

Jose L. Lado

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CV date: October 21st 2026

Employment

2023–	Assistant Professor level 2 (fixed-term), Department of Applied Physics, Aalto University, Finland
2019–2023	Assistant Professor level 1, Department of Applied Physics, Aalto University, Finland
2017–2019	ETH Postdoctoral Fellow, Institute for Theoretical Physics, ETH Zurich, Switzerland
2016–2017	Research Fellow, International Iberian Nanotechnology Laboratory, Braga, Portugal
2013–2016	Marie Curie-Sklodowska Early Stage Researcher, International Iberian Nanotechnology Laboratory, Braga, Portugal

Education

2013–2016	Ph.D. in Material Science, Department of Applied Physics, University of Santiago de Compostela, Spain. Thesis: “Topological electronic phases in graphene” (supervisor: Joaquín Fernández-Rossier)
2012–2013	Master degree in Material Science and Technology, University of Santiago de Compostela, Spain
2007–2012	Bachelor degree in Physics, University of Santiago de Compostela, Spain

Awards and Honours

2025–2030	European Research Council (ERC) Consolidator Grant (ULTRATWISTROICS)
2024	2DM Young Scientist Award, awarded by IOP
2023	Early Career Theory Award , Royal Spanish Physics Society – BBVA Foundation
2023	EPS Early Career Award , European Physical Society
2021	Early Career Award (runner-up) , DPG & IOP through New Journal of Physics
2020–2025	Academy of Finland Research Fellow
2017–2019	ETH Postdoctoral Fellowship, ETH Zurich, Switzerland
2016	Best Ph.D. Thesis in Theoretical Condensed Matter Physics , Spanish Royal Society of Physics
2016	Extraordinary Doctorate Prize, University of Santiago de Compostela, Spain

Selected Funding

2025–2030	2 000 k€ — ERC Consolidator Grant ULTRATWISTROICS , European Research Council (<i>sole PI</i>)
2020–2025	1 010 k€ — Academy Research Fellow grant , Research Council of Finland (<i>sole PI</i>)
2026–2028	434 k€ — Centre of Excellence in Quantum Materials QMAT , Research Council of Finland, share of the first funding period of a centre running 2026–2033 (<i>one of 8 PIs, vice-director</i>)
2025–2029	407 k€ — Atom-vdW project grant , Research Council of Finland (<i>co-PI</i>)
2021–2023	294 k€ — HEAVYTWIST , Jane and Aatos Erkkö Foundation (<i>sole PI</i>)
2023–2025	150 k€ — QUCOMAT , Jane and Aatos Erkkö Foundation (<i>co-PI</i>)
Total (PI)	4.39 M€ of external competitive funding since 2019. Every amount is my own share, not the total volume of the project.
Internal	1.28 M€ from Aalto University: 150 k€ tenure-track starting package, 200 k€ support grant for highly ranked ERC applicants, 220 k€ QMAT strategic co-funding, 241 k€ doctoral school funding, 173 k€ for two QDOC doctoral positions, and 296 k€ of departmental basic, Flagship co-funding and mobility funding.
Group	1.38 M€ secured by group members in their own name: Research Council of Finland postdoctoral (335 k€) and Research Fellow (1 040 k€) funding to A. Fumega. Further, a Magnus Ehrnrooth post-doctoral grant to F. Aikebaier and a four-year Nokia Industrial Doctoral School position to E. Pereira.

Supervision and Mentoring

Currently supervising 7 Ph.D. students (T. Antão, G. Lupi, A. Vera, Y. Sun, H. Stenbrink, C. Lee, A. Orsini) and 2 postdoctoral researchers and 1 research fellow. Graduated 6 Ph.D. students since 2019 (G. Chen, M. Khosravian, R. Koch, P. Vecsei, M. Niedermeier, F. Nigmatulin), with a seventh (E. Pereira) having submitted the thesis, defence scheduled for October 2026, and supervised 5 postdoctoral researchers, 11 completed M.Sc. theses and 13 completed B.Sc. theses. Mentored a postdoc who secured independent competitive funding (A. Fumega, 330 k€ RCF 2022, 1 M€ 2025) and a B.Sc. student awarded best physics B.Sc. thesis worldwide in 2023 (N. Karjalainen). Published with 213 coauthors (Scopus). Last author on 55 manuscripts since 2019.

Teaching

27 credits of pedagogical training, Aalto University.

