# Curriculum Vitae of German Sierra

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## Personal Data

Name : Germán
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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).
Full professor, CSIC, Spain (2005 - today).

## Publications/impact

200 articles, 4 books, 9.137 citations (Google Scholar), h-index: 50.

## Articles

[1] "Causality of a wave equation and invariance of its hyperbolicity conditions", A. F. Rañada and G. Sierra, Phys. Rev. **D22** (1980) 385.
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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.

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## Books (coautor)

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## Books (coeditor)

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## Talks at Congresses

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- 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 Hight-$T_c$ Superconductors", Florence, Italy, (1996).

- Worshop 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).

- Worshop 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 Nacionalde Física da Matéria Condensada. 14 - 18 May 2012, Águas de Lindóia, Sao Paolo, 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. Fernndez-Mndez (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 Universitat, 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.

- Workshop Información Cuántica en España, ICE-1", University of Zaragoza, June 25th - 27th (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. Bolonia, Italy, 15-18 Oct 2014.

- Real Sociedad de Matemática Española Congress, Granada, 2-4 February 2015.

- International Conference in Number Theory and Physics, Institute of Mathematics Pure and Applied (IMPA), Rio de Janeiro (Brasil), June 15-26, 2015.

- Workshop on "Strongly Coupled Field Theories for Condensed Matter and Quantum Information Theory", Natal (Brasil) August 17 - 21 ,2015.

- Workshop "Matrix Product States - day", LPTENS; LPTHE, Jussieu, Paris, 21st Sept 2015.

- VI Reunión Nacional de Sólidos, La Plata (Argentina), 9-12 de November 2015.

- Workshop "Entanglement in Strongly Correlated Systems", Centro de Ciencias de Benasque Pedro Pascual, 14-27 February 2016. Benasque, Spain.

- Program "Entanglement and dynamical systems", Simons Center of Geometry and Physics, 15th Sept. 2016, Stony Brook (USA).

- Workshop "Entanglement in Strongly Correlated Systems", Centro de Ciencias de Benasque Pedro Pascual, 6-18 February 2017. Benasque, Spain.

- Workshop and school on "Tensor categories and topological quantum matter", 20-30 July 2017, Fudan University, Shanghay (China).

- Workshop "Quantum Day@BSC" , Friday 22nd September, 2017, Barcelona (Spain).

- Program "Wonders of Broken Integrability", Simons Center of Geometry and Physics, 2 - 6 Oct. 2017, Stony Brook (USA).

- GGI workshop sobre "Entanglement in Quantum Systems", Florence (Italy), 13-22 June 2018,

- Workshop "Perspectives in Topological phases: From Condensed Matter lo High-Energy Physics", Quy-Nhon, Vietnam, 14-22 July 2018.

- Workshop "Quantum Computing for HEP", CERN, Geneva, 5-6 November 2018.

- Meeting on "Quantum Information Processing and Applications", Harish-Chandra Research Institute, Allahabad, India, 1-8 December 2018.

- Workshop "ANYON19", Max Planck Institute of Complex Systems, Dresden 21-25 January, 2019.

- March meeting of the American Physical Association (APS), Los Angeles (EEUU), 4- 8 March 2019.

- Workshop "Curiosity-Driven Physics: From Algebras to Quantum Chains and Statistical Mechanics", SISSA, Trieste, Italy, 22-24 April, 2019.

- Workshop "Quantum Computing Meetup", Zurich University, 15-17 May 2019.

- Workshop on Advanced Resolution Techniques for Equations in Mathematical Physics, ARTEMP-2019. Universidad Complutense Madrid, 24-27 June 2019. Madrid (Spain).

- XIth International Symposium: Quantum Theory and Symmetries(QTS), Centre de Recherches Mathématiques, Montreal, Canada, 1-5 July 2019.

- HEP-TN online seminar. Organized by the Gravity, Quantum Fields and Information Group Max Planck Institute for Gravitational Physics, March 27, 2020, Postdam, Germany

- Summer School on Quantum Computing : Software for Near Term Quantum Devices, Universidad Internacional Menndez Pelayo (UIMP), 31 August - 4 September 2020). [On line].

## Organization of workshops

- XVIII-GIFT International Seminar in Theoretical Physics on "Strings and Superstrings", El Escorial, 1987, Madrid, Spain. Organizers, J. Ramírez Mittelbrunn, M. Ram 'on Medrano and G. Sierra

- Course at the International University Menéndez Pelayo on "El Universo a cortas y largas distancias: gran unificación y supercuerdas", 1987, Santander, Spain. Director Juan Pérez Mercader, secretary. Germán Sierra.

- Summer School of the Universidad Complutense de Madrid, on "Strongly Correlated Magnetic and Superconducting Systems", El Escorial, Madrid, 1996. Director. G. Sierra, secretary: M. A. Martín-Delgado.

