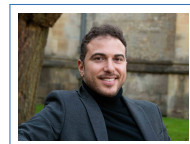


Alessio Lerose

Curriculum Vitae



Personal Data

Born: Magenta (Italy), 1990
Profile: [Google Scholar](#), [Linkedin](#), [ORCID](#), [arXiv](#)
Webpage: <https://alessioleroseweb.wixsite.com/mysite>

Academic Career

2024 – **Assistant Professor (Research Professor)**, *Institute for Theoretical Physics*, KU Leuven (BE)
2023 – 2024 **Leverhulme-Peierls Fellow**, *Rudolf Peierls Centre for Theoretical Physics*, University of Oxford (UK)
2023 – 2024 **Junior Research Fellow**, *Wadham College*, University of Oxford (UK)
2019 – 2023 **Post-doctoral researcher**, *Department of Theoretical Physics*, University of Geneva (CH)
Group: Prof. D. Abanin

Education

Oct 2019 **Ph.D., Statistical Physics**, SISSA - International School for Advanced Studies, Trieste (IT), *cum laude*
Dissertation: *Non-equilibrium phenomena in quantum many-body systems with long-range interactions*
Advisors: Prof. A. Gambassi, Prof. A. Silva
Oct 2015 **Master Degree, Physics**, University of Milan (IT), 110/110 *cum laude*
Dissertation: *Thermalization and its breakdown at the many-body localization transition* (internship at ICTP, Trieste, Italy)
Supervisors: Prof. A. Scardicchio (ICTP, Trieste, Italy), Prof. V. Mastropietro
Dec 2012 **Bachelor Degree, Physics**, University of Milan (IT), 110/110 *cum laude*
Dissertation: *Classical microscopic theory of polaritons in ionic crystals*
Supervisors: Prof. A. Carati, Prof. L. Galgani

Research Grants

2025 – 2029 **Flemish Research Foundation (FWO) PhD Fellowship**, KU Leuven (BE), ~ 247K EUR.
Promoter of Fabrizio Salas Ramirez's PhD project
2025 – 2030 **Flemish Research Foundation (FWO) Odysseus program**, KU Leuven (BE), 844K EUR.
2024 – 2026 **BOFZAP Startup**, KU Leuven (BE), 110K EUR.
2024 – 2028 **(declined) Swiss National Science Foundation (SNSF) Ambizione**, ETH Zürich (CH), 855K CHF.
Collaboration: Prof. E. Demler

Honors

Nov 2025 **Early-Career Prize Alfredo Di Braccio (5K EUR)**, by the [Lincean Academy](#)
Dec 2023 **Italian Abilitazione Scientifica Nazionale**, as Associate Professor in Theoretical Physics (02/A2)
Dec 2023 **Italian Abilitazione Scientifica Nazionale**, as Associate Professor in Physics of Matter (02/B2)
Dec 2022 **Leverhulme-Peierls Fellowship**, created "to support the most talented early-career theoretical physicists worldwide and to enrich the intellectual environment of the Rudolf Peierls Centre"
Nov 2021 **New Journal of Physics Early-Career Award (3K EUR)**, jointly awarded by the NJP Editorial Board, the German Physical Society (DPG) and the Institute of Physics (IOP), "for seminal and pioneering contributions in the field of non-equilibrium dynamics of quantum systems"
Sep 2021 **Early-Career Prize Giovanni Polvani (2K EUR)**, by the Italian Physical Society (SIF)

Supervision

- Jiangjing Dong, *PhD* at KU Leuven (BE), PhD project 2025-2029
- Dani Asafov, *PhD* at KU Leuven (BE), PhD project 2025-2029
- Fabrizio Salas Ramirez, *PhD* at KU Leuven (BE), PhD project 2024-2029
- Jaydev Singh Rao, *PhD* at KU Leuven (BE), PhD project 2024-2028
- Daan Uijlenhoet, *Master of Physics* at KU Leuven (BE), Master Dissertation 2026
- Yiqian Wu, *MPhysPhil* at University of Oxford (UK), Summer internship 2024
- Oliver Leask, *MMathPhys* at University of Oxford (UK), Master dissertation 2024