- 2025–** Responsible teacher, Advanced Quantum Materials (M.Sc.), Aalto University
- 2024–** Co-responsible teacher, Advanced Computational Methods in Physics (M.Sc.), Aalto University
- 2025** Co-lecturer, “Training Workshop: Modelling Layered Materials”, INL, Portugal
- 2026** Tutorial, “Correlated 2D materials”, Heraeus binational meeting, Nordita, Sweden
- 2020–2024** Responsible teacher, Solid State Physics (M.Sc.), Aalto University
- 2022** Main lecturer, 31st Jyväskylä Summer School: “Emergent quantum matter in artificial 2D materials”
- 2023** Co-lecturer, “Advanced Physics of van der Waals heterostructures”, Roscoff, France
- 2023** Co-lecturer, “Emergent phenomena in van der Waals heterostructures”, TIFR, Mumbai, India
- 2018–2019** Teaching assistant, ETH Zurich (Many-body quantum transport, Physics in the Smartphone, and Quantum field theoretical methods for mesoscopic transport)

Research Output and Open-Source Software

155 peer-reviewed publications (plus 16 preprints and 7 invited perspective articles), including 20 Physical Review Letters, 1 Physical Review X, 3 Nature Nanotechnology, 1 Nature, 1 Nature Physics, 1 Nature Materials, 12 Nano Letters, 5 Advanced Materials, 3 Nature Communications, 2 Science, 2 Science Advances. Cited 7288 times, h-index 39 ([Google Scholar](#), September 2026). Main developer of three widely used open-source packages:

- [pyqula](#) — Python library for tight-binding modeling of quantum materials, used by theoretical groups worldwide and the core software of the 2022 Jyväskylä Summer School.
- [dmrgpy](#) — Python library for many-body quantum lattice models with tensor-network techniques.
- [Quantum Lattice](#) — graphical interface for tight-binding modeling of van der Waals materials, used by experimental groups worldwide.

Research Highlights

- Heavy fermions** First theoretical proposal ([Phys. Rev. Lett. 127, 026401 \(2021\)](#)) and first experimental demonstration ([Nature 599, 582 \(2021\)](#)) of heavy-fermion physics in twisted van der Waals heterostructures, extending heavy-fermion phenomena beyond rare-earth compounds for the first time, later extended to a van der Waals monolayer, CeSiI ([Nano Letters \(2024\)](#)).
- Moiré quantum matter** A sequence of results ([Phys. Rev. Lett. 119, 107201 \(2017\)](#), [123, 096802 \(2019\)](#) and [121, 146801 \(2018\)](#) — PRL cover, APS 2019 calendar) established electrical control of correlated and topological states in twisted graphene multilayers, with the 2018 prediction experimentally confirmed in [Phys. Rev. Lett. 129, 076803 \(2022\)](#). An artificial moiré topological superconductor followed in [Nano Letters 22, 328 \(2022\)](#).
- vdW multiferroics** Established mechanisms for spin-orbit and twist-controlled multiferroicity in van der Waals magnets ([Phys. Rev. Lett. 126, 056803 \(2021\)](#), [Science Advances 6, eabb9379 \(2020\)](#), [2D Materials 9, 025010 \(2022\)](#) and [10, 025026 \(2023\)](#)), later confirmed experimentally in NiI₂ by scanning tunnelling microscopy ([Advanced Materials, 2311342 \(2024\)](#)).
- Tensor-network solvers** Developed tensor-network algorithms that extended many-body and large-scale quantum simulation beyond the reach of conventional methods, from a non-Hermitian kernel polynomial algorithm for dynamical excitations of open quantum many-body systems ([Phys. Rev. Lett. 130, 100401 \(2023\)](#)) to a self-consistent mean-field tensor-network solver for correlated super-moiré matter beyond one billion sites ([Phys. Rev. Research 7, 043288 \(2025\)](#)) and a method for real-space topological invariants in quasicrystals and super-moiré systems with hundreds of millions of sites, several orders of magnitude beyond conventional approaches ([Phys. Rev. Lett. 136, 156601 \(2026\)](#)). The dynamical-excitation algorithms are released in the open-source package [dmrgpy](#).
- Hamiltonian learning** Established machine-learning methods to extract quantum many-body Hamiltonians directly from spectroscopy ([Phys. Rev. Applied 20, 024054 \(2023\)](#)), extended to non-local impurity tomography of quantum magnets ([Phys. Rev. Applied 23, 054077 \(2025\)](#)) and demonstrated on experimental data to reconstruct the triplon excitations of an artificial nanoscale molecular quantum magnet ([Nano Letters 25, 13435 \(2025\)](#)). This line originates in conditional generative adversarial networks trained to reproduce the full dynamical excitation spectra of quantum many-body models, which enable Hamiltonian learning directly from those excitations ([Phys. Rev. Research 4, 033223 \(2022\)](#)).

