Curriculum vitae

Francesco Guerra

Dipartimento di Fisica, Sapienza Università di Roma

and Istituto Nazionale di Fisica Nucleare, Sezione di Roma

Piazzale Aldo Moro 5, 00185 Roma, Italy

Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi

Compendio del Viminale - Piazza del Viminale 1, 00184 Roma, Italy

e-mail: `francesco.guerra@roma1.infn.it`

March 3, 2018

- Born in Naples (Italy) on November 10, 1942.
- Classical Lyceum "Jacopo Sannazzaro" in Naples, licence on July 1960.
- Doctoral degree in Physics (*Laurea summa cum laude*) on November 20, 1964, at the University of Naples.
- a.y. 1964-66 Research fellow of the (Italian) National Council of Research (CNR), at the Institute of Physics of the University of Naples.
- a.y. 1966-68 Researcher of the (Italian) National Institute for Nuclear Physics (INFN), level R6 for 1966-67, level R5-1 for 1967-68.
- is granted the "idoneità R5 INFN" (habilitation as senior researcher) in the 1967 session, by a national competition.
- a.y. 1968-70 "Professore Incaricato" of General Physics at the University of Naples. Research collaborator of the (Italian) National Institute for Nuclear Physics (INFN), level R5-1 for 1968-69, level R5-2 for 1969-70.
- a.y. 1970-72 "Research Associate" at the Department of Physics of Princeton University (U.S.A.).
- "Libero Docente" (free professorsorship) in Theoretical Physics from June 1971, earned by national competition.
- a.y. 1972-73 "Professore Incaricato" of General Physics at the University of Salerno (Italy).
- a.y. 1973-76 "Professore Incaricato Stabilizzato" (tenured position) of Theoretical Physics.
- a.y. 1974-75 "Associate Professor" of Mathematical Physics at the University of Aix-Marseille at Luminy, France (visiting position).

- a.y. 1975-76 Member of the Institute for Advanced Study, Princeton.
- a.y. 1976-79 Full Professor of Theoretical Physics at the University of Salerno (from March 1st 1976), elected member of the Administration Council of the University, Director of the Institute of Physics.
- a.y. 1978-79 "Prorettore" (Deputy Rector) of the University of Salerno.
- a.y. 1979-2013 Full Professor of Theoretical Physics at the University of Rome "La Sapienza".
- a.y. 1979-85 Member of the Department of Mathematics.
- a.y. 1983-84 Director of the Department of Mathematics.
- a.y. 1985- Member of the Department of Physics.
- a.y. 1984-90 Member of the Committee for new developments of the University (Commissione di Ateneo per la Sperimentazione Didattica e Scientifica).
- a.y. 1995-2001 Director of the Department of Physics.
- a.y. 1998-2005 Member of the Evaluation Committee of the University (Nucleo di Valutazione dell'Ateneo).
- a.y. 1998-2001 Member of the Representative Committee of Department Directors.
- a.y. 2000-2011 Member of the Evaluation Committee of the National Institute for Higher Mathematics (INdAM).
- a.y. 2008-2013 Chairman of the Graduation Committee (Commissione di Laurea) at the Department of Physics.
- 2012-2013 Member of the Panel Physics of the ANVUR, National Agency for the Evaluation of Universities and Research.
- Recipient of "incarico di ricerca scientifica INFN" (research groups coordinated by Silvano Petrarca and Giovanni Amelino-Camelia) until December 31, 2013.
- Retired on October 31, 2013.
- Nominated as professor emeritus by the Faculty of Mathematical, Physical and Natural Sciences, and by the Academic Senate (Ministerial decree).
- Associated to INFN (National Institute for Nuclear Physics), as recipient of "incarico di associazione per eminenti personalità scientifiche".
- Associated to Centro Fermi - Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi.

Seminars and courses held by invitation in many Universities, Research Centers and Congresses, in particular at Marseille, Kiev, Moscow, Princeton, New York, Harvard, Karpacz, Paris, Varenna, Erice, Aix-en-Provence, Bures-sur-Yvette, Munich, Frankfurt, Mainz, Lausanne, Warsaw, Berlin, Barcellona, Madrid, Bielefeld, Rennes, Bochum, Schladmig, Kaiserslautern, Poiana-Brasov, Les Houches, Tokyo, Kyoto, Nagoya, Toulon, Amsterdam, Groeningen, Cergy-Pontoise, New Delhi, Kolkata, Rio de Janeiro, São Paulo,

Vienna, Leipzig, Lisbon, Nantes, Eindhoven, Geneve, Zurich, Stockholm, Hagen, Roma, Milano, Camerino, Como, Bologna, Cortona, Pisa, Torino, Frascati, Rimini, Genova, Bari, Padova, Modena, Trieste, Parma, Palermo, Lecce, Napoli, Pavia, Perugia, Salerno, Catania, Udine, Messina, Policoro.

Invitations include a plenary lecture at the 4ECM, Fourth European Congress of Mathematics, Stockholm, June 27-July 3, 2004, a plenary lecture at the ICMP2006, International Congress of Mathematical Physics, Rio de Janeiro August 6-13, 2006, a plenary lecture at the Italian Opening Ceremony of the International Year of Light 2015, Sala del Senato di Palazzo Madama, Torino, January 26, 2015.

Referee for Physical Review, Physical Review Letters, Reviews of Modern Physics, Journal of Mathematical Physics, Communications in Mathematical Physics, Il Nuovo Cimento, Lettere al Nuovo Cimento, Comptes Rendues, Acta Applicanda Mathematicae, Nuclear Physics, Europhysics Letters, Annals of Probability, Journal of Statistical Physics, Annals of Mathematics, Physics Letters.

Member of the editorial board for The European Physical Journal H - Historical Perspectives on Contemporary Physics, since its foundation in 2010, and managing editor from 2012.

Member of the Editorial Board of the Giornale di Fisica.

Member of the Advisory Board of Il Nuovo Cimento C.

Recipient of the Prize for History of Physics of the Italian Physical Society (2008).

Awarded as "Socio benemerito della Società Italiana di Fisica" (2013), for his contributions to theoretical physics and history of physics.

Coordinator of research funds coming from the University of Salerno, the National Council of Research, the Sapienza University of Rome, the Ministry of Instruction, University and Research.

Organizer and/or member of the scientific advisory committee of many international conferences.

Academico di nulla academia.

Scientific research experience includes:
- renormalization in quantum field theory, see for example [1, 2, 3, 5, 6, 7, 8, 9]. The main results include the development of the renormalization procedure based on recursive regularization of products of distributions and recursive absorption of the resulting ambiguities in the renormalization counter-terms, and the establishment of the analytic regularization method in configuration space.