Teaching

- 2025 **Analytical Mechanics**, *Master of Physics*, KU Leuven, Lecturer
- 2025 **Advanced Quantum Mechanics**, *Master of Physics*, KU Leuven, Lecturer
- 2022 **Quantum Light and Matter**, *Master course in Physics*, University of Geneva, Lecturer and Tutor
- 2022 **Group Theory**, *Master course in Physics*, University of Geneva, Teaching Assistant
- 2021 **Quantum Light and Matter**, *Master course in Physics*, University of Geneva, Lecturer and Tutor
- 2020-21 **Laboratory of Theoretical Physics**, *Master course in Physics*, University of Geneva, Teacher
- 2020 **Classical Stochastic Methods**, *Master course in Physics*, University of Geneva, Tutor

Organization

- 2025 *Belgian Quantum Physics initiative (BQPi) Colloquia*, Bruxelles *with N. Goldman, L. Vanderstraeten*
- 2024-2026 *Hybrid Quantum Many-Body Theory Seminar Series*, Leuven *with W. De Roeck*
- 2023-2024 *Seminar Series Condensed Matter Theory Forum*, Oxford *with B. Placke, A. Prakash*
- Mar 2023 *Workshop Quantum interactive dynamics*, Oxford *with V. Bulchandani, S. Sondhi*
- Year 2019 *SISSA Ph.D. Colloquia* *with F. Benini, B. Fantechi, C. Mathys, S. Ruffo*

Academic Service

- 2025 Reviewer for University Research Fellowship (URF) application *Royal Society (UK)*
- 2024 Reviewer for Discovery Project grant application *Quantum Science Austria (AT)*
- 2024-2025 Examiner for Ph.D. Dissertations *KU Leuven (BE), SISSA Trieste (IT)*
- 2024 Examiner for *Transfer and Confirmation of Status* of D.Phil. candidates *University of Oxford (UK)*
- 2016-2018 Ph.D. representative in the Academic Senate *SISSA Trieste (IT)*

Peer Review Invitations

- ★ *Nature*, *Nature Physics*, *Nature Communications*
- ★ *Science*
- ★ *Physical Review A, B, D, E, L, R, X, XQ*
- ★ *Journal of Statistical Mechanics*
- ★ *SciPost*
- ★ *Communications in Physics*
- ★ *Annales Henri Poincaré*
- ★ *Nature Physics Journal: Quantum Info*
- ★ *New Journal of Physics*
- ★ *Journal of High-Energy Physics*
- ★ *Quantum*
- ★ *European Physics Journal D*
- ★ *Physica A*

Outreach

- 2026 *Quantum Technology talks* *Outreach talks in Leuven*
- 2024 *Saturday Morning of Theoretical Physics* *Outreach talk for Oxford Alumni*
- 2018 *SISSA4Schools* *Outreach talk for Italian high schools*

Invitations at Conferences, Workshops, and Schools

- QPITI 2026 *Quantum Platforms: Implementations and Theoretical Insights*, Crete (Greece), 9th Jul 2026
- *Workshop in honor of I. Cirac and P. Zoller*, Fondation Universitaire, Brussels (Belgium), 3rd Oct 2025
- *Universality in Non-Equilibrium Quantum Matter*, Pollica (Italy), 8th Sep 2025
- *Non-equilibrium Quantum Statistical Physics*, ICTP Trieste (Italy), 21st Jul 2025
- *Theory at the sea*, Oostduinkerke (Belgium), 13th Jun 2025
- *Simulating Many-Body Quantum Systems: A Classical and Quantum Perspective*, EPF Lausanne (Switzerland), 2nd Jun 2025
- *ALPS II: Modern topics in quantum many-body physics, from chaos to integrability*, Les Diablerets (Switzerland), 29th May 2025
- *Quark Confinement and Hadron Spectrum*, Cairns, Queensland (Australia), 19th Aug 2024
- *Non-Equilibrium Quantum Matter*, Puchberg am Schneeberg (Austria), 5th Jul 2024
- *New Perspectives in quantum many-body physics $\hbar = 1$* , ETH Zurich (Switzerland), 1st Jul 2024
- *Chaos and information dynamics in quantum many body systems*, Ettore Majorana Center, Erice (Italy), 26th Nov 2023
- *Exploring Non-equilibrium Long-range Quantum Matter*, KITP Santa Barbara (USA), 13th Nov 2023
- *Non-equilibrium quantum dynamics*, University of Ljubljana (Slovenia), 12th May 2023
- *Quantum Computing methods for High Energy Physics*, Munich Institute for Astro-, Particle and BioPhysics (Germany), 26th Apr 2023
- *Quantum interactive dynamics*, University of Oxford (UK), 27th Mar 2023
- *Mathematical Quantum Matter*, University of Milan (Italy), 10th Jan 2023
- *The many facets of Statistical Field Theory*, SISSA Trieste (Italy), 17th Oct 2022
- *Youth Forum for Quantum Physics*, Tsung-Dao Lee Institute, Shanghai (China), 14th Jan 2022
- *Spacetime Duality in Quantum Circuits*, IIT Madras & Turipati (India), 10th Nov 2021
- *Trieste Quantum Days*, ICTP Trieste (Italy), 25th Jul 2019
- *Non-equilibrium behavior of classical and quantum systems*, SISSA, Trieste (Italy), 10th Sep 2018
- *Non-ergodicity & integrability*, ESI, Vienna (Austria), 28th May 2018
- *The many facets of non-equilibrium physics*, Mazara del Vallo (Italy), 18th Sep 2017