Selected Publications

As last author

Tensor network method for real-space topology in quasicrystal Chern mosaics

T. V. C. Antão, Y. Sun, A. O. Fumega, J. L. Lado — [Physical Review Letters 136, 156601 \(2026\)](#)

Multicomponent magneto-orbital order and magneto-orbitons in monolayer VCl_3

L. Camerano, A. O. Fumega, G. Profeta, J. L. Lado — [Nano Letters 25, 4825 \(2025\)](#)

Hamiltonian learning of triplon excitations in an artificial nanoscale molecular quantum magnet

R. Koch, R. Drost, P. Liljeroth, J. L. Lado — [Nano Letters 25, 13435 \(2025\)](#)

Nature of the unconventional heavy fermion Kondo state in monolayer $CeSiI$

A. O. Fumega, J. L. Lado — [Nano Letters 24, 4272 \(2024\)](#)

Topological Spin Excitations in Non-Hermitian Spin Chains with a Generalized Kernel Polynomial Algorithm

G. Chen, F. Song, J. L. Lado — [Physical Review Letters 130, 100401 \(2023\)](#)

Moiré-Enabled Topological Superconductivity

S. Kezilebieke, V. Vaño, M. N. Huda, M. Aapro, S. C. Ganguli, P. Liljeroth, J. L. Lado — [Nano Letters 22, 328 \(2022\)](#)

Emulating heavy fermions in twisted trilayer graphene

A. Ramires, J. L. Lado — [Physical Review Letters 127, 026401 \(2021\)](#)

Spontaneous Valley Spirals in Magnetically Encapsulated Twisted Bilayer Graphene

T. M. R. Wolf, O. Zilberberg, G. Blatter, J. L. Lado — [Physical Review Letters 126, 056803 \(2021\)](#)

Interaction driven surface Chern insulator in nodal line semimetals

W. Chen, J. L. Lado — [Physical Review Letters 122, 016803 \(2019\)](#)

Electrically tunable gauge fields in tiny-angle twisted bilayer graphene

A. Ramires, J. L. Lado — [Physical Review Letters 121, 146801 \(2018\)](#)

Selected collaborative publications

Observation of non-Hermitian topology from optical loss modulation

A. Hashemi, E. Louis Pereira, H. Li, J. L. Lado, A. Blanco-Redondo — [Nature Materials 24, 1393 \(2025\)](#)

Artificial heavy fermions in a van der Waals heterostructure

V. Vaño, M. Amini, S. C. Ganguli, G. Chen, J. L. Lado, S. Kezilebieke, P. Liljeroth — [Nature 599, 582 \(2021\)](#)

Probing magnetism in 2D van der Waals crystalline insulators via electron tunneling

D. R. Klein *et al.* — [Science 360, 1218 \(2018\)](#)

Hyperfine interaction of individual atoms on a surface

P. Willke *et al.* — [Science 362, 336 \(2018\)](#)

Electrically controlled nuclear polarization of individual atoms

K. Yang *et al.* — [Nature Nanotechnology 13, 1120 \(2018\)](#)

A kilobyte rewritable atomic memory

F. E. Kalfi *et al.* — [Nature Nanotechnology 11, 926 \(2016\)](#)

The complete list of publications is also at www.joselado.org and [ORCID](#).

Invited Perspective Articles

Doping a frustrated correlated van der Waals magnet

J. L. Lado — [Nature Materials 23, 1013 \(2024\)](#)

Putting a twist on spintronics

J. L. Lado — [Science 374, 6571 \(2021\)](#)

A layered unconventional superconductor

J. L. Lado, P. Liljeroth — [News & Views, Nature Physics \(2021\)](#)

Invited Talks

60 invited talks at international conferences and workshops since 2014, 57 of them since 2019. The complete list of talks, seminars and contributed talks included, is at www.joselado.org/talks.

2026 [A multicultural approach to fractionalization and electronic correlations in 2D materials, Nordita, Sweden](#)

[Atomic structure of nanosystems from first-principles simulations and microscopy experiments, Finland-Sweden](#)

[Experimental and Theoretical Research on 2D Quantum Materials and Related Systems, Finland](#)

[Quantum Materials in and out of Equilibrium – Computational and Experimental Advances, Bremen, Germany](#)

2025 [Nordic Quantum Information Processing workshop, Nordita, Sweden](#)

[Quantum Correlated Light and Matter, Aalto University, Finland](#)

[International workshop on tensor cross interpolation and other algorithms for learning tensor networks, Grenoble, France](#)

[Workshop on Symmetry and Topology in Quantum Matter, Chalmers University, Sweden](#)

[New Directions in Quantum and Quantum Reservoir Computing, Quantum Devices and Related Technologies, Finland](#)

[Topology and geometry beyond perfect crystals, Nordita, Sweden](#)

