

# Curriculum Vitae of German Sierra

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## Professional data

Organism : Consejo Superior de Investigaciones Cientificas (Spain)  
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## Academic Career

Graduate in Physics, Univ. Complutense de Madrid, Spain (1978).  
PhD in Physics, Univ. Complutense de Madrid, Spain (1981).  
Postdoc at l'Ecole Normale Superieure, Paris, France (1981 -1983).  
Titular professor at Univ. Complutense de Madrid, Spain (1984 - 1987).  
Fellow at CERN, Geneva, Switzerland (1987 - 1989).  
Scientific researcher, CSIC, Spain (1989 - 2005).  
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## Publications

From Web of Science: 136 articles, 3.871 citations and h-index: 31.

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## Articles

- [1] "Causality of a wave equation and invariance of its hyperbolicity conditions", A. F. Rañada y G. Sierra, Phys. Rev. **D22** (1980) 385.
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- [11] "Vanishing potentials in gauged N=2 supergravity: an application of Jordan algebras", M. Gunaydin, G. Sierra, P. K. Townsend, Phys.Lett.**144B** (1984) 41.
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- [17] "Convex cones, Jordan algebras and the geometry of d=9 Maxwell-Einstein supergravity", M. Awada, P. K. Townsend, M. Gunaydin, G. Sierra, Class. and Quantum Gravity **2** (1985) 801.
- [18] "Causality on the world-sheet of the string", F. Jiménez, J. Ramírez Mittelbrunn, G. Sierra, Phys.Lett. **167B** (1986) 178.
- [19] "Quantum mechanical amplitudes for string propagation", F. Jiménez, J. Ramírez Mittelbrunn, M. Ramon Medrano, G. Sierra, Phys.Lett. **171B** (1986) 369.
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#### Books (coautor)

- [157] "Introducción a la teoría de cuerdas y supercuerdas", J. Ramírez Mittelbrunn, M. Ramón Medrano, G. Sierra, editado por la Real Academia de Ciencias Exactas, Físicas y Naturales, Madrid, 1987.
- [158] "Teorías de campos conformes, sistemas integrables y grupos cuánticos", R. Cuerno, C. Gómez, G. Sierra, editado por la Universidad de Salamanca, 1991.
- [159] "Quantum electron liquids and high- $T_c$  superconductivity", J. González, M.A. Martín-Delgado, G. Sierra, A. H. Vozmediano, Lecture Notes in Physics vol. **m38** , Springer-Verlag, 1995; cond-mat/9509134.
- [160] "Quantum Groups in two-dimensional Physics", C. Gómez, M. Ruiz-Altaba, G.Sierra, Cambridge Monographs on Mathematical Physics, Cambridge University Press, London, 1996.

### Books (coeditor)

- [161] “Strings and Superstrings”, XVIII International GIFT Seminar in Theoretical Physics. Eds: J.R. Mittelbrunn, M. Ramón-Medrano and G. Sierra, World Scientific (Singapore, 1988).
- [162] “Strongly Correlated Magnetic and Superconducting Systems”, Proceedings of the U. Complutense Summer School, Madrid, 1996. Eds G. Sierra, M.A. Martín-Delgado, Lecture Notes in Physics vol. **478**, Springer-Verlag, 1997.