Invited Seminars and Colloquia

2025:

- Seed Seminar, IHES (France), 11th Jun 2025
- University of Antwerp (Belgium) [host: Antwerp Young Minds], 10th Jun 2025
- University of Antwerp (Belgium) [host: Jacques Tampere], 5th May 2025
- University of Durham (UK) [host: IPPP], 6th Feb 2025

2024:

- University of Ghent (Belgium) [host: N. Bultinck], 24th Oct 2024
- Université Libre de Bruxelles (Belgium) [host: L. Vanderstraeten], 21st Oct 2024
- University of Maryland (USA) [host: Z. Davoudi], 9th Jul 2024
- LPTMC, Sorbonne Université (France) [host: J. Vidal], 24th Apr 2024
- LPTMS, University of Paris-Saclay (France) [host: V. Ros], 14th May 2024
- *TP Colloquium*, University of Innsbruck and IQOQI (Austria) [host: H. Pichler], 10th Apr 2024
- Politecnico di Torino (Italy) [host: L. Barbiero], 8th Apr 2024
- University of Pisa (Italy) [host: D. Rossini], 4th Apr 2024
- University of Padua (Italy) [host: S. Montangero], 27th Mar 2024

- University of Bologna (Italy) [host: E. Ercolessi], 25th Mar 2024
 - MPIPKS Dresden (Germany) [host: M. Bukov], 9th Jan 2024
- 2023:
- University of Strathclyde (UK) [host: P. Poggi, A. Daley], 23th Nov 2023
 - Ecole Normale Supérieure de Lyon (France) [host: T. Roscilde], 28th Sep 2023
 - University of the Basque Country (Spain) [host: G. Tóth], 5th Sep 2023
 - University of Augsburg (Germany) [host: M. Heyl], 19th Apr 2023
- 2022:
- Technische Universität Munich (Germany) [host: M. Knap], 28th Nov 2022
 - Ludwig-Maximilians Universität Munich (Germany) [host: J. von Delft], 25th Nov 2022
 - Freie Universität Berlin (Germany) [host: J. Eisert], 4th Jul 2022
 - CEA Grenoble (France) [host: M. Filippone], 13th May 2022
 - *Balades Quantiques*, Ecole Normale Supérieure de Paris (France), 7th Apr 2022
 - University of Leeds (UK) [host: Z. Papic], 10th Mar 2022
 - University of Cambridge (UK) [host: A. Lamacraft], 8th Mar 2022
 - University of Oxford (UK) [host: S. Parameswaran], 2nd Mar 2022
 - Universidade Federal do Rio Grande do Norte, Natal (Brasil) [host: T. Macrì], 13th Jan 2022
- 2021:
- ICTP/SISSA, Trieste (Italy) [host: A. Gambassi], 1st Oct 2021
 - University of Mainz (Germany) [host: J. Marino], 14th Jul 2021
 - Leeds-Leighborough-Nottingham Nonequilibrium Seminars (UK), 16th Jun 2021
 - Karlsruhe Institute of Technology (Germany) [host: E. Doggen], 13th Apr 2021
- 2020:
- IST Vienna (Austria) [host: M. Serbyn], 16th Dec 2020
- 2019:
- Paul Scherrer Institute, Villigen (Switzerland) [host: M. Müller], 31st Jan 2019
 - University of Saarland (Germany) [host: G. Morigi], 29th Jan 2019
 - University of Heidelberg (Germany) [host: T. Enss], 23th Jan 2019
- 2018:
- Harvard University (USA) [host: J. Marino], 1st May 2018