- constructive quantum field theory, [10, 11, 12, 13, 15, 18, 20, 14, 21, 22, 23, 24, 25, 26, 29, 30, 32, 47, 55, 56, 122]. Here new methods based on Euclidean field theory are applied to study the infinite volume limit of states and quantum correlation functions, by including statistical mechanics techniques. The Wightman axioms are proved for interacting fields in two space-time dimensions in the strong coupling regime, by using correlation inequalities.
- gauge fields on the lattice, [33, 34, 35, 36, 37, 41, 43, 44, 48]. Recursive equations are established for correlation functions, with large convergence radius. Correlation inequalities are established and exploited for the proof of quark confinement in simple models. Higgs phenomenon and mass generation is studied independently from the spontaneous gauge symmetry breaking.
- applications of stochastic methods in quantum field theory and quantum mechanics [16, 17, 19, 45, 46, 49, 52, 53, 54, 57, 59, 60, 64, 65, 66, 68, 70, 71, 73, 75, 84, 85, 88, 87, 93, 100]. The connection between Nelson stochastic mechanics and Euclidean quantum field theory is established. Various applications are given to free and interacting quantum fields.
- stochastic processes on curved manifolds, [38, 39, 74, 76, 80, 81]. The geodesic correction to stochastic parallel displacement is defined. Various proposals for the definition of kinetic energy for stochastic processes are introduced. The stochastic isokinetic map allows to derive Schrödinger equation for quantum system on curved manifolds without the curvature term.
- stochastic variational principles, [62, 67, 77, 78, 86]. Stochastic variational principles are considered for dissipative and non-dissipative systems. The Guerra-Morato variational principle allows to derive Schrödinger equation and the algebra of quantum observable, in the frame of stochastic control theory.
- statistical mechanics of spin glasses and complex systems, and related topics [89, 90, 91, 95, 97, 98, 97, 99, 103, 104, 105, 107, 108, 109, 110, 114, 111, 112, 117, 118, 121, 123, 124, 135, 139, 136, 140, 142, 143, 144, 145, 147, 146, 148, 153, 151, 152, 159, 158, 160, 161, 162, 166, 167, 168, 169, 170, 171, 173, 174, 178, 181]. Interpolation methods are introduced in order to study the cavity properties and the infinite volume limit for free energy and states in mean field spin glass models, and related models, as the bipartite models and neural networks. Stochastic stability is exploited in order to derive the so called Ghirlanda-Guerra equalities for the overlap distribution, strongly connected to ultra-metricity. A sum rule connecting the free energy of mean field models with the Parisi expressions has been the key tool to prove the Parisi formula in the infinite volume limit. The interpolation methods have been extended to other mean field models.
- history of nuclear physics and related topics [113, 116, 130, 131, 126, 119, 127, 133, 134, 129, 132, 149, 138, 157, 141, 150, 155, 156, 163, 164, 172, 175,

176, 177, 179, 180]. The first laboratory notebook of Enrico Fermi has been located among the papers of Oscar D'Agostino in Avellino. This allows to study the discovery of the neutron induced radioactivity (1934) on a new primary documentary basis. An extensive study has been pursued on the scientific and academic activity of Ettore Majorana. Some aspects of his disappearance have been clarified. The period of scientific activity of Bruno Pontecorvo in Italy and France has been reconstructed.

For other research topics (dynamical systems, signal processing, biological immune system) see [4, 51, 42, 58, 61, 63, 69, 72, 92, 79, 82, 115, 94, 83, 101, 102, 154, 137, 106, 165]. Here, in particular, it is shown how dynamical methods for complex systems allow to build realistic models for musical organization and speech production. Moreover, it is shown how methods of statistical mechanics can be at the basis of useful description of the immune system, with direct experimental verification.

List of ten significant papers

- Francesco Guerra, "Uniqueness of the Vacuum Energy Density and van Hove Phenomenon in the Infinite-Volume Limit for Two-Dimensional Self-Coupled Bose Fields," Physical Review Letters **28**, 1213 (1972).

- Francesco Guerra and Patrizia Ruggiero, "New Interpretation Of The Euclidean-Markov Field In The Framework Of Physical Minkowski Space-Time", Physical Review Letters **31**, 1022 (1973).

- Francesco Guerra, Lon Rosen and Barry Simon, "The $P(\phi)_2$ Euclidean Quantum Field Theory as Classical Statistical Mechanics", Annals of Mathematics **101**, 111-259 (1975).

- Francesco Guerra and Laura M. Morato, "Quantization of Dynamical Systems and Stochastic Control Theory", Physical Review D **27**, 1774-1786 (1983).

- Francesco Guerra, "About the Overlap Distribution in Mean Field Spin Glass Models", International Journal of Modern Physics B **10**, 1675-1684 (1996).

- Francesco Guerra and Stefano Ghirlanda, "General Properties of Overlap Probability Distributions in Disordered Spin Systems. Towards Parisi Ultrametricity", Journal of Physics A-Mathematical and General **31**, 9149-9155 (1998).

- Francesco Guerra, Fabio L. Toninelli, "The Thermodynamic Limit in Mean Field Spin Glass Models", Communications in Mathematical Physics **230**, 71-79 (2002).

- Francesco Guerra, "Broken Replica Symmetry Bounds in the Mean Field Spin Glass Model", Communications in Mathematical Physics **233**,

1-12 (2003),

- Adriano Barra, Giuseppe Genovese, Francesco Guerra, "The Replica Symmetric Approximation of the Analogical Neural Network", Journal of Statistical Physics **140**, 784-796 (2010).

- Elena Agliari, Adriano Barra, Francesco Guerra, Francesco Moauro, "A thermodynamical perspective of immune capabilities", Journal of Theoretical Biology **287**, 48-63 (2011).

References

[1] Francesco Guerra and Maria Marinaro, "Divergence of Renormalized vs Convergence of Regularized Perturbative Expansions in a Field-Theoretical Model", Nuovo Cimento **42**, 285 (1966).

[2] Francesco Guerra and Maria Marinaro, "Removal of Poit-Loop Ambiguities through Finite-Part Renormalization", Nuovo Cimento **42**, 306 (1966).

[3] Eduardo R. Caianiello, Francesco Guerra and Maria Marinaro, "Renormalization Theory", Progress of Theoretical Physics, Suppl. **37-38**, 183 (1966).

[4] Giovanni De Franceschi, Francesco Guerra, Francesco Vanoli and Vittorio Silvestrini, "Width $\Gamma_{X_0 \to 2\gamma}$ as a Test of the Mass Formula of Boson Nonets", Physical Review **166**, 1587 (1968).

[5] Eduardo R. Caianiello, Francesco Guerra and Maria Marinaro, "Form Invariant Renormalization", Nuovo Cimento **60A**, 713 (1969).

[6] Francesco Guerra and Maria Marinaro, "A Class of Finite-Part Integration Rules for Quantum Field Theory Defined by a Method of Analytic Continuation", Nuovo Cimento **60A**, 756 (1969).

[7] Filippo Esposito, Ugo Esposito and Francesco Guerra, "The Renormalization Group in a Quantum Field Theory Regularized by Finite-Part Integration Rules", Nuovo Cimento **60A**, 772-790 (1969).

[8] Francesco Guerra, "Equivalence Problems in Models with Infinite Renormalization", Nuovo Cimento **68A**, 258 (1970).

[9] Francesco Guerra, "On Analytic Regularization in Quantum Field Theory", Nuovo Cimento **1A**, 523 (1971).

