

## LUIZ DAVIDOVICH - CURRICULUM VITÆ - October 2011

### • PERSONAL DATA:

· *Place and Date of Birth:* Rio de Janeiro (Brazil) - June 25, 1946

· *Citizenship:* Brazilian

· *Home Address:*

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· *Work Address:*

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### • EDUCATIONAL BACKGROUND

· B. Sc. at PUC-Rio, 1969.

· Ph. D. at the University of Rochester, 1975 (Advisor: Prof.H.M. Nussenzveig).

### • AWARDS

· Grand-Cross of the National Order of Scientific Merit, awarded by the President of Brazil, 2000.

· 2001 Physics Prize, Third World Academy of Sciences (Trieste, Italy).

· Member of the Brazilian Academy of Sciences since 1995.

· Member of the Academy of Sciences for the Developing World (TWAS) since 2003.

· Foreign Associate of the National Academy of Sciences, USA, elected in 2006.

· Fellow of the Optical Society of America, elected in 2009.

· Brazilian National Prize of Science and Technology “Admiral Alvaro Alberto”, 2010.

· Tamandare Medal, awarded by the Brazilian Navy, 2010.

**• ACADEMIC ACTIVITIES:**

- Research Assistant at the Univ. of Rochester, 1969-1975.
- Assistant Professor at the Institut für Theoretische Physik, ETH - Zurich, 1976-1977.
- Assistant Professor at PUC-Rio - 1977-1982.
- Associate Professor at PUC-Rio - 1982-1993.
- Full Professor at PUC-Rio - 1993-1994.
- Full Professor at the Universidade Federal do Rio de Janeiro - From 1994.
- Visiting Professor at the Laboratoire Kastler-Brossel de l'École Normale Supérieure, Paris: September 1986 - July 1987, January-March 1991, February 1994, July 1995, January-February 1997, January-February 2001, November 2001-January 2002.
- Visiting Professor at the Center for Advanced Studies of the University of New Mexico, Albuquerque, New Mexico: January-February 1989, September 1991-May 1992, February 1998.
- Visiting Professor at the Max-Planck Institute für Quantenoptik, Garching, July-August 1989.
- Visiting Researcher at the Service de Physique Atomique, Centre d'Énergie Atomique de Saclay, Saclay, April-August 1991.
- Visiting Scientist, Institute of Theoretical Physics, University of California at Santa Barbara, California, USA, November-December 1996, and August-October 2001.
- Visiting Researcher, Isaac Newton Institute, University of Cambridge, England, July 1999.
- Visiting Professor, Université de Paris VI, January-February 2001, and June 2005.
- Visiting Researcher, University of Texas A&M, College Station, Texas, USA, February 2006.
- Visiting Researcher, Max-Planck Institute für Physik komplexer Systeme, Dresden, Germany, July 2006.
- Visiting Researcher, University of Freiburg, Germany, July 2008.
- Visiting Researcher, Weizmann Institute, Israel, August 2008.
- Visiting Researcher, ICFO (Institute of Photonic Sciences), Barcelona, Spain, July 2009.

- Visiting Researcher, University of Texas A&M, College Station, Texas, USA, February 2010.
- Lecturer at College de France, Paris, France, February 2011.

- **COURSES TAUGHT IN RECENT YEARS:**

- Quantum Mechanics (undergraduate and graduate)
- Quantum Optics I and II (graduate)
- Atomic and Molecular Physics (undergraduate)
- Experimental Physics IV (undergraduate)
- Quantum Information (graduate)
- Stochastic Processes and Statistical Optics (undergraduate)