	4th European Conference on Molecular Spintronics, Ireland
	AI 4 Science: from molecules to materials, Finland
2024	JQUEST: JYU Quantum Electronics, Superconductivity, and Topology workshop, Finland
	New Generation in Strongly Correlated Electron Systems, Spain
	A quantum leap: unraveling the mysteries of correlated electronic states in quantum materials through atomic-scale imaging and spectroscopy, CMD31, Portugal
	Carbon-based nanostructures with engineered electronic and spin properties, CMD31, Portugal
	ICM2024, Bologna, Italy
	NT24, MIT, Boston, US
	International Conference “Quantum sensing”. Collège de France, France
	17th European School on Molecular Nanoscience (ESMolNa2024), Spain
	DPG Meeting, Berlin, Germany
	APS March Meeting, Minneapolis, US
2023	Workshop on Twistronics and Moiré Materials: Bridging Theory and Experiments, ICTP, Trieste, Italy
	International symposium on Quantum computing for quantum chemistry and quantum materials science, VTT, Finland
	MRS Meeting, Boston, US
	Plenty of Room at the Bottom – New Developments in Scanning Probe Tools, Germany
	Lorentz Workshop Quantum Magnetic Materials, Leiden, Netherlands
	CMD30, Milan, Italy
	International Workshop on Superconductivity and Magnetism in Two Dimensional Films and Heterostructures, UK
	36th European Conference on Surface Science, Poland
	Joint European Magnetic Symposia (JEMS), Spain
	InstituteQ Workshop on fundamentals for quantum technology, Aalto University, Finland
	Dynamical and Hidden Orders, Nordita, Sweden
	Machine Learning and (Quantum) Physics Workshop, Obergurgl, Austria
	MATSUS nanoGe: Materials for Quantum Technology, Valencia, Spain
	TopCore meeting, Amsterdam, Netherlands
	International Workshop on twisted bilayer graphene and beyond, University of Seoul, South Korea
	Emergent phenomena in van der Waals heterostructures, TIFR, Mumbai, India
2022	ICQMT 2022, Bodrum, Turkey
	Correlations in Topological Quantum Matter, Lammi, Finland
	Hacking 4Hb, Weizmann Institute, Israel
	4th International Workshop on Quantum Matter – Quantum Many-body Dynamics, Tsung-Dao Lee Institute, China
	Bienal RSEF, New trends in Superconductivity, Murcia, Spain
	First-principles modelling of defects in solids, ETH Zurich, Switzerland
	NanoSpain2022, Madrid, Spain
	Quantum materials and devices at the nanoscale, Spain
	Young investigators online workshop on unconventional superconductivity in heavy fermions
2021	Graphene 2021, Grenoble, France
	7th International Conference on Superconductivity and Magnetism, Milas-Bodrum, Turkey
	Real-space Simulations of Topological Matter and Disordered Materials (online) IOP-EPS mini-colloquium, UK
	Moiré-Twistronics workshop (online), UK
	ICN+T 2021 (online), Canada
	TopoSuper2021 (online), Aalto University, Finland
2020	Coherent order and transport in spin-active systems: Interplay between magnetism and superconductivity, SPICE
	CMD2020GEFES RSEF-GEFES & EPS-CDM (online)
2019	Zhejiang Workshop on Correlated Matter, Hangzhou (China)
	APS March Meeting 2019, Boston (US)
2018	Workshop on New Structures for Microelectronics and Spintronics, Alicante (Spain)

2017 Quantum Materials and Technologies BIENAL RSEF, Santiago de Compostela (Spain)
2015 ICCP9 Singapore

Leadership and Professional Service

Elected member, CMD board, European Physical Society (2023–). Management committee member, COST Action CA21144 (2022–). CECAM Node director, Finland (2020–2024). Quantum Materials Work Package coordinator, Finnish Quantum Flagship. Leader, ResQ Quantum Materials, Finnish Quantum Institute InstituteQ. Vice-director, [Centre of Excellence in Quantum Materials QMAT](#). Co-Chair, Physics Days 2026, Finnish Physical Society. Early Career Advisor, Physical Review Letters, American Physical Society (2025–).

Meetings Co-Chair, Physics Days 2026, Finland. European School on Superconductivity and Magnetism in Quantum Materials, Spain (2024). CMD31 (2024) and CMD30 (2023) minicolloquia. InstituteQ Annual Symposium (2023). CECAM SMMART Workshop, Aalto (2022). Atomic-scale Quantum Materials colloquium series (2020–2024)

Review Peer reviewer of 143 manuscripts for Science, Nature, Nature Physics, Nature Materials, Nature Communications, Nature Reviews Materials, Physical Review X/Letters/Research, and 2D Materials. External reviewer for FLAG-ERA/Graphene Flagship, Israel Science Foundation, US-Israel BSF, NCN Poland, US DOE, FWF, Swiss NSF, German Research Foundation, and the ERC.