[10] Francesco Guerra, "Uniqueness of the Vacuum Energy Density and van Hove Phenomenon in the Infinite-Volume Limit for Two-Dimensional Self-Coupled Bose Fields," Physical Review Letters **28**, 1213 (1972).

[11] Francesco Guerra, Lon Rosen and Barry Simon, "Nelson's Symmetry and the Infinite Volume Behavior of the Vacuum in $P(\phi)_2$", Communications in Mathematical Physics **27**, 10-22 (1972).

[12] Francesco Guerra, Lon Rosen and Barry Simon, "The Vacuum Energy for $P(\phi)_2$: Infinite Volume Limit and Coupling Constant Dependence", Communications in Mathematical Physics **27**, 10 (1972).

[13] Francesco Guerra, Lon Rosen and Barry Simon, "Statistical Mechanics Results in the $P(\phi)_2$ Quantum Field Theory," Physics Letters B **44**, 102 (1973).

[14] Francesco Guerra, "Introduction to Euclidean-Markov Methods in Constructive Quantum Field Theory", in:*New Developments in Relativistic Quantum Field Theory*, Acta Universitatis Wratislaviensis, n. 207, Wroclaw, 1974.

[15] Francesco Guerra, Lon Rosen and Barry Simon, "The $P(\phi)_2$ Euclidean Quantum Field Theory as Classical Statistical Mechanics", Annals of Mathematics **101**, 111-259 (1975).

[16] Francesco Guerra and Patrizia Ruggiero, "New Interpretation Of The Euclidean-Markov Field In The Framework Of Physical Minkowski Space-Time", Physical Review Letters **31**, 1022 (1973).

[17] Francesco Guerra, "On The Connection Between Euclidean-Markov Field Theory and Stochastic Quantization", in: *C^*-Algebras and their Applications to Statistical Mechanics and Quantum Field Theory*, D. Kastler, ed., North Holland, Amsterdam, 1976.

[18] Francesco Guerra, "Bose Field Theory as Classical Statistical Mechanics. I. The Variational Principle and the Equilibrium Equations", in: *Constructive Quantum Field Theory*, G. Velo and A.S. Wightman, editors, Springer-Verlag, Berlin, 1973.

[19] Francesco Guerra, "On Stochastic Field Theory", Supplement Journal de Physique **34**, CL, 1973.

[20] Francesco Guerra, "Nelson's Symmetry at Work: The Infinite Volume Behavior of the Vacuum for Two-Dimensional Self Coupled Bose

Fields", in: *Renormalization and Invariance in Quantum Field Theory*, E.R. Caianiello, ed., Plenum Publishing Corp., New York, 1974.

[21] Francesco Guerra, Lon Rosen and Barry Simon, "The Pressure is Independent of the Boundary Conditions for $P(\phi)_2$ Field Theories", Bullettin of the American Mathematical Society **80**, 1205-1209 (1974).

[22] Francesco Guerra, "Euclidean Quantum Field Theory", in: *Mathematical Physics and Physical Mathematics*, K. Maurin and R. Raczka, editors, D. Reidel, Dordrecht, and PWN, Warszawa, 1976.

[23] Francesco Guerra, "Statistical Mechanics Methods in Quantum Field Theory", in: *International School of Mathematical Physics*, University of Camerino, Camerino, 1974.

[24] Francesco Guerra, Lon Rosen and Barry Simon, "Correlation Inequalities and the Mass Gap in $P(\phi)_2$. III. Mass Gap for a Class of Strongly Coupled Theories with Nonzero External Field", Communications in Mathematical Physics **41**, 19-32 (1975).

[25] Francesco Guerra, "Local Algebras in Euclidean Quantum Field Theory", Istituto Nazionale di Alta Matematica, Symposia Mathematica, Vol. XX, 13-26, Academic Press, London, 1976.

[26] Francesco Guerra, "Exponential Bounds in Lattice Field Theory", in: *Les Methodes Mathématiques de la Théorie Quantique des Champs*, F. Guerra, D.W. Robinson and R. Stora, editors, Editions du CNRS, Paris, 1976.

[27] Francesco Guerra, Derek W. Robinson and Raymond Stora, editors, *Les Methodes Mathématiques de la Théorie Quantique des Champs*, Editions du CNRS, Paris, 1976.

[28] Francesco Guerra, "Sviluppi Recenti della Teoria Quantistica dei Campi. Linee di Tendenza e Considerazioni Generali", in: *Matematica e Fisica: Strutture e Ideologia*, E. Donini, A. Rossi and T. Tonietti, editors, De Donato, Bari, 1977.

[29] Francesco Guerra, "External Field Dependence of Magnetization and Long Range Order in Quantum Field Theory", in: *Quantum Dynamics: Models and Mathematics*, L. Streit, ed., Acta Physica Austriaca, Supplementum XVI, Springer-Verlag, Wien, 1976.

[30] Francesco Guerra, Lon Rosen and Barry Simon, "Boundary Conditions for the $P(\phi)_2$", Annales Institute Henri Poincare, Physique Théorique **25**, 231-334 (1976).

[31] Francesco Guerra, "Introduction to Stochastic Field Theory (Abstract)", Astèrisque **40**, 99 (1976).

[32] Salvatore De Martino, Silvio De Siena, Francesco Guerra and Pasquale Sodano, "Spontaneous Magnetization in Quantum Field Theory in the Displaced Gaussian Approximation to the Variational Principle for Entropy Density", Lettere al Nuovo Cimento **16**, 569-573 (1976).

[33] Gian Fabrizio De Angelis, Diego de Falco and Francesco Guerra, "Lattice Gauge Models in the Strong Coupling Regime", Lettere al Nuovo Cimento **19**, 55-58 (1977).

[34] Gian Fabrizio De Angelis, Diego de Falco and Francesco Guerra, "Scalar Quantum Electrodynamics on a Lattice: Correlation Inequalities and Infinite Volume Limit", Physics Letters B **68**, 255-257 (1977).

[35] Gian Fabrizio De Angelis, Diego de Falco and Francesco Guerra, "Scalar Quantum Electrodynamics on a Lattice as Classical Statistical Mechanics", Communications in Mathematical Physics **57**, 201-212 (1977).

[36] Gian Fabrizio De Angelis, Diego de Falco and Francesco Guerra, "A Note on the Abelian Higgs-Kibble Model on a Lattice: Absence of Spontaneous Magnetization", Physical Review D **17**, 1624-1628 (1978).

[37] Gian Fabrizio De Angelis, Diego de Falco and Francesco Guerra, "Gauge Fields on the Lattice", in: *Mathematical Problems in Theoretical Physics*, G.F. Dell'Antonio, S. Doplicher and G. Jona Lasinio, editors, Springer-Verlag, Berlin, 1978.

[38] Daniela Dohrn and Francesco Guerra, "Geodesic Correction to Stochastic Parallel Displacement of Tensors", in: *Stochastic Behavior in Classical and Quantum Hamiltonian Systems*, G. Casati and J. Ford, editors, Springer-Verlag, Berlin, 1979.