- **THESIS ADVISING:**

- Hélio Rochlin, “*Quantum Theory of Laser Radiation Scattering by Electrons in Magnetic Fields*”, M. Sc., 1981.
- Jean Claude Garreau, “*Atomic Ionization in Intense Laser Fields*”, M. Sc., 1985.
- Ricardo Horowicz, “*Transverse Effects and Fluctuations in Optical Bistability*”, Ph. D., 1985.
- Carlos Renato de Carvalho, “*Quantum Fluctuations in Dispersive Optical Bistability*”, M. Sc., 1985.
- Mauro Fernandes Pereira Jr., “*Photon Echoes in Alkaline Cyanides*”, M. Sc., 1985.
- Ricardo Toddling, “*Ionization by Laser Fields: Study of a One-Dimensional Model*”, M. Sc., 1986.
- Paulo Américo Maia Neto, “*Quantum Theory of the Two-Photon Micromaser: The Non-Degenerate Case*”, M. Sc., 1988.
- Antonio Zelaquett Khoury, “*Role of Pumping Statistics in Micromasers*”, M. Sc., 1990.
- Paulo Alberto Nussenzveig, “*Theory of the Correlated Emission Laser*”, M. Sc., 1990.
- Paulo Américo Maia Neto, “*Theory of Two-Photon Lasers and Masers: The Non-degenerate Case*”, Ph. D., 1991.

- Carlos Renato Carvalho, “*Singularities in the Starting Times of Micromasers and Lamb-dip effects in Lasers with Saturable Absorbers*”, Ph. D., 1991.
- Sérgio Mendes Dutra, “*Squeezed Light Generation in Two-Photon Correlated Emission Lasers*”, M. Sc., 1991.
- Márcia T. Fontenelle, “*Quantum Noise Reduction in Lasers with Injected Signal*”, Ph. D., 1994.
- Antônio Zelaquett Khoury, “*Subpoissonian Lasers and Masers*”, Ph. D., 1994.
- Luiz Guilherme Lutterbach, “*Production and Detection of Squeezed States in Cavities*”, M. Sc., 1995.
- Fábio M. Peixoto, “*Stochastic Schrödinger Equations applied to a Quantum Non-demolition Measurement*”, M. Sc., 1995.
- Tarso Benigno L. Kist, “*Stochastic Schrödinger Equations applied to Dissipative Systems*”, Ph. D., 1996.
- Dario Tavares de Castro Neto, “*Quenching of Phase Noise in Lasers with Injected Signal*”, M. Sc., 1996.
- Marcelo P. E. de França Santos, “*Dynamics of Statistical Properties of Electromagnetic Fields emerging from Cavities*”, M. Sc., 1997.
- Pérola Milman, “*Production, manipulation, and protection of quantum states and decoherence*”, Ph. D., 2000.
- Luiz Guilherme Lutterbach, “*Measuring the quantum state of harmonic systems*”, Ph. D., 2001.
- Marcelo P. E. de França Santos, “*Entangled states of atoms and photons: production, characterization, and applications*”, Ph. D., 2001.
- André Ricardo R. de Carvalho, “*Chaos, decoherence, quantum-state protection, and the quantum-classical transition in trapped ions*, Ph. D., 2002.
- Dario Tavares de Castro Neto, “*Multistability in a trapped-ion system*, Ph. D., 2003.
- Paulo Augusto Sá Pires Filho, “*Output coupling for trapped fermions*,” Ph. D., 2005.
- Alexandre Baron Tacla, “*Microscopic theory of decoherence in cavity QED*, ” M. Sc., 2005.
- Miguel Justiniano Peralta Abanto, “*Constraints for the realization of Silicon-based quantum computers*,” Ph. D., 2006.
- Fernando da Rocha Vaz Bandeira de Melo, “*Entanglement, complementarity, and decoherence*”, Ph. D., 2006.

- Mario Leandro Aolita, “*The physics of entanglement: production, detection, and applications*,” Ph. D., 2008. Awarded the Brazilian Physical Society prize for the best thesis in physics, 2010.
- Malena Hohr-Meyll, “*Effects of the environment on the entanglement of quantum states*,” Ph. D., 2009.
- Rafael Chaves Souto Araújo, “*Emaranhamento sob decoerência e suas aplicações*”, Ph. D., 2010.
- Adriana Auyuanet, “*Dynamics of quantum correlations*”, Ph. D., 2010.
- Bruno Moura Escher, “*Parameter estimation in open quantum systems*”, Ph. D., 2011.