- Journeys on "Teoría Cuántica de Campos en Sistemas de Baja Dimensionalidad y Materia Condensada". Instituto de Ciencias de Materiales del CSI, 7-8 Nov 1996. Organizers: 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", coorganizer with D. Espriu, Sant Feliu de Guíxols, June 11-15, 2001 (Girona, Spain).

- "INSTANS Summer School", 2010, June 20 - July 3, Centro de Ciencias de Benasque (Huesca, Spain). G. Mussardo (SISSA), G. Sierra (CSIC), K. Schoutens (ITFA).

- "Quantum Mechanics, Operator Theory and the Riemann Zeta function". Organizers: J.P. Keating (U. Bristol, UK), J.C. Lagarias (U. Michigan, USA), G. Sierra (CSIC-UAM, Spain), Centro de Ciencias de Benasque (Huesca, Spain), 17-23 Jun 2012.

- Workshop "Entangle This: strings, fields and atoms", IFT UAM-CSIC, 2012 Nov. 19-21, Madrid, Spain. Organizers: Esperanza López (IFT), José L.F. Barbón, Karl Landsteiner, G. Sierra.

- Workshop on "Quantum Integrability, Conformal Field Theory and Topological Quantum Computation", Coorganized with F. C. Alcaraz (Sao Carlos, Brazil); F. H. L. Essler, (Oxford, UK); G. Mussardo, (Trieste, Italy); G. Sierra, (Madrid, Spain) and Rodrigo Pereira, (Sao Carlos, Brazil); March 23- April 06, 2014. Natal (Brasil).

- Workshop "Entangle This: Space, Time & Matter", Organizers: José L.F. Barbón, Esperanza López, Belén Paredes, Germán Sierra. IFT UAM/CSIC Madrid, February 16 - 20, 2015.

- Latin American Workshop in Condensed Matter: Low Dimensional Topological Quantum Matter. International Institute of Physics (I3P). August 24 - 28, 2015, Natal, Brazil. Organizers: Daniel Cabra (National University of La Plata, Argentina) and German Sierra (UAM/CSIC, Madrid, Spain).

- Program on "Mathematical Aspects of Quantum Integrable Models in and out of Equilibrium", Isaac Newton Institute for Mathematical Sciences, Cambridge (UK). 11th January 2016 to 5th February 2016. Organizers: Denis Bernard (Paris), Fabian H. L. Essler (Oxford), Giuseppe Mussardo (Trieste), German Sierra (Madrid).

- Conference on "Entanglement and Non-Equilibrium Physics of Pure and Disordered Systems", 25 Jul 2016 - 27 Jul 2016, ICTP, Trieste (Italy). Organizers: Pasquale Calabrese, Olalla Castro-Alvaredo, Fabian H. L. Essler, Markus Mueller, Giuseppe Mussardo, Antonello Scardicchio, German Sierra.

- Workshop "Entangle This: Tensor Networks and Gravity", Organizers: José L.F. Barbón, Ignacio Cirac, Esperanza López, David Pérez-García, Germán Sierra, Y-W. Sun. IFT UAM/CSIC Madrid, May 8 - 10, 2017.

- Thematic program "Quantum Paths" at the The Erwin Schroedinger International Institute for Mathematics and Physics (ESI), Organizers: P. Calabrese (SISSA, Trieste), F. H. L. Essler (Oxford U), G. Mussardo (SISSA, Trieste), J. Schmiedmayer (TU Vienna), ? G. Sierra (IFT Madrid), F. Verstraete (U Vienna); Wien, April 9 ? June 8, 2018.

- Workshop "Entangle This IV: Chaos, Order and Qubits", Organizers: Jose L.F. Barbón, Esperanza Lopez, David Pérez-García, Germán Sierra. IFT UAM/CSIC Madrid, September 9 - 13, 2019.

## Direction of PhD 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". 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"". 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". 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". Miguel Ibanez Berganza, Universidad Autónoma de Madrid, Facultad de Ciencias (14 de Noviembre de 2011). Rating: Sobresaliente Cum Laude por unanimidad.

- Title: "Quantum Entanglement in Random and Inhomogeneous Spin Chains". Giovanni Ramírez, Universidad Autónoma de Madrid, Facultad de Ciencias (3 July 2015). Codirected with Javier Rodríguez Laguna. Thesis score: Sobresaliente Cum Laude por unanimidad.

- Title: "Gaussian Many-Body States: Tachyonic Quenches and Conformal Blocks". Sebastián Montes Palencia. Universidad Autónoma de Madrid, Facultad de Ciencias (13 May 2018) Codirected with Javier Rodríguez Laguna. Thesis score: 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 (since 2004) and the "Journal of High Energy Physics" JHEP (since 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).

- Fulbright fellow. April-June 2015.

- Member of the Mathematics-Physics Commission of the IUPAP (International Union of Pure and Applied Physics), 2014-2021.