Ph.D. exams External reviewer or opponent in 13 Ph.D. dissertations since 2020, in Spain (4), Switzerland (2), Netherlands (2), Sweden (2), India (2) and Czechia (1).

Additional Information

Outreach Panelist, [The Convergence of AI and Quantum Technologies](#), a public panel of InstituteQ and ELLIS Institute Finland on the convergence of quantum technologies and artificial intelligence, Marsio and online, forthcoming on 30 September 2026. One of sixteen Aalto researchers, designers and students featured in the [Laboratory of Hope](#) exhibition, Marsio building, Aalto University, 5 February to 27 March 2026, with a personal account of quantum materials research and of the prospect of a topological quantum computer for the general public.

Languages Spanish (native), English (fluent), Portuguese (intermediate)

Complete List of Publications

155 peer-reviewed publications, 7 invited perspective articles and 16 preprints, from the publications database, hyperlinked by DOI/URL.

Peer-reviewed papers

[155] *Intrinsic i -Wave Altermagnetism in 2D Graphene Superlattices*
Cuiju Yu, [Jose L. Lado](#) — [Advanced Science](#), e78167 (2026)

[154] *Controllable Superconductivity in Suspended NbSe₂*
Ruihuan Fang, Cuiju Yu, Youqiang Huang, Tosson Elalaili, Yuvraj Chaudhry, Yaoqiang Zhou, Andres Castellanos-Gomez, Sanshui Xiao, Jiwon Park, Hyunyoung Choi, Fida Ali, Hanlin Fang, [Jose Lado](#), Pertti Hakonen, Zhipei Sun — [Advanced Electronic Materials](#), e70592 (2026)

[153] *Fingerprinting superconductors by disentangling Andreev and quasiparticle currents across tunable tunnel junctions*
Petro Maksymovych, Sang Yong Song, Benjamin Lawrie, Wonhee Ko, [Jose L. Lado](#) — [Small](#) (2026)

[152] *Moiré Mott correlated mosaics in twisted bilayer 1T-TaS₂*
Ana Vera Montoto, [Jose L. Lado](#), Adolfo O. Fumega — [Nano Letters](#) (2026)

[151] *Topology and criticality in non-Hermitian multimodal optical resonators through engineered losses*
Elizabeth Louis Pereira, Hongwei Li, Andrea Blanco-Redondo, [Jose L. Lado](#) — [Phys. Rev. Research](#) 8, 033132 (2026)

[150] *Quantum circuit algorithm for topological invariants of second-order topological many-body quantum magnets*
Sebastián Domínguez-Calderón, Marcel Niedermeier, [Jose L. Lado](#), Pascal M. Vecsei — [Phys. Rev. B](#) 114, 065139 (2026)

[149] *Cross-Platform Autonomous Control of Minimal Kitaev Chains*
David van Driel, Rouven Koch, Vincent P. M. Sietes, Sebastiaan L. D. ten Haaf, Chun-Xiao Liu, Francesco Zatelli, Bart Roovers, Alberto Bordin, Nick van Loo, Guanzhong Wang, Jan Cornelis Wolff, Grzegorz P. Mazur, Tom Dvir, Ivan Kulesh, Qingzhen Wang, A. Mert Bozkurt, Sasa Gazibegovic, Ghada Badawy, Erik P. A. M. Bakkers, Michael Wimmer, Srijit Goswami, [Jose L. Lado](#), Leo P. Kouwenhoven, Eliska Greplova — [PRX Intelligence](#) 1, 013005 (2026)

[148] *Hamiltonian learning quantum magnets with dynamical impurity tomography*
Netta Karjalainen, Greta Lupi, Rouven Koch, Adolfo O. Fumega, [Jose L. Lado](#) — [Phys. Rev. Research](#) (2026)

[147] *Parity-dependent double degeneracy and spectral statistics in the projected dice lattice*
Koushik Swaminathan, Anouar Moustaj, [Jose L. Lado](#), Sebastiano Peotta — [Phys. Rev. B](#) 114, L051108 (2026)

[146] *Machine-learning-enabled characterization of individual ring resonators in integrated photonic lattices*
Elizabeth Louis Pereira, Amin Hashemi, Faluke Aikebaier, Hongwei Li, [Jose L. Lado](#), Andrea Blanco-Redondo — [APL Photonics](#) 11, 076124 (2026)