● **OTHER ACTIVITIES:**

- Secretary General of the Brazilian Physical Society, 1981–1983.
- Member of the Physics Committee of the Brazilian National Science Foundation, 1988–1989 and 1998-2000.
- Member of the Advisory Editorial Boards of *Optics Communications* (1994-2000) and *Journal of Optics B: Quantum and Semiclassical Optics* (1998-2001).
- Associate Editor of the *Journal of the Brazilian Association for the Advancement of Science* (1995-2000).
- Councillor of the Brazilian Association for the Advancement of Science, 1993–1995.
- Councillor of the Brazilian Physical Society, 1997-2001, 2003-2007, and 2009-2013.
- Member of the Editorial Board of the UNICAMP Publishing House, 2002-2004.
- Member of the Editorial Board of the *Annals of the Brazilian Academy of Sciences*, 2003-2010.
- Head of the *Brazilian Millenium Institute for Quantum Information* (involving 12 institutions in Brazil), from December 2001 to April 2006.
- Director of the Brazilian Academy of Sciences, 2004-2007, 2007-2010, and 2010-2013.
- Member of the Editorial Board of *Physical Review A*, since January 2005 – December 2009.
- Member of the Deliberative Council of the Brazilian National Research Foundation (CNPq), 2005-2009.

- Member of the Scientific Council of the International Institute of Physics (Natal, Brazil), since 2010.
- Member of the Advisory Editorial Board of *Journal of Physics B: Atomic, Molecular, and Optical Physics*, since January 2008.
- Member of the Higher Council of CAPES (Division of the Ministry of Education of Brazil), 2008-2014.
- Member of the Administrative Council of IMPA (Institute for Pure and Applied Mathematics), since 2008.
- Member of the board of the InterAcademy Council (IAC), since 2011.
- Member of the Executive Board of the International Council for Science (ICSU), since 2011.

• **ORGANIZATION OF CONFERENCES AND WORKSHOPS SINCE 2003**

- Co-organizer of the Panamerican Advanced Studies Institute (PASI) on the Physics of Information, held in Buzios, Brazil, from November 30 to December 14, 2003.
- Co-organizer of the International Workshop on Quantum Computation, held at the International Center for Condensed Matter Physics, Brasilia, August 2004
- Member of the Program Committee of the conference Quantum Optics II, held in Cozumel, Mexico, December 2004
- Member of the Program Committee of the 9th International Conference on Squeezed States and Uncertainty Relations, held in Besancon, May 2005
- Convenor of the Symposium on the World Year of Physics, in the 16th General Meeting of the Academy of Sciences for the Developing World (TWAS), held in Alexandria, Egypt, December 2005
- Member of the Program Committee of the conference Quantum Optics III, held in Pucon, Chile, December 2006
- Member of the Program Committee of the SPIE meeting on Fluctuations and Noise, Florence, Italy, May 2007
- Member of the Program Committee of the OSA Workshop on Entanglement and Decoherence, Boston, USA, July 2008
- Secretary-General of the 4th. Brazilian National Conference on Science, Technology, and Innovation for a Sustainable Development, Brasilia, Brazil, May 2010