[39] Daniela Dohrn and Francesco Guerra, "Nelson's Stochastic Mechanics on Riemannian Manifolds", Lettere al Nuovo Cimento **22**, 121-127 (1978).

[40] Gian Fabrizio De Angelis, Diego de Falco, Francesco Guerra and Rossana Marra, "Confinement as a Problem in Statistical Mechanics", in: *Mathematical Aspects of Quantum Field Theory*, Acta Universitatis Wratislaviensis, n. 519, Wroclaw, 1979.

[41] Francesco Guerra, Rossana Marra and Giorgio Immirzi, "Strong Coupling Expansion For Lattice Yang-Mills Fields", Lettere al Nuovo Cimento **23**, 237-240 (1978).

[42] Francesco Guerra and Maria I. Loffredo, "On the Problem of Quantum Hydrodynamics", Unpublished internal report of the University of Salerno, 1978.

[43] Gian Fabrizio De Angelis, Diego de Falco, Francesco Guerra and Rossana Marra, "Gauge Fields on a Lattice (Selected Topics)", in: *Facts and Prospects of Gauge Theory*, Paul Urban, ed., Springer-Verlag, Wien-New York, 1978.

[44] Giovanni Gallavotti, Francesco Guerra and Salvador Miracle-Sole, "A Comment to the Talk by E. Seiler", in: *Mathematical Problems in Theoretical Physics*, G.F. Dell'Antonio, S. Doplicher and G. Jona Lasinio, editors, Springer-Verlag, Berlin, 1978.

[45] Francesco Guerra and Patrizia Ruggiero, "A Note On Relativistic Markov Processes", Lettere al Nuovo Cimento **23**, 529-534 (1978).

[46] Daniela Dohrn, Francesco Guerra and Patrizia Ruggiero, "Spinning Particles and Relativistic Particles in the Framework of Nelson's Stochastic Mechanics", in: *Feynman Path Integrals*, S. Albeverio et al., editors, Springer-Verlag, Berlin, 1979.

[47] Diego de Falco and Francesco Guerra, "On the Local Structure of the Euclidean Dirac Field", Journal of Mathematical Physics **21**, 1111-1114 (1980).

[48] Francesco Guerra, "Gauge Fields on a Lattice. Selected Topics. II.", in: *Field Theoretical Methods in Particle Physics*, W. Rühl, ed., Plenum Press, New York, 1980.

[49] Francesco Guerra and Maria I. Loffredo, "Stochastic Equations for the Maxwell Field", Lettere al Nuovo Cimento **27**, 41-45 (1980).

[50] Francesco Guerra, "Stochastic Dynamics, Statistical Mechanics and Quantum Field Theory", in: *Recent Advances in Statistical Mechanics*, Central Institute of Physics, Bucharest, 1979.

[51] Francesco Guerra, "Reversibilità/Irreversibilità", Enciclopedia Einaudi, vol. XI, 1067-1106, Giulio Einaudi Editore, Torino, 1980.

[52] Francesco Guerra, "Structural Aspects of Stochastic Mechanics and Stochastic Field Theory", Physics Reports **77**, 263-312 (1981).

[53] Francesco Guerra and Maria I. Loffredo, "Thermal Mixtures in Stochastic Mechanics", Lettere al Nuovo Cimento **30**, 81-87 (1981).

[54] Gian Fabrizio De Angelis, Diego de Falco and Francesco Guerra, "Probabilistic Ideas in the Theory of Fermi Fields: Stochastic Quantization of the Fermi Oscillator", Physical Review D **23**, 1747-1751 (1981).

[55] Francesco Guerra, "Constructive Quantum Field Theory, Stochastic Processes and Statistical Mechanics", in: *Proceedings of the Japan-Italy Symposium on Fundamental Physics*, S. Fukui and T. Toyoda, editors, Tokyo, 1981.

[56] Salvatore De Martino, Silvio De Siena and Francesco Guerra, "Spectral Mass Sum Rules for Self-Coupled Bose Fields", Lettere al Nuovo Cimento **31**, 607-615 (1981).

[57] Francesco Guerra, "Toward a Probabilistic Approach to Quantum Field Theory with Fermi Particles", in: *Gauge Theories: Fundamental Interactions and Rigorous Results*, Birkhauser, Boston-Basel-Stuttgart, 1982.

[58] Claudio Baffioni, Francesco Guerra and Laura Tedeschini Lalli, "Music and Aleatory Processes", in: *Stochastic Differential Equations*, Proceedings of the "5-Take-Kurs" of the USP Mathematisierung at Bielfeld University, 12-16 October, 1981.

[59] Gian Fabrizio De Angelis, Diego de Falco and Francesco Guerra, "Stochastic Processes in Quantum Field Theory", Lecture Notes in Physics **173**, 56-66 (1982).

[60] Francesco Guerra and Laura M. Morato, Momentum-Position Complementarity in Stochastic Mechanics", in: *Stochastic Processes in Quantum Theory and Statistical Physics*, Lecture Notes in Physics **173**, Springer-Verlag, Berlin, 1982.

[61] Francesco Guerra and Modesto Pusterla, "A Non-Linear Schrödinger Equation and its Relativistic Generalization from Basic Principles", Lettere al Nuovo Cimento **34**, 351-356 (1982).

[62] Francesco Guerra and Laura M. Morato, "Quantization of Dynamical Systems and Stochastic Control Theory", Physical Review D **27**, 1774-1786 (1983).

[63] Francesco Guerra and Rossana Marra, "Configuration Spaces for Quantum Spinning Particles", Physical Review Letters **50**, 1715-1718 (1983).

[64] Silvio De Siena, Patrizia Ruggiero and Francesco Guerra, "Stochastic Quantization of the Vector Meson Field", Physical Review D **27**, 2912-2915 (1983).

[65] Francesco Guerra and Rossana Marra, "Origin of the Quantum Observable Operator Algebra in the Frame of Stochastic Mechanics", Physical Review D **28**, 1916-1921 (1983).

[66] Philippe Combe, Roger Rodriguez, Michel Sirigue, Madeleine Sirigue-Collin, "Quantum Dynamical Time Evolutions as Stochastic Flows in Phase Space", Physica A **124**, 561-574 (1984).

[67] Francesco Guerra and Rossana Marra, "Discrete Stochastic Variational Principles and Quantum Mechanics", Physical Review D **29**, 1647-1655 (1984).

[68] Francesco Guerra and Rossana Marra, "Stochastic Mechanics of Spin-1/2 Particles", Physical Review D **30**, 2579-2584 (1984).

[69] Francesco Guerra and Rossana Marra, "A Remark on a Possible Form of Spin-Statistics Theorem in Non-relativistic Quantum Mechanics", Physics Letters B **141**, 93-94 (1984).

[70] Francesco Guerra, "Probability and Quantum Mechanics: the Conceptual Foundations of Stochastic Mechanics", Lecture Notes in Mathematics **1055**, 134-145, Springer-Verlag, Berlin, 1984.