[145] *Observation of tunable chiral spin textures with nonlinear optics*
Youqiang Huang, Tiago V. C. Antão, Adolfo O. Fumega, Mikko Turunen, Yi Zhang, Hanlin Fang, Nianze Shang, Juan C. Arias-Muñoz, Fedor Nigmatulin, Hao Hong, Andrew S. Kim, Faisal Ahmed, Hyunyoung Choi, Sanshui Xiao, Kaihui Liu, [Jose L. Lado](#), Zhipei Sun — [Nature Communications](#) 17, 7576 (2026)

[144] *Tensor network approach to momentum-resolved spectroscopy in nonperiodic super-moiré systems*
Anouar Moustaj, Yitao Sun, Tiago V. C. Antão, [Jose L. Lado](#) — [Phys. Rev. Research](#) 8, 023282 (2026)

- [143] *Exploring Charge Density Waves in two-dimensional NbSe₂ with Machine Learning*
Norma Rivano, Francesco Libbi, Chuin Wei Tan, Christopher Cheung, **Jose Lado**, Arash Mostofi, Philip Kim, Johannes Lischner, Adolfo O. Fumega, Boris Kozinsky, Zachary A. H. Goodwin — [npj Computational Materials 12, 239 \(2026\)](#)
- [142] *Tensor network method for real-space topology in quasicrystal Chern mosaics*
Tiago V. C. Antão, Yitao Sun, Adolfo O. Fumega, **Jose L. Lado** — [Phys. Rev. Lett. 136, 156601 \(2026\)](#)
- [141] *Solving the Gross-Pitaevskii equation on multiple different scales using the quantum tensor train representation*
Marcel Niedermeier, Adrien Moulinas, Thibaud Louvet, **Jose L. Lado**, Xavier Waintal — [Phys. Rev. Research 8, 023006 \(2026\)](#)
- [140] *Roadmap on nanoscale superconductivity for quantum technologies*
Oleksandr Dobrovolskiy, Hermann Suderow, Francesco Tafuri, Annica M. Black-Schaffer, **Jose L. Lado**, Asle Sudbø, Daniela Stornaïoulo, Chuan Li, Anna E. Böhmer, Lan Maria Tran, Andrzej J. Zaleski, Adrian Crisan, Massimiliano Polichetti, Armando Galluzzi, Ali Gencer, Bernd Aichner, Neven Barišić, Wolfgang Lang, Tomas Samuely, Martin Gmitra, Tristan Cren, Mateo Calandra, Peter Samuely, Jeroen Custers, Rosa Córdoba, Vladimir M. Fomin, Nicola Poccia, Pavol Szabó, Fabrizio Porrati, Gleb Kakazei, Jan Aarts, Jason Robinson, Javier E. Villegas, Matthias Althammer, Hans Huebl, Akashdeep Kamra, Mathias Weiler, J. Hugo Dil, Daniil Evtushinsky, Beena Kalisky, Yonathan Anahory, Simon Bending, Peter Liljeroth, Abdou Hassanien, Isabel Guillaumon, Edwin Herrera, Alejandro V. Silhanek, Joris Van de Vondel, Anna Palau, Ilya Charaev, Maria Sidorova, Floriana Lombardi, Thilo Bauch, Cheryl Feuillet-Palma, Vasily Stolyarov, Dimitri Roditchev, Vladimir M. Krasnov, Benedikt Hempel, María José Martínez-Pérez, Javier Sesé, Dieter Koelle, Stefano Poletto, Alessandro Bruno, Davide Massarotti — [Superconductor Science and Technology 39, 023502 \(2026\)](#)
- [139] *Strain-induced two-dimensional topological crystalline insulator in bilayer SnTe*
Liwei Jing, Mohammad Amini, Adolfo O. Fumega, Orlando J. Silveira, **Jose L. Lado**, Peter Liljeroth, Shawulien Kezilebieke — [Nature Communications 17, 817 \(2026\)](#)
- [138] *Coupling of Klein-Andreev Resonant States in BiSrCaCuO-graphene-BiSrCaCuO Devices*
Sharadh Jois, **Jose L. Lado**, Genda Gu, Qiang Li, Ji Ung Lee — [Phys. Rev. B 113, 035410 \(2026\)](#)
- [137] *Self-consistent tensor network method for correlated super-moiré matter beyond one billion sites*