- Member of the Program Committee of the OSA-Shanghai Institute of Optics Workshop on Entanglement, Decoherence, and Quantum Control, Qufu, China, June 2010
- Co-chair of the OSA Latin American Optics and Photonics Conference, Recife, Brazil, September 2010
- **INVITED TALKS AND COURSES IN CONFERENCES AND SCHOOLS (SINCE 1995):**
  - *Les Houches Summer School, Session LXIII: Quantum Fluctuations*, Les Houches, France, July 1995, Invited Course (“Sub-Poisson Photon Statistics”).
  - *French-Brazilian Colloquium on Laser-Matter Interaction*, Rio de Janeiro, Brazil, January 1996, Invited Talk (“Decoherence in Cavity QED”).
  - *V Jorge André Swieca Summer School: Quantum and Non-Linear Optics*, Rio de Janeiro, Brazil, January 1996, Invited Course (“Probing Quantum Mechanics with Cavity QED”).
  - *VI Jorge André Swieca Summer School: Quantum and Non-Linear Optics*, January 1998, São Carlos, São Paulo, Brazil, Invited Course (“Quantum States of the Radiation in Cavities”).
  - *International Conference on Coherent and Non-linear Optics (ICONO’98)*, June 1998, Moscou, Russia, Invited Talk (“Ramsey Interferometry, Wigner function, and controlled-not gates”).
  - *XXXI Latin-American School of Physics*, Mexico City, Mexico, July 1998, Invited Course (“Quantum Optics in Cavities and the Classical Limit of Quantum Mechanics”).
  - *Workshop “Mysteries, Puzzles and Paradoxes of Quantum Mechanics”*, Garda Lake, Italy, August 1998, Invited Talk (“Decoherence, Wigner functions and the Classical Limit of Quantum Mechanics”).
  - *International Workshop “Collective Excitations in Fermi and Bose Systems”*, Serra Negra, São Paulo, Brazil, September 1998, Invited Talk (“Measuring the Quantum State of the Electromagnetic Field”).
  - *Annual Meeting of the Argentinian Physics Association*, La Plata, Argentina, September 1998, Invited Talk (“Schrödinger Cats and Decoherence in Quantum Optics”).
  - *Workshop on Novel Directions in Quantum Physics and Materials Science*, Pune, India, December 1998, Invited Course (“Decoherence, Quantum Optics, and Quantum Measurement Theory”).

- *Summer School of the Physics Department of the Federal University of Pernambuco, Recife, Pernambuco, Brazil, January 1999, Invited Course (“Topics in Quantum Optics”).*
- *Workshop “Complexity, Computation, and the Physics of Information”, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, Cambridge, England, July 1999, Invited Talk (“Decoherence, Wigner Functions, and Controlled-not Gates”).*
- *Workshop “Entanglement and Decoherence”, Garda Lake, Italy, September 1999, Invited Talk (“Decoherence, Reservoir Engineering, and Quantum State Protection”).*
- *VII Jorge André Swieca Summer School: Quantum and Non-Linear Optics, February 2000, Recife, Pernambuco, Brazil, Invited Course (“Quantum Optics in Cavities”).*
- *Pan American Advanced Institute on “New Trends in Atomic and Molecular Physics”, May 2000, Angra dos Reis, Rio de Janeiro, Invited Course (“Decoherence and Quantum Optics”).*
- *II Winter School Juan José Giambiagi, July 2000, Universidade de Buenos Aires, Argentina, Invited Course (“Topics of Quantum Optics”).*
- *International Conference “Quantum Optics I,” August 2000, Pontificia Universidad de Chile, Santiago, Chile, Invited Talk “Decoherence, Pointer Engineering, and Quantum State Protection”).*
- *Pan American Advanced Study Institute on “Chaos, decoherence and quantum entanglement,” October 2000, Ushuaia, Argentina, Invited Talk (“Quantum Optics in Cavities, Phase Space Representations, and the Classical Limit of Quantum Mechanics”).*
- *31st Physics of Quantum Electronics Conference, January 2001, Snowbird, Utah, USA, Invited Talk (“Direct Measurement of the Wigner Function: Probing the Quantum-Classical Transition”).*
- *Summer School of Physics, January 2001, Universidad de Concepcion, Concepcion, Chile, Invited Course (“Quantum Optics, Decoherence, and Phase Space Representations”).*
- *International Workshop on Quantum Chaos, July 2001, Cuernavaca, México, Invited Talk (“Decoherence and the Classical Limit of Quantum Mechanics”).*
- *Workshop on Quantum Information, December 2001, Santa Barbara, California, USA, Invited Talk (“Decoherence and Quantum State Measurement in Quantum Optics”).*

