

Curriculum vitae

Gheorghe Nenciu

Born:

28.06.1944, Moeciul de Jos, Brasov, Romania.

Nationality:

Romanian

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Education

University of Bucharest: 1962-1967

Master: Physics.

Scientific degree

PhD (Theoretical Physics) 1974.

Present position:

Senior scientific researcher I, Institute of Mathematics “Simion Stoilow”
of the Romanian Academy.

Positions held:

Scientific researcher, Institute of Atomic Physics, Bucharest, Romania: 1967-1974.

Senior scientific researcher III, Institute of Atomic Physics, Bucharest, Romania: 1974-1990.

Associate Professor of Theoretical Physics, University of Bucharest, Romania: 1990-1995.

Professor of Theoretical Physics, University of Bucharest, Romania: 1995-2009.

Senior scientific researcher I, Institute of Mathematics "Simion Stoilow" of the Romanian Academy: 1993-

Awards

"D. Hurmuzescu" Prize of the Romanian Academy, 1972.

Member of:

"Advisory Board" **Helvetica Physica Acta** (1990-2000).

"Editorial Board" **Asian-European Journal of Mathematics** (2008-2010).

Visiting positions:

Senior scientific researcher:

IUCN-Dubna, USSR: 1980-1983

Directeur de recherche, CNRS, Paris, France, 1993 (3 months), 1994 (6 months).

1-3 months visiting professor:

Université Paris VII, Paris, France ; Max Planck Institut, Munchen, Germany; CPT Marseille, Marseille, France; Institut Mittag-Leffler, Stocholm, Sweden; Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland; Universität Zurich, Zurich, Switzerland; E.T.H. Zurich, Switzerland; Erwin Schrödinger Institute, Vienna, Austria; Université Paris XIII; Aalborg University, Denmark.

Publications

More than 80 papers in ISI journals and conference proceedings.

Selected areas of research and representative papers :

i. Spectral theory of magnetic Schrödinger operators: regularized magnetic perturbation theory and applications.

Representative papers:

1. N. Anghel, M. Bundaru, G. Nenciu: On the Landau Diamagnetism. *Commun. Math. Phys.* **42**, 9-28 (1975).
2. G. Nenciu: Dynamics of Band Electrons in Electric and Magnetic Fields: Rigorous Justification of Effective Hamiltonians. *Rev. Mod. Phys.* **63**, 91-127 (1991).
3. D.H.Cornean, G.Nenciu: On the eigenfunction decay for magnetic Schrödinger operators. *Commun. Math. Phys.* **192**, 671-685 (1998)
4. G. Nenciu: On asymptotic perturbation theory for quantum mechanics: almost invariant subspaces and gauge invariant magnetic perturbation theory. *J. Math. Phys.* **43**, 1273–1298 (2002).
5. G. Nenciu: On the smoothness of gap boundaries for generalized Harper operators. *Advances in operator algebras and mathematical physics*, 173–182, Theta Ser. Adv. Math., 5, Theta, Bucharest, 2005.
6. H. D. Cornean, G. Nenciu, T. G. Pedersen: The Faraday effect revisited: general theory. *J. Math. Phys.* 47 (2006), no. 1, 013511
7. H.D.Cornean, G. Nenciu, The Faraday effect revisited: thermodynamic limit. *J. Funct. Anal.* **257** (2009), no. 7, 2024-2066.

ii. Relativistic quantum mechanics; Dirac equation: self-adjointness for singular (Coulomb like) potentials, non-relativistic limit and spontaneous pair creation in linear Q.E.D..

Representative papers:

7. G. Nenciu: Self-adjointness and Invariance of the Essential Spectrum for Dirac Operators Defined as Quadratic Forms. *Commun. Math. Phys.* **48**, 235-247 (1976).
8. G. Nenciu, Existence of Spontaneous Pair Creation in the External Field Approximation of Q.E.D. *Commun. Math. Phys.* **109**, 303-312 (1987).
9. D. R. Grigore, G. Nenciu, R. Purice: On the Non-relativistic Limit of the Dirac Hamiltonian.

Ann. Inst. Henri Poincaré **51**, 231-263 (1989).

iii. Rigorous results in statistical mechanics and solid state theory: existence of thermodynamic limit in classical and quantum statistical mechanics, dynamics of Bloch electrons in external electromagnetic field, transport theory in mesoscopic systems.

Representative papers:

10. N. Angelescu, G. Nenciu: On the Independence of the Thermodynamic Limit on the Boundary Condition in Quantum Statistical Mechanics. *Comm. Math. Phys.* **29**, 15-30 (1972).

11. A. Nenciu, G. Nenciu: Dynamics of Bloch Electrons in External Electric Fields: I. Bounds for Interband Transitions and Effective Wannier Hamiltonians.

II. Existence of Stark-Wannier resonances

J. Phys. A: Math. Gen. **14**, 2817, (1981); **15**, 3313 (1982)

12. G. Nenciu: Existence of the Exponentially Localized Wannier Functions.

Commun. Math. Phys. **91**, 81-85 (1983)

13. A.Nenciu, G.Nenciu

Existence of generalized Wannier functions for one dimensional systems.

Commun. Math. Phys. **190**, 541-548 (1998)

14. G. Nenciu: Independent electron model for open quantum systems: Landauer-Büttiker formula and strict positivity of the entropy production.

J. Math. Phys. **48**, 033302, 8 pp. (2007).

iv. Adiabatic expansions and asymptotic perturbation theory.

Representative papers:

15. G. Nenciu: Adiabatic Theorem and Spectral Concentration. I. Arbitrary Order Spectral Concentration for the Stark Effect in Atomic Physics.

Commun. Math. Phys. **82**, 121-136 (1981).

16. G. Nenciu: Linear Adiabatic Theory. Exponential Estimates.

Commun. Math. Phys. **152**, 479-496 (1993).

17. Ph. A. Martin, G. Nenciu: Semi-classical Inelastic S-Matrix for One-dimensional N-States Systems

Rev. Math. Phys. **7**, 193-242 (1995)

v. Threshold phenomena for Schrödinger type operators: asymptotic expansions of the resolvent at thresholds and the form of Fermi Golden Rule

at threshold for Schrödinger operators in odd dimensions.

Representative papers:

18. A. Jensen, G. Nenciu: A unified approach to resolvent expansions at thresholds.

Rev. Math. Phys. **13**, 717–754 (2001).

19. A. Jensen, G. Nenciu: The Fermi Golden Rule and its form at threshold in odd dimensions.

Commun. Math. Phys. **261**, 693–727 (2006).

Current scientific interest

Partial Differential Operators; spectral theory for Schroedinger and Dirac operators.