Yitao Sun, Marcel Niedermeier, Tiago V. C. Antão, Adolfo O. Fumega, **Jose L. Lado** — [Phys. Rev. Research 7, 043288 \(2025\)](#)
- [136] *Transfer learning of many-body electronic correlation entropy from local measurements*
Faluke Aikebaier, Teemu Ojanen, **Jose L. Lado** — [Phys. Rev. Applied 24, 054014 \(2025\)](#)
- [135] *Hamiltonian learning of triplon excitations in an artificial nanoscale molecular quantum magnet*
Rouven Koch, Robert Drost, Peter Liljeroth, **Jose L. Lado** — [Nano Letters 25, 36, 13435-13440 \(2025\)](#)
- [134] *Multiferroic nematic d-wave altermagnetism driven by orbital-order on the honeycomb lattice*
Luigi Camerano, Adolfo O. Fumega, **Jose L. Lado**, Alessandro Stroppa, Gianni Profeta — [npj 2D Materials and Applications 9, 75 \(2025\)](#)
- [133] *Observation of non-Hermitian topology from optical loss modulation*
Amin Hashemi, Elizabeth Louis Pereira, Hongwei Li, **Jose L. Lado**, Andrea Blanco-Redondo — [Nature Materials 24, 1393-1399 \(2025\)](#)
- [132] *Electrical probe of spin-spiral order in quantum spin Hall/spin-spiral magnet van der Waals heterostructures*
Fedor Nigmatulin, **Jose L. Lado**, Zhipeng Sun — [Phys. Rev. B 112, 024430 \(2025\)](#)
- [131] *Frustration-Induced Many-Body Degeneracy in Spin -1/2 Molecular Quantum Rings*
Donglin Li, Nan Cao, Marvin Metzelaars, Orlando J. Silveira, Joakim Jestilä, Adolfo Fumega, Tomohiko Nishiuchi, **Jose Lado**, Adam S. Foster, Takashi Kubo, Shigeki Kawai — [J. Am. Chem. Soc., 147, 30, 26208-26217 \(2025\)](#)
- [130] *Roadmap on quantum magnetic materials*
Antonija Grubišić-Čabo, Marcos H. D. Guimarães, Dmytro Afanasiev, Jose H. Garcia Aguilar, Irene Aguilera, Mazhar N. Ali, Semonti Bhattacharyya, Yaroslav M. Blanter, Rixt Bosma, Zhiyuan Cheng, Zhiying Dan, Saroj P. Dash, Joaquín Medina Dueñas, Joaquín Fernández-Rossier, Marco Gibertini, Sergii Grytsiuk, Maurits J. A. Houmes, Anna Isaeva, Chrystalla Knekna, Arnold H. Kole, Samer Kurdi, **Jose Lado**, Samuel Mañas-Valero, J. Marcelo J. Lopes, Damiano Marian, Mengxing Na, Falk Pabst, Sergio Barquero Pierantoni, Mexx Regout, Riccardo Reho, Malte Rösner, David Sanz, Toeno van der Sar, Jagoda Sławińska, Matthieu J. Verstraete, Muhammad Waseem, Herre S. J. van der Zant, Zeila Zanolli, David Soriano — [2D Materials 12, 031501 \(2025\)](#)
- [129] *Hamiltonian learning quantum magnets with non-local impurity tomography*
Greta Lupi, **Jose L. Lado** — [Phys. Rev. Applied 23, 054077 \(2025\)](#)
- [128] *Control of Andreev Reflection via a Single-Molecule Orbital*
Lorenz Meyer, **Jose L. Lado**, Nicolas Néel, Jörg Kröger — [Phys. Rev. Lett. 134, 146201 \(2025\)](#)
- [127] *Charge-entropy-stabilized selenide Ag_xSn_{1-x}Se*
Mohamed Oudah, Daisuke Takegami, Shinji Kitao, **Jose L. Lado**, Anna Meléndez-Sans, Denise S. Christovam, Masato Yoshimura, Ku-Ding Tsuei, Graham McNally, Masahiko Isobe, Kathrin Küster, M. Seto, Bernhard Keimer, D. A. Bonn, Liu Hao Tjeng, George Sawatzky, Hidenori Takagi — [Communications Materials 6, 58 \(2025\)](#)
- [126] *Topological zero modes and correlation pumping in an engineered Kondo lattice*
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Invited perspective articles