- *First International Workshop on Decoherence, Information, Complexity and Entropy DICE 2002, September 2002* Piombino, Tuscany, Invited Talk (“Decoherence and Quantum-State Measurement in Quantum Optics”).
- *8th International Conference on Squeezed States and Uncertainty Relations*, June 2003, Puebla, Mexico, Invited Talk (“Dissipation, diffusion, and the quantum-classical transition in phase space”).
- *Pan-American Advanced Studies Institute on the Physics of Information*, December 2003, Buzios, Brazil, co-organizer and invited course (“Quantum information and quantum optics”).
- *9th Jorge André Swieca Summer School: Quantum and Non-Linear Optics*, February 2004, Belo Horizonte, Minas Gerais, Brazil, Invited Course (“Quantum optics, quantum information, and quantum-state reconstruction”).
- *Spring Meeting of the Materials Research Society*, April 2004, San Francisco, CA, USA, Plenary Talk (“Quantum Information”).
- *Entanglement, Information, and Noise*, May 2004, Krzyzowa, Poland, Invited Talk (“Quantum-classical limit in phase space: Roles of dissipation and diffusion”).
- *XIX International Conference on Atomic Physics (ICAP)*, June 2004, Rio de Janeiro, Brazil, Plenary Talk (“Decoherence and quantum-classical transition in phase space”).
- *International Conference on Frontiers of Nonlinear Physics*, July 2004, Nizhny Novgorod, Russia, Invited Talk (“Quantum-classical transition in phase space: Roles of dissipation and diffusion”).
- *Workshop on Quantum Computation*, August 2004, Brasília, Brazil, Organizer and Invited Talk (“Decoherence and the classical limit of quantum mechanics”).
- *Quantum Optics II*, December 2004, Cozumel, Mexico, Invited Talk (“Decoherence and the classical limit of quantum mechanics for chaotic systems”).
- *International Conference on Squeezed States and Uncertainty Relations 2005, May 2005*, Besançon, France, Invited Talk (“Quantum-classical transition in phase space”).
- *Fluctuations and Noise 2005*, May 2005, Austin, Texas, USA, Invited Talk (“Decoherence and the quantum-classical limit in phase space”).
- *International Summer School on Quantum Information*, September 2005, Dresden, Germany, Invited Talk (“Probing finite-time disentanglement for cavity QED and trapped ions”).

- *Workshop on Noise and Instabilities in Quantum Mechanics*, October 2005, Trieste, Italy, Invited Talk (“Heisenberg-limited measurements of displacements and rotations with cavity QED and ion traps”).
- *16th General Meeting of the Academy of Sciences for the Developing World (TWAS)*, December 2005, Alexandria, Egypt, Convener of the Symposium on the World Year of Physics, and Invited Talk (“Spooky action at a distance: Exploring the subtleties of the quantum world”).
- *International Conference on Quantum Optics*, December 2005, Hong Kong, China, Invited Talk (“Heisenberg-limited measurements and sub-Planck structures in phase space”).
- *International Nathiagali Summer College*, June 2006, Nathiagali, Pakistan, Invited course (“Entanglement and decoherence”).
- *V Meeting of the Brazilian Society for Materials Research*, October 2006, Florianopolis, Brazil, Keynote Lecture (“Quantum information”).
- *Quantum Optics III*, December 2006, Pucón, Chile, Invited Talk (“Experimental observation of the sudden death of entanglement”).
- *X Jorge André Swieca School on Quantum Optics and Nonlinear Optics*, March 2007, Maceió, Alagoas, Brazil, invited course (“Quantum optics and quantum information”).
- *XXX National Meeting on Condensed Matter Physics*, May 2007, São Lourenço, Brazil, Plenary Lecture (“Entanglement and decoherence”).
- *Fluctuations and Noise 2007*, May 2007, Florence, Italy, invited talk (“Experimental observation of environment-induced sudden death of entanglement”).
- *Coherence and Quantum Optics 9*, June 2007, Rochester, NY, USA, invited talk (“Entanglement and decoherence: global versus local dynamics”).
- *Workshop on Entanglement and Quantum Decoherence*, January 2008, Nara, Japan, invited talk (“Entanglement and decoherence”).
- *XI Jorge André Swieca School on Quantum Optics and Nonlinear Optics*, February 2008, São Paulo, Brazil, invited course (“Introduction to entanglement and quantum information”).
- *Quantum Electronics and Laser Science (QELS)*, May 2008, San Jose, California, tutorial talk (“Entanglement, decoherence, and quantum information”).
- *Quantum Coherence and Decoherence*, Benasque, Espanha, September 2008, invited talk (Dynamics of entanglement).