[71] Francesco Guerra, "Quantum Field Theory and Probability Theory: Outlook on New Possible Developments", in: *Trends and Developments in the Eighties*, S. Albeverio and P. Blanchard, editors, World Scientific, Singapour, 1985.

[72] Claudio Baffioni, Francesco Guerra and Laura Tedeschini Lalli, "The Theory of Stochastic Processes and Dynamical Systems as a Basis for Models of Musical Structures", in: *Musical Grammars and Computer Analysis*, M. Baroni and L. Callegari, Editors, L.S. Olschki, Firenze, 1984, ISBN: 88-222-3229-1

[73] Silvio De Siena, Francesco Guerra and Patrizia Ruggiero, "On the Connection between the Stochastic Quantization of the Vector Meson Field and the Euclidean Theory", Physical Review D **33**, 2498-2499 (1986).

[74] Daniela Dohrn and Francesco Guerra, "Compatibility between the Brownian Metric and the Kinetic Metric in Nelson Stochastic Quantization", Physical Review D **31**, 2521-2524 (1985).

[75] Francesco Guerra, "Carlen Processes: a New Class of Diffusions with Singular Drifts", Lecture Notes in Mathematics **1136**, 259-267, Springer-Verlag, Berlin, 1985.

[76] Ettore Aldrovandi, Daniela Dohrn and Francesco Guerra, "Stochastic Mechanics on Curved Manifolds. The Problem of the Stochastic Action", in: *Creativity and Inspiration: Perspectives of Scientific Collaboration between Italy and Japan*, G. Cavallo, S. Fukui, H. Matsumara and T. Toyoda, editors, Nagoya University Press, Nagoya (1988).

[77] Francesco Guerra and Michele Pavon, "Stochastic Variational Principles and Free Energy for Dissipative Processes", in: *Analysis and Control of Nonlinear Systems*, North Holland, Amsterdam, 1988.

[78] Francesco Guerra, "Stochastic Variational Principles and Quantum Mechanics", Annales de l'Institute Henri Poincare, Physique Theorique **49**, 315-324 (1988).

[79] Luigi Galgani, C. Angaroni, L. Forti, Antonio Giorgilli and Francesco Guerra, "Classical Electrodynamics as a Non Linear Dynamical System", Physics Letters A **139**, 221-230 (1989).

[80] Ettore Aldrovandi, Daniela Dohrn, and Francesco Guerra, "Stochastic Action of Dynamical Systems on Curved Manifolds. The Geodesic Interpolation", Journal of Mathematical Physics **31**, 639-648 (1990).

[81] Ettore Aldrovandi, Daniela Dohrn, and Francesco Guerra, "Stochastic Action of Dynamical Systems on Curved Manifolds. The Isokinetic Developing Map on Trajectories", in: *Stochastic Processes, Physics and Geometry*, World Scientific, Singapore, 1990.

[82] R. D'Autilia and Francesco Guerra: "Qualitative Aspects of Signal Processing through Dynamical Neural Networks", in: *Representation of Musical Signals*, G. De Poli, A. Piccialli and C. Roads, editors, p. 447-472, The MIT Press, Cambridge, Mass, 1991.

[83] Francesco Guerra, Maria I. Loffredo, Carlo Marchioro, Editors, *Probabilistic Methods in Mathematical Physics*, World Scientific, Singapore, 1992.
ISBN: 981-02-0923-1

[84] Francesco Guerra, "Meccanica Stocastica", Enciclopedia delle Scienze Fisiche, Istituto dell'Enciclopedia Italiana, Roma, 1992.

[85] Francesco Guerra, "Equazioni Differenziali Stocastiche", Enciclopedia delle Scienze Fisiche, Istituto dell'Enciclopedia Italiana, Roma, 1992.

[86] Ettore Aldrovandi, Daniela Dohrn and Francesco Guerra, "The Lagrangian Approach to Stochastic Variational Principles on Curved Manifolds", Acta Applicandae Mathematicae **26**, 219-236 (1992).

[87] Nicola Cufaro Petroni and Francesco Guerra, "Quantum Mechanical States as Attractors for Nelson Processes", Foundations of Physics **25**, 297-315 (1994).

[88] Francesco Guerra, "Nelson Quantum Mechanics and the Interpretation of Quantum Mechanics", in: *The interpretation of Quantum Theory: where do we Stand?*, Istituto dell'Enciclopedia Italiana, Roma, 1994.

[89] Francesco Guerra, "Fluctuations and Thermodynamic Variables in Mean Field Spin Glass Models", in: *Stochastic Processes, Physics and Geometry, II*, S. Albeverio, U. Cattaneo and D. Merlini, editors, World Scientific, Singapore, 1995.

[90] Francesco Guerra, "Functional Order Parameters for the Quenched Free Energy in Mean Field Spin Glass Models", in: *Field Theory and Collective Phenomena*, S. De Lillo, P. Sodano, F.C. Khanna and G. Semenoff, editors, World Scientific, Singapore, 1995.
ISBN 981-02-1279-8

[91] Francesco Guerra, "The Cavity Method in the Mean Field Spin Glass Models: Functional Representation of the Thermodynamic Variables", in: *Advances in Dynamical Systems and Quantum Physics*, S. Albeverio, R. Figari, E. Orlandi, A. Teta, editors, World Scientific, Singapore, 1995.

[92] Francesco Guerra and Roberto D'Autilia: "Creatività nella costruzione dei modelli fisici", in *Atti del Convegno: Pensiero Scientifico e Creatività*, Ancona, 17-19 marzo 1994, M. Ottaviano e G. Frosali, editors, **21** Quaderni di Innovazione e Scuola, I.R.R.S.A.E. - Marche, 1996.

[93] Francesco Guerra: "Introduction to Nelson Stochastic Mechanics as a Model for Quantum Mechanics", in *The Foundations of Quantum Mechanics*, C. Garola and A. Rossi, editors, Kluwer Academic Publishers, 1995.

[94] Francesco Guerra, "Can we Understand Intelligent Behavior by Methods of Theoretical Physics?", in: *Thinking Science for Teaching: The Case of Physics*, C. Bernardini, C. Tarsitani, and M. Vicentini, editors, Plenum Press, New York, 1995.

[95] Francesco Guerra, "About the Overlap Distribution in Mean Field Spin Glass Models", International Journal of Modern Physics B **10**, 1675-1684 (1996).

[96] Roberto D'Autilia and Francesco Guerra, "Statistical mechanics of neural networks: theory and applications", Proc. SPIE 2760, Applications and Science of Artificial Neural Networks II, 726 (March 22, 1996). doi: 10.1117/12.235972

[97] Francesco Guerra and Andreas Knauf, "Free Energy and Correlations of the Number Theoretical Spin Chain", Journal of Mathematical Physics **39**, 3188-3202 (1998).

[98] Francesco Guerra and Mauro Talevi, "On the Thermodynamic Limit in Random Resistor Network", Journal of Physics A **29**, 7287-7299 (1996).