- [R7] *Nobel Prize (Quantum Physics in Action)*
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- [R6] *Nobel prize in physics 2025: Bringing quantum tunneling all the way up to the human scale*
Jose Lado — *Europhysics News* 56, 27-28 (2025)
- [R5] *Quantum science and technology*
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- [R4] *Engineering exotic quantum matter in twisted van der Waals materials*
Jose Lado — *Europhysics News* 55, 24-27 (2024)

[R3] *Doping a frustrated correlated van der Waals magnet*

Jose L. Lado — [Nature Materials 23, 1013-1014 \(2024\)](#)

[R2] *Putting a twist on spintronics*

Jose L. Lado — [Science 374, 1048-1049 \(2021\)](#)

[R1] *A layered unconventional superconductor*

Jose L. Lado, Peter Liljeroth — [News & Views, Nature Physics 17, 1287-1288 \(2021\)](#)

Preprints

[P16] *One-dimensional quasicrystals with tensor-network finite-state automata*

Milla Kolehmainen, **Jose L. Lado**, Anouar Moustaj — [arXiv:2609.06040](#)

[P15] *Interaction-driven electronic ferroelectricity in van der Waals heterostructures*

Ziying Wang, Ana Vera Montoto, Mohammad Amini, Yuxiao Ding, **Jose L. Lado**, Robert Drost, Adolfo O. Fumega, Peter Liljeroth — [arXiv:2607.24087](#)

[P14] *Emergent ferromagnetism in the NiI₂-NbSe₂ van der Waals heterostructure*

Büşra Gamze Arslan, Mohammad Amini, Ziying Wang, Alessandro Orsini, **Jose L. Lado**, Adolfo O. Fumega, Robert Drost, Peter Liljeroth — [arXiv:2607.21218](#)

[P13] *Electrical Control of Altermagnetism in a Quasi-1D Magnet*

Alberto M. Ruiz, Cuiju Yu, Diego López-Alcalá, **Jose L. Lado**, Adolfo O. Fumega, José J. Baldoví — [arXiv:2607.16856](#)

[P12] *Tensor network solvers for ultra-large tight-binding Hamiltonians: algorithms and applications*

Tiago V. C. Antão, Anouar Moustaj, Yitao Sun, **Jose L. Lado** — [arXiv:2607.00991](#)

[P11] *Learning Inhomogeneous Heisenberg Hamiltonians in Nanographene Spin Chains*

Greta Lupi, Saketh Ravuri, Chenxiao Zhao, Weidan Zhang, Cesare Roncaglia, Renxiang Liu, Xinliang Feng, Daniele Passerone, Pascal Ruffieux, Roman Fasel, **Jose L. Lado**, Gonçalo Catarina — [arXiv:2606.29281](#)

[P10] *Real-space spectral functions of three-dimensional billion-size topological non-Hermitian matter with tensor networks*

Yitao Sun, **Jose L. Lado**, Guangze Chen — [arXiv:2606.16424](#)

[P9] *Hamiltonian learning for spin-spiral moiré magnets from electronic magnetotransport*

Fedor Nigmatulin, Greta Lupi, **Jose L. Lado**, Zhipei Sun — [arXiv:2604.02959](#)

[P8] *Atomically Reconfigurable Single-Molecule Optoelectronics*

Atif Ghafoor, Santeri Neuvonen, Thinh Tran, Oscar Moreno Segura, Yitao Sun, Yaroslav Pavlyukh, Riku Tuovinen, **Jose L. Lado**, Shawulienu Kezilebieke — [arXiv:2603.29286](#)

[P7] *Tensor-network methodology for real-space super-moiré excitons*

Anouar Moustaj, Yitao Sun, Tiago V. C. Antão, Lumen Eek, **Jose L. Lado** — [arXiv:2603.02011](#)

[P6] *Molecular Hamiltonian learning from setpoint-dependent scanning tunneling spectroscopy*

Greta Lupi, Adolfo O. Fumega, Mohammad Amini, Robert Drost, Peter Liljeroth, **Jose L. Lado** — [arXiv:2601.19371](#)

[P5] *Atomic-scale probe of molecular magneto-electric coupling*

Mohammad Amini, Linghao Yan, Orlando J. Silveira, Adolfo O. Fumega, Viliam Vaňo, **Jose L. Lado**, Shawulienu Kezilebieke, Peter Liljeroth, Robert Drost — [arXiv:2512.07489](#)

[P4] *Moiré modulated quantum spin liquid candidate 1T-TaSe₂*

Ziying Wang, Adolfo O. Fumega, Ana Vera Montoto, Mohammad Amini, Büşra Gamze Arslan, Aleš Cahlk, Yuxiao Ding, **Jose L. Lado**, Robert Drost, Peter Liljeroth — [arXiv:2511.03311](#)

[P3] *Observation of electromagnons in a monolayer multiferroic*

Mohammad Amini, Tiago V. C. Antão, Liwei Jing, Ziying Wang, Antti Karjasilta, Robert Drost, Shawulienu Kezilebieke, **Jose L. Lado**, Adolfo O. Fumega, Peter Liljeroth — [arXiv:2510.08253](#)

[P2] *Electrical control of magnons in multiferroic NiI₂*

Andrey Rybakov, Adolfo O. Fumega, Dorye L. Esteras, **Jose L. Lado**, José J. Baldoví — [arXiv:2407.21645](#)

[P1] *Designer quantum matter in van der Waals heterostructures*

Jose L. Lado, Peter Liljeroth — [arXiv:2102.11779](#)