### Talks at Congresses

- XIX Winter School and Workshop of Theoretical Physics, Karpacz, Poland, (1983).
- 7th Johns Hopkins Workshop on Current Problems in Particle Theory, Bonn, Germany, (1983).
- 13th Johns Hopkins Workshop on Current Problems in Particle Theory, Florence, Italy, (1989).
- 8th Summer Workshop on Mathematical Physics on Quantum Groups, Clausthal, Germany, (1989).
- Pavia Seminar on Quantum Groups, Pavia, Italy, (1990).
- Summer School in High-Energy Physics, Trieste, Italy, (1990).
- Advanced Research Workshop on Quantum Field Theory, Statistical Mechanics, Quantum Groups and Topology, Miami, USA, (1991).
- Research Conference on Advanced Quantum Field Theory and Critical Phenomena, Como, Italy, (1991).
- XXI Conference on Differential and Geometrical Methods in Theoretical Physics, Tianjin, China, (1992).
- XXIII GIFT Seminar on Recent Problems in Mathematical Physics, Salamanca, Spain, (1992).
- Workshop in the Landau Institute of Theoretical Physics on “Topics of Mathematical Physics”, Chernogolovska-Moscow, Russia, (1994).
- Workshop in Topics on Statistical Mechanics, Seville, Spain, (1994).
- Colloquium “Selected Topics in Mathematical Physics”, Lyon, France, (1995).
- Workshop on “Spin-Fermion Models of High- $T_c$  Superconductors”, Florence, Italy, (1996).
- Workshop on “The Density Matrix Renormalization Group”, Max Planck Institute, Dresden, Germany, (1998).
- Workshop on “The Exact Renormalization Group”, Faro, Portugal, (1998).
- Workshop on “Quantum Magnetism”, Institute of Theoretical Physics, Santa Barbara, USA, (1999).
- Workshop on “Integrable Models in Condensed Matter and Non-Equilibrium Physics”, Montreal, Canada (2000).
- VIII Escuela de Otoño de Física Teórica sobre “Métodos de Teoría Cuántica de Campos en Física de la Materia Condensada”, Santiago de Compostela, 4-15 sep 2000, Spain.
- NATO advanced research workshop on “Statistical field theories”, Villa Olmo, Como (Italy), 18-23 june 2001.
- Workshop on the “Exact Renormalization Group”, 9-13 july, 2001, Benasque, Spain.
- Workshop on the “Conformal Field Theory and Integrable Models”, Chernogolovka, Moscow, 16-22 sep 2002, Russia.
- Workshop on “Integrable Models and Applications: from Strings to Condensed Matter”, Florence, Italy 15-20 September 2003.
- Workshop on “Low dimensional Field Theory at work in Condensed Matter and String Theory”, Capri, Italy 20-22 September 2004.
- XXIII International Conference of Differential Geometric Methods in Theoretical Physics, Nankai Institute of Mathematics, August 20-26, 2005 Tianjin , China.

- Interdisciplinary Statistical and Field Theory Approaches to Nanophysics and low-dimensional Systems, 12-16 June 2006, Como, Italy.
- 17th National Congress of the Australian Institute of Physics, 3-8 December 2006, Brisbane, Australia.
- Statistical Mechanical/Gordon Godfrey workshop, 11, 12 December 2006, Sidney, Australia
- STATPHYS 23 Satellite Meeting "Statistical Field Theory of Quantum Devices" 16 - 19 July 2007, Perugia, Italy.
- Plenary talk at 'The 5th International Symposium on Quantum Theory and Symmetries' 22- 28 July 2007, University of Valladolid, Spain.
- International Conference in Statistical Physics Sigma Phi 2008, Orthodox Academy of Crete, Kolymbari, Chania, Greece 14-18 July 2008.
- Workshop on "Low-dimensional Quantum Field Theories and Applications", Galileo Galilei Institute for Theoretical Physics (GGI), Firenze (Italy), 8-12 September 2008.
- XV Jornada SIMUMAT on "Simulación Numérica de Procesos Cuánticos", Universidad Autónoma de Madrid, 22 September 2008.
- Workshop on "Theoretical aspects of Tensor Network states", Facultad de Matematicas, Universidad Complutense de Madrid, 15-18 October 2008.
- "Workshop on Correlations and Coherence in Quantum Matter", Evora, Portugal, 10-14 November 2008.
- "Conference on Bifurcations: Mathematical & Quantum Aspects & Applications, BIFUR 08", Madrid, 9-12 December 2008.
- Amsterdam Summer Workshop on Low-D Quantum Condensed Matter, Amsterdam, The Netherlands, 6-11 July 2009.
- 'Quantum Information Concepts for Condensed Matter Problems', at the Max-Planck Institute for Physics of Complex Systems. Organized by Ian Affleck (UBC, Vancouver), Masud Haque (MPI-PKS Dresden) and Ulrich Schollwoeck (LMU, Munich). Dresden, Germany, 14-25 June 2010.
- Mathematica Summer School on Theoretical Physics devoted to the subject "2D Physics in Condensed Matter". Organized by Pedro Vieira (Perimeter Institute). Porto, Portugal, 11- 16 July 2010.
- "Kavli Royal Society International Meeting on Topology and Physics". Organized by Jiannis K. Pachos (University of Leeds). Checheley Hall, London, 14-17 July 2010.
- "International Workshop on Density Matrix Renormalization Group and Other Advances in Numerical Renormalization Group Methods". Organized by X. Wang (Renmin University of China) and T. Xiang (Chinese Academy of Sciences). Beijing, China, August 3- September 23, 2010.
- "Third Iberian Mathematical Meeting". Organized by M. Abreu (SMP). Braga, Portugal, 1-3 October 2010.
- Workshop on "Quantum coherence and correlations in condensed-matter and cold-atom systems". Organized by J. Carmelo (University of Evora). Evora, Portugal, 11-15 October 2010.
- Workshop "What is Quantum Field Theory?", Organized by M. Asorey et al. (U. Zaragoza), 2011, Sep 14 – Sep 18 (Benasque, Spain).
- Workshop on "Advanced Conformal Field Theory". Organized by P. Fendley, H. Saleur, V. Schomerus, S. H. Simon, N. Read and J. Jacobsen. Institut Henri Poincare, Paris, France, 1-31 Oct 2011.
- Workshop on "Topological Quantum Computation", Organized by K. Schoutens. The Institute of Physics, University of Amsterdam, The Netherlands, 6-7 Feb 2012.
- Workshop on "New quantum states of matter in and out of equilibrium". Organized by I. Affleck (U. British Columbia), P. Calabrese (Pisa University), J. Cardy (U. Oxford), F. H. L. Essler (U. Oxford), E. Fradkin (U. Illinois at Urbana-Champaign), F. D. M. Haldane (Princeton University). Galileo Galilei Institute for Theoretical Physics (GGI). Florence, Italy, April 2012.



