francesco Severi" National Institute of Higher Mathematics (INdAM). Project approved and financed with *1 kEuro per 1 year*.

- June 2007: Proponent and investigator of the reseach project "Guided solitons in matter waves and optical waves with normal and anomalous dispersion", by Flavio Toigo (principal investigator), Francesco Ancilotto (investigator) e Luca Salasnich (investigator). Project presented to the Fondazione CARIPARO (Italy). Project approved and financed with *76 kEuro per 2 years*.

- Organizer and chair of the "Padua Symposium on Nonlinear Phenomena and Correlations in Ultracold Gases", Department of Physics "Galileo Galilei" University of Padua, 19 September 2008.

- Organizer and chair of the "Second Padua Symposium on Nonlinear Phenomena and Correlations in Ultracold Gases", Department of Physics "Galileo Galilei" University of Padua, 18 September 2009.

7 Referee

I am reviewer and referee of many scientific journals, publishers and societies. In particular:
– Computer Physics Communications, from 2007.

– Chinese Optics Letters, dal 2009.
– European Physical Journal B, dal 2009.
– European Physical Journal D, from 2003.
– Europhysics Letters, from 2003.
– Few Body Systems, from 2003.
– Journal of Low Temperature Physics, from 2004.
– Journal of Physics A, from 2003.
– Journal of Physics B, from 2002.
– Mathematical Reviews, from 1998.
– New Journal of Physics, from 2003.
– Optics Communications, from 2005.
– Physics Letters A, from 2004.
– Physics Letters B, from 1998.
– Physical Review A, from 1999.
– Physical Review E, from 2005.
– Physical Review Letters, from 2002.
– Progress of Theoretical Physics, from 2002.
– Royal Society (UK) for the "Royal Society Research Professorship", from 2005
– Springer-Verlag Pubishing Company, from 1997.
– Symmetry, Integrability and Geometry: Methods and Applications (SIGMA), from 2007.

8 Invited talks

8.1 Invited talks at Conferences

⋆ "Generalized superfluid hydrodynamics for the unitary Fermi gas",
Mathematical Models of Quantum Fluids, Verona (Italy), September 14-17, 2009.

⋆ "Density functional and hydrodynamics equations for the unitary Fermi gas",
Quark Gluon Plasma Meets Ultracold Atoms - Episode II, Riezlern (Austria), August 3-8, 2009.

⋆ "Surface effects in the confined unitary Fermi gas",
XVII International Laser Physics Workshop, Barcelona (Spain), July 13-17, 2009.

⋆ "Macroscopic quantum phenomena and atomic Bose-Einstein condensates", *7th Christmas Symposium of Physicists*, CAMTP - Center for Applied Mathematics and Theoretical Physics, University of Maribor (Slovenia), 11 - 13 December 2008.

⋆ "Dynamical Josephson effect with superfluid Fermi atoms across a Feshbach resonance",
XVII International Laser Physics Workshop, Trondheim (Norway), June 30 - July 4, 2008.

⋆ "Single and multiple solitons with attractive BECs in optical lattices",
at the International Conference 'NLQUGAS 2008', Nonlinear phenomena in degenerate quantum gases, Universidad de Castilla-La Mancha, Toledo (Spain), April 1-4, 2008.

⋆ "Thermodynamics of Single and Multiple Matter-wave Solitons in a Ring",
Novacella Autumn Conference "Chaos and complex systems 2006", Novacella (Italy), 9-12 October 2006.

⋆ "Dynamics and Thermodynamics of Atomic Bright Solitons in a Ring",
at the International Conference 'SOLIQUANTUM 2006: Solitons and nonlinear phenomena in degenerate quantum gases', Universidad de Castilla-La Mancha, Cuenca (Spain), Sept. 27-30, 2006.

⋆ "Mean-Field vs Monte-Carlo equation of state for the expansion of a Fermi Vapor in the BCS-BEC Crossover",
XV International Laser Physics Workshop, Lausanne (Switzerland), July 2006.

⋆ "Multiple Bright Solitons in a Toroidal Trap",
6th Int. Summer School/Conference 'Let's Face Chaos Through Nonlinear Dynamics', Maribor (Slovenia), July 2005.

⋆ "Generalized Lieb-Liniger Theory for Correlated Bose Gases under Transverse Harmonic Confinement",
XIII International Laser Physics Workshop, Trieste (Italy), July 2004.

⋆ "Bose-Einstein Condensation with Dilute Gases",
II Symposium of Physicists of the University of Maribor, Maribor (Slovenia), Dicembre 2003.

⋆ "Modulational Instability and Complex Dynamics with BEC Bright Solitons",
XII International Laser Physics Workshop, Hamburg (Germany), August 2003.

⋆ "Formation and Dynamics of Soliton Trains in Bose-Einstein Condensates",
IV European Advanced Studies Conference, 'Chaos and Complexity', Novacella (Italy), May 2003.

⋆ "BEC Solitons under Transverse Confinement",
5th Int. Summer School/Conference 'Let's Face Chaos Through Nonlinear Dynamics', Maribor (Slovenia), July 2002.

⋆ "Parametric Resonance Phenomena in the Tunneling of Bose-Einstein condensates",
XI International Laser Physics Workshop, Bratislava (Slovakia), July 2002.

⋆ "Dynamics of Bose-condensed Bright Solitons",
III European Advanced Studies Conference, 'Nonlinearity, Noncommutativity and Applications', Trakoscan (Croatia), May 2002.