[99] Francesco Guerra and Stefano Ghirlanda, "General Properties of Overlap Probability Distributions in Disordered Spin Systems. Towards Parisi Ultrametricity", Journal of Physics A-Mathematical and General **31**, 9149-9155 (1998).

[100] Francesco Guerra, "The Problem of the Physical Interpretation of Nelson Stochastic Mechanics as a Model for Quantum Mechanics", in: *New Perspective in the Physics of Mesoscopic Systems: Quantum-like Descriptions and Macroscopic Coherence Phenomena*, S. De Martino, S. De Siena, S. De Nicola, R. Fedele and G. Miele, editors, World Scientific, Singapore, 1997.

[101] Antonio Ponno, Luigi Galgani and Francesco Guerra, "Analytical Estimate of Stochasticity Thresholds in Fermi-Pasta-Ulam and ϕ^4 Models", Physical Review E **61**,7081-7086 (2000).

[102] Francesco Guerra, "h and hbar in the formulation of quantum mechanics and quantum field theory", Conference Proceedings, Italian Physical Society, Volume 79, 2000.

[103] Francesco Guerra, "Sum Rules for the Free Energy in the Mean Field Spin Glass Model", Fields Institute Communications **30**, 161-170 (2001).

[104] Francesco Guerra and Fabio L. Toninelli, "Quadratic Replica Coupling for the Sherrington-Kirkpatrick Mean Field Spin Glass Model", Journal of Mathematical Physics **43**, 3704-3716 (2002).

[105] Francesco Guerra and Fabio L. Toninelli, "Central Limit Theorem for Fluctuations in the High Temperature Rregion of the Sherrington-Kirkpatrick Mean Field Spin Glass Model", Journal of Mathematical Physics **43**, 6224 (2002).

[106] Salvatore Capozziello, Salvatore De Martino, Silvio De Siena, Francesco Guerra and Fabrizio Illuminati, "A phenomenological model explaining the observed scales of astrophysical and cosmological structures", Europhysics Letters **58**, 315-320 (2002).

[107] Francesco Guerra, Fabio L. Toninelli, "The Thermodynamic Limit in Mean Field Spin Glass Models", Communications in Mathematical Physics **230**, 71-79 (2002).

[108] Francesco Guerra, "Broken Replica Symmetry Bounds in the Mean Field Spin Glass Model", Communications in Mathematical Physics **233**, 1-12 (2003), ISSN: 0010-3616

[109] Francesco Guerra and Fabio L. Toninelli, "The infinite volume limit in generalized mean field disordered models", Markov Processes and Related Fields **9**, 195-207 (2003), ISSN: 1024-2953

[110] Francesco Guerra and Fabio L. Toninelli, "Some comments on the connection between disordered long range spin glass models and their mean field version", Journal of Physics A: Mathematical and General **36**, 10987-10995 (2003), ISSN: 0305-4470

[111] Francesco Guerra and Fabio L. Toninelli, "Infinite volume limit and spontaneous replica symmetry breaking in mean field spin glass models", Ann. Henri Poincaré **4** 417-444 (2003).
doi: 10.1007/s00023-003-0934-x

[112] Francesco Guerra, "About the cavity fields in mean field spin glass models", invited lecture at the International Congress of Mathematical Physics, Lisboa, 2003, available on arXiv:cond-mat/0307673.

[113] Giovanni Acocella, Francesco Guerra and Nadia Robotti, "La Scoperta della Radioattività Indotta da Neutroni: il Ritrovamento ad Avellino del Primo Quaderno di Laboratorio di Enrico Fermi", Il Nuovo Saggiatore **19**, 9-18 (2003), ISSN: 1422-6944

[114] Francesco Guerra and Fabio L. Toninelli, "The High Temperature Region of the Viana-Bray Diluted Spin Glass Model", Journal of Statistical Physics, **115**, 531-555 (2004), ISSN: 0022-4715

[115] Carlo Di Castro, Francesco Guerra, Fabio Martinelli, editors, special issue "In Honor of Gianni Jona-Lasinio's 70th Birthday", Journal of Statistical Physics **115**, 3-6 (2004).

[116] Giovanni Acocella, Francesco Guerra and Nadia Robotti, "Enrico Fermi's discovery of Neutron-Induced Artificial Radioactivity: The recovery of His First Laboratory Notebook", Physics in Perspective **6**, 29-41 (2004).
doi: 10.1007/s00016-003-0175-x

[117] Francesco Guerra, "Mathematical aspects of mean field spin glass theory", in: *European Congress of Mathematics, Stockolm, June 27-July 2, 2004'*, Ari Laptev, Editor, European Mathematical Society, Zurich, 2005, ISBN/ISSN: 3-03719-009-4

[118] Francis Comets, Francesco Guerra, and Fabio Lucio Toninelli, "The Ising-Sherrington-Kirkpatrick Model in a Magnetic Field at High Temperature", Journal of Statistical Physics **120** 147-165 (2005).
doi: 10.1007/s10955-005-5471-1

[119] Francesco Guerra, Matteo Leone, Nadia Robotti, "Enrico Fermi's Discovery of Neutron-Induced Artificial Radioactivity: Neutrons and Neutron Sources", Physics in Perspective **8** 255-281 (2006).
doi: 10.1007/s00016-006-0296-0

[120] Francesco Guerra, "Quantum Field Theory and Renormalization Theory in the Early Scientific Activity of Eduardo R. Caianiello", in *Imagination and Rigor*, 93-108, Settimo Termini, ed, Springer Milan, 2006, ISBN 978-88-470-0320-0.
doi: 10.1007/88-470-0472-1_8

[121] Francesco Guerra, "Spin Glasses", In: *Encyclopedia of Mathematical Physics*, 1-5, J-P Francoise et al, editors, 655-665, Elsevier Limited, Oxford, 2006, ISBN/ISSN: 0-12-512660-3

[122] Francesco Guerra, " Euclidean Field Theory", In: *Encyclopedia of Mathematical Physics*, 1-5, J-P Francoise et al, editors, 256-265, Elsevier Limited, Oxford, 2006, ISBN/ISSN: 0-12-512660-3

[123] Francesco Guerra, "An introduction to mean field spin glass theory: methods and results", In: *Mathematical Statistical Physics*, A. Bovier et al, editors, 243-271, Elsevier, Oxford, Amsterdam, 2006.
ISBN 0-444-52813-X

[124] Philippe Carmona, Francesco Guerra, Yueyun Hu, Olivier Mejane, "Strong disorder for a certain class of directed polymers in a random environment", Journal of Theoretical Probability **19**, 134-151 (2006).
doi: 10.1007/s10959-006-0010-9

[125] Giovanni Acocella, Francesco Guerra, Matteo Leone, and Nadia Robotti, "The Oscar DAgostino Archives in Avellino", Physis **43**, 203233 (2006).

[126] Francesco Guerra and Nadia Robotti, "Comment on the Scientific Paper no. 1b: Ettore Majorana on the Thomas-Fermi statistical model for atoms and ions. The communication at the meeting of the Italian Physical Society (Rome, December 1928)", in: *Ettore Majorana. Scientific Papers*, 32-36, Springer-Verlag, Berlin, 2006.