- XXXV Encontro Nacional de Física da Matéria Condensada. 14 - 18 May 2012, Águas de Lindóia, Sao Paulo, Brasil.
- Workshop on "Quantum Simulations with Ultracold Atoms". Organized by I. Bloch, M. Inguscio, M. Lewenstein, G. Mussardo and A. Trombettoni, ICTP, Trieste, Italy, 16-20 July 2012.
- Workshop on "The Beauty of Integrability: low-dimensional Physics, Statistical Models and Solitons". Organized by F. Alcaraz (U. de So Paulo, Brazil), G. Mussardo (SISSA-ICTP, Trieste, Italy) P. Pearce (U. Melbourne, Australia). The International Institute of Physics (IIP), Federal University of Rio Grande do Norte, Natal, Brasil, 15-28 July 2012.
- Workshop on Advances in Quantum Technology: From Quantum Information to Quantum Devices The International Institute of Physics, Natal, Brazil, August 2012.
- Workshop on "Disordered and Topological Systems". Organized by Ravin Bhatt (Princeton University), Ming-Chiang Chung (Chung-Hsing University), Xin Wan (Zhejiang University) Zhejiang University, Hangzhou, China, March 18-22, 2013
- Workshop on "Quantum Physics: from fundamental questions to applications". Organized by I. Cirac and M. Lewenstein. Casa de la Pedrera, ICFO, Barcelona, Spain, May 22-24.
- Workshop on "Quantum Many Body Systems in Low Dimensions: Theory and Experiment". Organized by Xiwen Guan, Zong-Chao Yan, Chao-Hong Lee, Murray T Batchelor, Chengbin Li, Li-Juan Liu. Wuhan Institute of Physics and Mathematics, Chinese Academy of Science, Wuhan, China, 19-21 June 2013.
- Workshop on "Topological Phases in Condensed Matter and Cold Atom Systems: towards quantum computations". Organized by D. Poilblanc (CNRS & Univ. de Toulouse, FR), E. Ardonne (Stockholm University, SE), N. Regnault (ENS, FR & Princeton Univ., US), M. Troyer (ETH Zurich, CH). Institut d'Etude Scientifique de Cargese (IESC), France, June 24 to July 6, 2013.
- 1st i-Link Workshop Macro-from-Micro: Quantum Gravity and Cosmology. Organized by G. Calcagni (IEM-CSIC), G. A. Mena Marugn (IEM-CSIC), M. Fernandez-Mendez (IEM-CSIC). Madrid, Septiembre 2013.
- Workshop on "Perspectives on Quantum Many-Body Entanglement". Organized by Román Orús (JGU Mainz) and Matteo Rizzi (JGU Mainz). Johannes-Gutenberg Universität, Mainz, Germany, September 2013.
- Lectures at the Winter PhD School on Statistical Field Theory, The Galileo Galilei Institute for Theoretical Physics Arcetri, Florence, Italy. 3-14 Feb, 2014. Organizers: P. Calabrese, A. Cappelli, F. Colomo, G. Mussardo.
- Workshop on "Tensor Networks and Simulations". Organized by J. Ignacio Cirac and Frank Verstraete. Simons Institute for the Theory of Computing at Berkeley University (USA). April 21 to 25 (2014).
- Workshop on "Entanglement Entropy in Many Body Quantum Systems". Organized by Olalla Castro-Alvaredo and Benjamin Doyon. King's College London and City University London, 2-4 June 2014.
- Tercer Encuentro Conjunto de la Real Sociedad Matemática Española y la Sociedad Matemática Mexicana., Zacatecas, México, 1-5 Sept 2014.
- 9th Bologna Workshop in CFT and Integrable Models. Organized by F. Ravanini. Bologna, Italy, 15-18 Oct 2014.