- *Quantum Optics IV*, Florianopolis, Brasil, October 2008, invited talk (Experimental investigation of the dynamics of entanglement: Sudden death, complementarity, and continuous monitoring of the environment).
- *International Workshop on the Foundations of Light-Matter Interactions*, Recife, October 2008, invited talk (Entanglement and decoherence).
- *Workshop on Open Quantum Systems: Decoherence and Control*, Harvard University, Boston, USA, November 2008 (Dynamics of entanglement).
- *XXXII National Meeting on Condensed Matter Physics*, May 2009,guas de Lindia, Brasil, invited talk (Dynamics of Entanglement).
- *Laser Physics 2009*, July 2009, Barcelona, Spain, invited talk (Entanglement and decoherence).
- *Workshop on Atoms, Cavities, and Photons*, September 2009, College de France, Paris, France, invited talk (“From quantum to classical: Schrödinger cats, entanglement, and decoherence”).
- *Workshop Quantum Nonstationary Systems*, October 2009, Brasilia, DF, Brazil, Invited talk (“Schrödinger cats, entanglement, and decoherence”).
- *Worskhop on Nanomagnetism, Spin Electronics, and Quantum Optics*, November 2009, CBPF, Rio de Janeiro, Brazil, invited talk (“Effects of the environment on quantum systems: Schrödinger cats, entanglement, and decoherence”).
- *3rd. Workshop on Quantum Chaos: Theory and Applications*, December 2009, Buenos Aires, Argentina, Invited talk (“From quantum to classical: Schrödinger cats, entanglement, and decoherence”).
- *Workshop on Entanglement, Decoherence, and Quantum Control*, June 2010, Qufu, China, invited talk (“Dynamics of entanglement”).
- *19th International Laser Physics Workshop (LPHYS'10)*, July 2010, Foz do Iguau, Brazil, invited talks (“Entanglement, decoherence, and quantum metrology” and “Open-system dynamics of entanglement”).
- *International Iran Conference on Quantum Information 2010 (IICQI-10)*, September 2010, Kish Island, Iran, Plenary talk (“Entanglement and Decoherence: From Einstein and Schrödinger to Quantum Optics Experiments”).
- *OSA Latin America Optics and Photonics Conference (LAOP)*, September 2010, Recife, Brazil, Tutorial (“Entanglement and Decoherence: From Einstein and Schrödinger to Quantum Optics Experiments”).
- *21st General Meeting of the Academy of Sciences for the Developing World (TWAS)*, October 2010, Hyderabad, India, Plenary talk (“Exploring the subtleties of the quantum world”).

- *OSA Frontiers in Optics Conferences (FiO 2010)*, October 2010, Rochester, NY, USA, Invited talk (“Quantum limits to lossy optical interferometry”).
- *Collège de France*, February 2011, four lectures on “Entanglement, decoherence, and quantum metrology”.
- *XII International Conference on Squeezed States and Uncertainty Relations*, May 2011, Foz do Iguau, Brazil, Plenary talk (“Ultimate precision limits in noisy quantum-enhanced metrology”).
- *18th Central European Workshop on Quantum Optics*, May 2011, Madrid, Spain, Plenary talk (“Quantum metrology with noisy systems”).
- *4th International Conference on Quantum Information*, June 2011, Ottawa, Canada, Invited talk (“Ultimate precision limits for parameter estimation in noisy quantum-enhanced metrology”).
- *XIII Cross Border Workshop on Laser Science*, June 2011, Rochester, NY, USA, plenary talk (“Entanglement and decoherence: From Einstein and Schrödinger to Quantum Optics experiments”).