[127] Felice Cennamo, Francesco Guerra, Nadia Robotti, Gilda Senatore, "Ettore Majorana a Napoli: la testimonianza dell'allieva Gilda Senatore", Physis, Rivista Internazionale di Storia della Scienza, **XLIV** 185-202 (2007), ISSN: 0031-9414

[128] Francesco Guerra, "A.O. Bolivar, Quantum-Classical Correspondence Dynamical Quantization and the Classical Limit. Springer Series: The Frontiers Collection", Meccanica **42**, 517518 (2007), book review.
doi 10.1007/s11012-006-9044-4

[129] Francesco Guerra, "Un manoscritto inedito di E.R. Caianiello e S. Weinberg sulla descrizione di fenomeni elettromagnetici tramite interazione di Fermi", in *L'eredità di Fermi, Majorana e altri temi*, M. Leone, B. Preziosi, N. Robotti, editors, Bibliopolis, Napoli, 2007.

[130] Francesco Guerra and Nadia Robotti, "Enrico Fermi and the neutron induced radioactivity: history of a discovery", in *L'eredità di Fermi, Majorana e altri temi*, M. Leone, B. Preziosi, N. Robotti, editors, Bibliopolis, Napoli, 2007.

[131] Francesco Guerra and Nadia Robotti, "Ettore Majoranas forgotten publication on the Thomas-Fermi model", Physics in Perspective **10**, 56-76 (2008).
doi: 10.1007/s00016-007-0340-8

[132] Francesco Guerra and Nadia Robotti, *Ettore Majorana. Aspects of his scientific and academic activity*, Edizioni della Normale, Pisa, 2008, ISBN: 978-88-7642-331-4

[133] Francesco Guerra and Nadia Robotti, "L'archivio Majorana alla Domus: storia e attualità", Il Veltro **4-6**, 41-74 (2008), ISSN: 0042-3254

[134] Francesco Guerra and Nadia Robotti, "Majorana e Fermi", Il Veltro **4-6**, 75-103 (2008), ISSN: 0042-3254

[135] Luca De Sanctis and Francesco Guerra, "Mean field dilute ferromagnet. High temperature and zero temperature behavior", Journal of Statistical Physics, **132** 759-785 (2008).
doi: 10.1007/s10955-008-9575-2

[136] Adriano Barra and Francesco Guerra, "About the ergodic regime in the analogical Hopfield neural networks: Moments of the partition function", Journal of Mathematical Physics **49** 125217-1-125217-18 (2008).
doi: 10.1063/1.3039083

[137] Francesco Guerra, "Coupled Self-Oscillating Systems: Theory and Applications", International Journal of Modern Physics B, **23** 5505-5514 (2009).
doi: 10.1142/S021797920906381X

[138] Francesco Guerra and Nadia Robotti, "Enrico Fermis Discovery of Neutron-Induced Artificial Radioactivity: The Influence of His Theory of Beta Decay", Physics in Perspective, **11** 379-404 (2009).
doi: 10.1007/s00016-008-0415-1

[139] Francesco Guerra, "Spontaneous replica symmetry breaking in the mean field spin glass model", In: *Proceedings of the International Congress of Mathematical Physics, Rio de Janeiro, Brasil, August 6-13, 2006*, Rio de Janeiro (2009).

[140] Adriano Barra, Aldo Di Biasio, and Francesco Guerra, "Replica symmetry breaking in mean-field spin glasses through the Hamilton-Jacobi technique", Journal of Statistical Mechanics: Theory and Experiment, P09006 (2010).
doi: 10.1088/1742-5468/2010/09/P09006

[141] Francesco Guerra and Nadia Robotti, "Ettore Majorana sul piroscafo", Il Nuovo Saggiatore, **26**, 103 (2010), extended version at: http://www.sif.it/SIF/ resources/public/files/ opinioni/op_1011_guerra_robotti.pdf .

[142] Adriano Barra and Francesco Guerra, "Constraints for order parameters in analogical neural networks". In: Italo Capuzzo Dolcetta, Maria Transirico, Antonio Vitolo, editors, *PERCORSI INCROCIATI (in ricordo di Vittorio Cafagna)*, 19-33, Collana Scientifica di Ateneo, Università degli Studi di Salerno, Rubbettino Editore, Soveria Mannelli (CZ), Italy, 2010.
ISBN: 978-88-498-2854-2

[143] Adriano Barra, Giuseppe Genovese, Francesco Guerra, "The Replica Symmetric Approximation of the Analogical Neural Network", Journal of Statistical Physics **140**, 784-796 (2010).
doi: 10.1007/s10955-010-0020-y

[144] Adriano Barra, Giuseppe Genovese, Francesco Guerra, "Equilibrium statistical mechanics of bipartite spin systems", Journal of Physics A: Mathematical and Theoretical **44**, 245002 (2011).
doi: 10.1088/1751-8113/44/24/245002

[145] Elena Agliari, Adriano Barra, Francesco Guerra, Francesco Moauro, "A thermodynamical perspective of immune capabilities", Journal of Theoretical Biology **287**, 48-63 (2011).
doi: 10.1016/j.jtbi.2011.07.027

[146] Elena Agliari, Adriano Barra, Kristian Gervasi Vidal, Francesco Guerra, "Can persistent Epstein-Barr virus infection induce Chronic Fatigue Syndrome as a Pavlov feature of the immune response?", Journal of Biological Dynamics **6**, 740-762 (2012).
doi: 10.1080/17513758.2012.704083

[147] Adriano Barra, Francesco Guerra, Emanuele Mingione, "Interpolating the Sherrington-Kirkpatrick replica trick", Philosophical Magazine **92**,

78-97 (2012).
doi: 10.1080/14786435.2011.637979

[148] Adriano Barra, Giuseppe Genovese, Francesco Guerra, and Daniele Tantari, "How glassy are neural networks?", Journal of Statistical Mechanics: Theory and Experiment, P07009 (2012).
doi:10.1088/1742-5468/2012/07/P07009

[149] Francesco Guerra, Matteo Leone, Nadia Robotti, "The Discovery of Artificial Radioactivity", Physics in Perspective **14** 33-58 (2012).
doi: 10.1007/s00016-011-0064-7

[150] Francesco Guerra and Nadia Robotti, "La Borsa di Studio della Rivista 'Missioni': un punto fermo sulla vicenda di Ettore Majorana", Il Nuovo Saggiatore **28**, 8688 (2012); expanded version at website http://www.sif.it/SIF/resources/public/files/opinioni/op_1202_guerra_robotti-sq.pdf .