⋆ "Pulsed Quantum Tunneling in Matter Waves",
X International Laser Physics Workshop, Moscow (Russia), July 2001.

⋆ "Recent Results on Degenerate Quantum Gases and Bose-Einstein Condensation",
I European Advanced Studies Conference, 'Bexbach Colloquium on Science', Bexbach (Germany), October 2000.

⋆ "Chaotic Oscillations in Finite Quantum Systems: Trapped Bose-Einstein Condensates",
4th Int. Summer School/Conference 'Let's Face Chaos Through Nonlinear Dynamics', Maribor (Slovenia), July 1999.

⋆ "Statistical Mechanics of a Trapped Bose-Einstein Condensate",
Minisimposio su Meccanica Statistica e Termodinamica Computazionale, IV Congresso della Società Italiana Matematica Applicata ed Industriale (SIMAI), Giardini Naxos (Italy), June 1998.

⋆ "Coexistence of Ordered and Chaotic States in Atomic Nuclei",
International Conference on *Nuclear Data for Science and Technology*, ICTP, Trieste (Italy), May 1997.

⋆ "Quantum Signature of the Chaos-Order Transition in a Homogenous SU(2) Yang-Mills-Higgs Field",
International Conference *Symmetry Methods in Physics*, JINR, Dubna (Russia), August 1997.

⋆ "The Onset of Chaos in the SU(3) Nuclear Model",
International Workshop *From Classical to Quantum Chaos*, SISSA, Trieste (Italy), July 1993.

8.2 Invited talks at universities and research centers

⋆ "Metodi fisico-matematici per la soluzione dell'equazione di Gross-Pitaevskii",
Dipartmento di Informatica, Università di Verona, giugno 2008, su invito del Dr. M. Squassina.

⋆ "Bose-Einstein Condensates with Attractive Scattering Length",
European Laboratory for Nonlinear Spectroscopy (LENS), Università di Firenze, maggio 2008, su invito della Dr.ssa C. Fort.

⋆ "Mixtures of Bose-Einstein Condensates",
Department of Computer Science, University of Verona, April 2008, invited by Dr. M. Squassina.

⋆ "Bright Solitons in Bose-Einstein Condensates",
Monthly Seminar of the Statistical Mechanics and Condensed Matter Groups, Department of Physics "Galileo Galilei", University of Padua, October 2006, invited by Dr. F. Baldovin.

⋆ "Quantum Phases of Attractive Matter Waves in a Toroidal Trap",
Centro Ricerca e Sviluppo INFM BEC, Department of Physics, University of Trento, May 2005, invited by Prof. F. Dalfovo.

⋆ "Formation and Complex Dynamics of BEC Bright Solitons",
Center for Applied Mathematics and Theoretical Physics (CAMTP), University of Maribor (Slovenia) 23-10-2003, invited by Prof. M. Robnik.

⋆ "Formazione e Dinamica di Bright Solitons in Condensati di Bose-Einstein",
Department of Physics "E. Caianiello" of the University of Salerno, 9-10-2003, invited by Prof. M. Salerno.

⋆ "Dynamics of Matter-Waves in Optical Traps",
Center for Applied Mathematics and Theoretical Physics (CAMTP), University of Maribor (Slovenia), 13-02-2003, invited by Prof. M. Robnik.

⋆ "Recenti Risultati sulla Condensazione di Bose-Einstein in Gas Alcalini Ultrafreddi",
Monthly Meeting of the Condensed Matter Group, Department of Physics of the University of Milan, 4-11-2002, invited by Dr. N. Manini.

⋆ "Studi Teorici sui Condensati di Bose-Einstein",
Materials Innovation Division dei Pirelli Labs di Milan, 29-01-2002, invited by Ing. F. Fontana.

⋆ "Dynamical Properties of Bose-Einstein Condensates",
Department of Physics del Politecnico di Torino, 13-01-2001, invited by Dr. V. Penna.

⋆ "Analytical Results on Bose-Einstein Condensation",
Nuclear Physics Group Meeting, Department of Physics of the University of Milan, 29-05-2001, invited by Dr. L. Viverit.

⋆ "Degenerate Quantum Gases and Bose-Einstein Condensation",
University of Maribor (Slovenia), 6-02-2001, invited by Prof. M. Robnik.

⋆ "Alcuni Problemi di Fluidodinamica Computazionale ed un Modello agli Elementi Finiti della Laguna di Venezia",
Department of Matematica Pura ed Applicata of the University of Padua, 14-02-2000, invited by Prof. M. Morandi Cecchi.

⋆ "Time-Dependent Variational Approach to Bose-Einstein Condensation",
University of Maribor (Slovenia), 18-02-1999, invited by Prof. M. Robnik.

⋆ "Bose-Einstein Condensation: Harmonic vs Toroidal Traps",
University of Maribor (Slovenia), 29-01-1998, invited by Prof. M. Robnik.

⋆ "Bosoni in una Trappola Toroidale: Stato Fondamentale e Superfluidità",
Department of Physics of the University of Milan, 15-12-1997, invited by Prof. L. Reatto.

⋆ "Order-Chaos Transition in Nuclear Systems",
University of Maribor (Slovenia), 9-01-1997, invited by Prof. M. Robnik.

⋆ "Caos Quantistico nei Sistemi Nucleari",
Department of Physics of the University of Catania, 16-12-1996, invited by Prof. A. Rapisarda.

⋆ "From Torus Quantization to the Exact One",
University of Maribor (Slovenia), 24-04-1996, invited by Prof. M. Robnik.

Padua, October 10, 2009