#### Organization of workshops

- XVIII International GIFT Seminar on "Strings and Superstrings". El Escorial, Madrid, 1987. Coorganizers: J. Ramírez Mittelbrunn (UCM) and M. Ramon Medrano (UCM).
- Universidad Complutense Summer School on "Strongly Correlated Magnetic and Superconducting Systems". El Escorial, Madrid, 1996. Coorganizer: M. A. Martín-Delgado (UCM).
- Journeys on "Quantum Field Theory in Low Dimensional Systems and Condensed Matter", Instituto de Ciencias de Materiales CSIC. Cantoblanco, Madrid, 1996. Coorganizers: F. Guinea (CSIC), C. Tejedor (UAM), L. Brey (CSIC), G. Gómez-Santos (UAM), G. Sierra (CSIC) y M.A. Martín Delgado (UCM).

- “Advanced Seminar on Field Theoretical Methods in Condensed Matter Physics”. Girona, Spain , 2001. Coorganizer: D. Espriu (U Barcelona).
- ”INSTANS Summer School”, Centro de Ciencias de Benasque (Huesca, Spain), 2010. Coorganizers: G. Mussardo (SISSA), K. Schoutens (ITFA).
- ”Quantum Mechanics, Operator Theory and the Riemann Zeta function”. Centro de Ciencias de Benasque (Huesca, Spain), 2012. Coorganizers: J.P. Keating (U. Bristol, UK), J.C. Lagarias (U. Michigan, USA).
- Workshop on ”Quantum Integrability, Conformal Field Theory and Topological Quantum Computation”, Natal, Brasil. 2014. Coorganizers: F. C. Alcaraz (Sao Carlos, Brazil); F. H. L. Essler, (Oxford, UK); G. Mussardo, (Trieste, Italy) and Rodrigo Pereira, (Sao Carlos, Brazil);

#### Direction of doctoral thesis

- “Simetrías grupo cuánticas en Teorías Superconformes”. PhD: Fernando Jiménez Lorenzo. Universidad Complutense de Madrid, Facultad de Ciencias Físicas (1992). Rating: Sobresaliente Cum Laude.
- “Modelos bidimensionales de vértices y simetrías bajo álgebras cuánticas”. PhD: Rodolfo Cuerno Rejado. Universidad Autónoma de Madrid, Facultad de Ciencias Físicas (1993). Rating: Sobresaliente Cum Laude.
- “Técnicas de Grupo de Renormalización en Espacio Real y aplicaciones””. Doctorando: Javier Rodriguez-Laguna. Universidad Complutense de Madrid, Facultad de Ciencias Físicas (2002). Codirected with Miguel Angel Martin-Delgado. Rating: Sobresaliente Cum Laude por unanimidad.
- “Fases críticas y masivas VBS en sistemas cuánticos fuertemente correlacionados”. Doctorando: Javier Almeida Linare, Universidad Complutense de Madrid, Facultad de Ciencias Físicas (23 de Junio de 2009). Codirected with Miguel Angel Martin-Delgado. Rating: Sobresaliente Cum Laude por unanimidad.
- ”Exactly solvable models in low-dimensional many-body physics”, Doctorando: Miguel Ibanez Berganza, Universidad Autónoma de Madrid, Facultad de Ciencias (14 de Noviembre de 2011). Rating: Sobresaliente Cum Laude por unanimidad.

#### Other merits

- National Award in undergraduate physical sciences. Ministry of Education in Spain (1980).
- Extraordinary prize in physical sciences Ph.D. Universidad Complutense of Madrid (1981).
- Fellow at CERN, Geneva, Switzerland (1987 - 1989).
- Editor of ”Journal of Statistical Mechanics: Theory and Experiment” JSTAT (from 2004) and the ”Journal of High Energy Physics” JHEP (from 2012).
- Coordinator of the National Assessment Agency and Foresight (ANEP) in the area of Physics and Space Sciences (2004 - 2006).
- Vicedirector of the Institute of Theoretical Physics UAM/CSIC (2007 - 2009).
- Member of the Committee of the area of ”Physical science and technologies” at CSIC (July 2008 - April 2012).