[151] Elena Agliari, Adriano Barra, Andrea Galluzzi, Francesco Guerra, Francesco Moauro, "Multitasking associative networks", Phys. Rev. Lett. **109**, 268101 (2012).
DOI: http://dx.doi.org/10.1103/PhysRevLett.109.268101

[152] Francesco Guerra, "Pierluigi Contucci and Cristian Giardinà: Perspectives on Spin Glasses", Journal of Statistical Physics **151**, 985-986 (2013) (book review).
doi: 10.1007/s10955-013-0736-6

[153] Francesco Guerra, "The phenomenon of spontaneous replica symmetry breaking in complex statistical mechanics systems", Journal of Physics: Conference Series **442**, 012013 (2013).
doi: 10.1088/1742-6596/442/1/012013

[154] Elena Agliari, Adriano Barra, Silvia Bartolucci, Andrea Galluzzi, Francesco Guerra, and Francesco Moauro, "Parallel processing in immune networks", Phys. Rev. E **87**, 042701 (2013).
doi: 10.1103/PhysRevE.87.042701

[155] Francesco Guerra, Nadia Robotti, "The Disappearance and Death of Ettore Majorana", Physics in Perspective **15**, 160-177 (2013).
doi: 10.1007/s00016-013-0111-7

[156] Francesco Guerra, Nadia Robotti, "Bruno Pontecorvo in Italy", in *Bruno Pontecorvo, Selected Scientific Works*, edited by S.M. Bilenky et al., pag. 527-547, Società Italiana di Fisica, Bologna, Italy, 2013.

[157] Francesco Guerra, Matteo Leone, Nadia Robotti, "When Energy Conservation Seems to Fail: The Prediction of the Neutrino", Science & Education **23** 1339-1359 (2014).

[158] Adriano Barra, Andrea Galluzzi, Francesco Guerra, Andrea Pizzoferrato, Daniele Tantari, "Mean field bipartite spin models treated with mechanical techniques", The European Physical Journal B, 87:74 (2014).

[159] Michele Castellana, Adriano Barra, Francesco Guerra, "Free-energy bounds for hierarchical spin models", Journal of Statistical Physics **155**, 211 (2014).

[160] Adriano Barra, Giuseppe Genovese, Francesco Guerra, Daniele Tantari, "About a solvable mean field model of a Gaussian spin glass", Journal of Physics A: Mathematical and Theoretical **47**, 155002 (2014).

[161] Francesco Guerra, "Interpolation and Comparison Methods in the Mean Field Spin Glass Model", pag. 1-12, in *Trends in Contemporary Mathematics*, vol. **8**, Vincenzo Ancona and Elisabetta Strickland, editors, Springer INdAM Series, Springer International Publishing, 2014.

[162] Adriano Barra, Andrea Di Lorenzo, Francesco Guerra, Antonio Moro, "On quantum and relativistic mechanical analogues in mean field spin models", Proceeding of the Royal Society A (London), 470, 20140589 (2014).

[163] Francesco Guerra, Nadia Robotti, "Enrico Fermi and Ettore Majorana: so strong, so different", in *Frontiers of Fundamental Physics and Physics Education Research*, pp 29-39, Springer Proc. Physics 145, Springer, Switzerland, 2014.

[164] Francesco Guerra, Nadia Robotti, "The beginning of a great adventure: Bruno Pontecorvo in Rome and Paris", Il Nuovo Cimento **37 C** 39-53 (2014).

[165] Elena Agliari, Adriano Barra, Gino Del Ferraro, Francesco Guerra, Daniele Tantari, "Anergy in self-directed B lymphocytes from a statistical mechanics perspective", Journal of Theoretical Biology **375**, 21-31 (2015).

[166] Elena Agliari, Adriano Barra, Andrea Galluzzi, Francesco Guerra, Daniele Tantari, Flavia Tavani, "Metastable states in the hierarchical Dyson model drive parallel processing in the hierarchical Hopfield network", Journal of Physics A: Mathematical and Theoretical **48**, 015001 (2015).

[167] Elena Agliari, Adriano Barra, Andrea Galluzzi, Francesco Guerra, Daniele Tantari, Flavia Tavani, "Hierarchical neural networks perform both serial and parallel processing", Neural Networks **66**, 22-35 (2015).

[168] Elena Agliari, Adriano Barra, Andrea Galluzzi, Francesco Guerra, Daniele Tantari, Flavia Tavani, "Retrieval Capabilities of Hierarchical Networks: From Dyson to Hopfield", Physical Review Letters **114**, 028103 (2015).

[169] Elena Agliari, Adriano Barra, Andrea Galluzzi, Francesco Guerra, Flavia Tavani, Daniele Tantari, "Dynamical graph approach to hierarchical networks", Physical Review **E 91**, 062807 (2015)

[170] Elena Agliari, Adriano Barra, Andrea Galluzzi, Francesco Guerra, Daniele Tantari, Flavia Tavani, "Metastable states in the hierarchical Dyson model drive parallel processing in the hierarchical Hopfield network", Journal of Physics: **A 48**, 015001 (2015).

[171] Francesco Guerra, "Spontaneous Replica Symmetry Breaking and Interpolation Methods for Complex Statistical Mechanics Systems", Lecture Notes in Mathematics Volume 2143, pp 45-70, 2015.

[172] Francesco Guerra, Nadia Robotti, *Enrico Fermi e il quaderno ritrovato: 20 marzo 1934 - La vera storia della scoperta della radioattività indotta da neutroni*, pp VIII+272, Società Italiana di Fisica, Bologna, Ottobre 2015.

[173] Andrea Galluzzi, Daniele Tantari, Francesco Guerra, "Universality for Couplings Correlation in Mean Field Spin Glasses", in *Theory and Applications in Mathematical Physics*, Elena Agliari et al, editors, pag. 49-64, World Scientific, 2015

[174] Francesco Guerra, "Legendre structures in statistical mechanics for ordered and disordered systems", Cambridge University Press, in *Advances in disordered systems, random processes and some applications*, P. Contucci et al, editors, (2017). ISBN: 9781107124103

[175] Francesco Guerra, Matteo Leone, Nadia Robotti, "The discovery of X-rays diffraction from crystals to DNA: A case-study to promote understanding of the nature of science and of its interdisciplinary character", Il Nuovo Cimento **38 C**, article 95 (2015).

[176] Francesco Guerra, Nadia Robotti, "Enrico Fermi - Una duplice genialità tra teorie ed esperimenti", Giornale di Fisica **LVII**, 3-26 (2016).

[177] Francesco Guerra, Nadia Robotti, "La straordinaria vita di Ettore Majorana", in *Nessuno mi troverà - Majorana memorandum*, Istituto Luce Cinecittà, Roma, 2016.

[178] Francesco Guerra, "Minimal replica symmetry breaking in complex statistical mechanics models: the case of the Random Energy Model", preprint 2016.

[179] Francesco Guerra, Nadia Robotti, "1938 - IL NAVIGATORE ITALIANO È SBARCATO NEL NUOVO MONDO", in *Storia mondiale dell'Italia*, pp 664-667, Laterza, 2017.

[180] Francesco Guerra, Nadia Robotti, *The Lost Notebook of ENRICO FERMI - The True Story of the Discovery of Neutron-Induced Radioactivity*, pp VIII+272, Springer Verlag and Società Italiana di Fisica, Berlin-Bologna, Ottobre 2017.

[181] Francesco Guerra, "Interpolating the replica trick in the Sherrington-Kirkpatrick spin glass model and the Derrida random energy model", preprint 2017.