Complete List of Publications

Preprints

6. I. Vilkoviskiy, M. Sonner, Q. C. Huang, W. W. Ho, **AL**, D. Abanin
Temporal entanglement transition in chaotic quantum many-body dynamics
[arXiv:2511.03846 \(2025\)](#)
5. B. Placke, G. J. Sreejith, **AL**, S. L. Sondhi
Running Quantum Computers in Discovery Mode
[arXiv:2507.01013 \(2025\)](#)
4. D. Luo, F. M. Surace, A. De, **AL**, E. R. Bennewitz, B. Ware, A. Schuckert, Z. Davoudi, A. V. Gorshkov, O. Katz, C. Monroe
Quantum simulation of bubble nucleation across a quantum phase transition
[arXiv:2505.09607 \(2024\)](#)
3. F. M. Surace, **AL**, O. Katz, E. R. Bennewitz, A. Schuckert, D. Luo, A. De, B. Ware, W. Morong, K. Collins, C. Monroe, Z. Davoudi, A. V. Gorshkov

2. A. De*, **AL***, D. Luo, F. M. Surace, A. Schuckert, E. R. Bennewitz, B. Ware, W. Morong, K. S. Collins, Z. Davoudi, A. V. Gorshkov, O. Katz, C. Monroe
Observation of string-breaking dynamics in a quantum simulator
[arXiv:2410.13815](#) (2024)
1. **AL**
Simulating Schwinger model dynamics with quasi-one-dimensional qubit arrays
[arXiv:2409.14544](#) (2024)

Peer-reviewed articles

30. E. R. Bennewitz, B. Ware, A. Schuckert, **AL**, F. M. Surace, R. Belyansky, W. Morong, D. Luo, A. De, K. Collins, O. Katz, C. Monroe, Z. Davoudi, A. Gorshkov
Simulating Meson Scattering on Spin Quantum Simulators
[Quantum 9, 1773](#) (2025)
29. **AL**, T. Parolini, R. Fazio, D. Abanin, S. Pappalardi
Theory of robust quantum many-body scars in long-range interacting systems
[Phys. Rev. X 15, 011020](#) (2025)
28. N. Defenu, **AL**, S. Pappalardi
Out-of-equilibrium dynamics of quantum many-body systems with long-range interactions
[Physics Reports 1074, 1-92](#) (2024) (Invited review article)
27. B. Kloss, J. Thoenniss, M. Sonner, **AL**, M. Fishman, M. Stoudenmire, O. Parcollet, A. Georges, D. Abanin
Equilibrium quantum impurity problems via matrix-product state encoding of the retarded action
[Phys. Rev. B 108, 205110](#) (2023)
26. J. Thoenniss, M. Sonner, **AL**, D. Abanin
Efficient method for quantum impurity problems out of equilibrium
[Phys. Rev. B 107, L201115](#) (2023)
25. J. Thoenniss, **AL**, D. Abanin
Non-equilibrium quantum impurity problems via matrix-product states in the temporal domain
[Phys. Rev. B 107, 195101](#) (2023)
24. **AL**, M. Sonner, D. Abanin
Overcoming the entanglement barrier in quantum many-body dynamics via space-time duality
[Phys. Rev. B 107, L060305](#) (2023)
23. F. Balducci, A. Gambassi, **AL**, A. Scardicchio, C. Vanoni
Interface dynamics in the two-dimensional quantum Ising model
[Phys. Rev. B 107, 024306](#) (2023)
22. O. Chelpanova, **AL**, S. Zhang, I. Carusotto, Y. Tserkovnyak, J. Marino
Competition between lasing and superradiance under spintronic pumping
[Phys. Rev. B 108, 104302](#) (2023)
21. M. Collura, A. De Luca, D. Rossini, **AL**
Discrete time-crystalline response stabilized by domain-wall confinement
[Phys. Rev. X 12, 031037](#) (2022)
20. F. Balducci, A. Gambassi, **AL**, A. Scardicchio, C. Vanoni
Localization and melting of interfaces in the two-dimensional quantum Ising model
[Phys. Rev. Lett. 129, 120601](#) (2022)

19. G. Giudice, G. Giudici, M. Sonner, J. Thoenniss, **AL**, D. Abanin, L. Piroli
Temporal entanglement, quasiparticles and the role of interactions
[Phys. Rev. Lett. **128**, 220401 \(2022\)](#)
18. K. Seetharam, **AL**, R. Fazio, J. Marino
Dynamical scaling of correlations generated by short- and long-range dissipation
[Phys. Rev. B **105**, 184305 \(2022\)](#)
17. M. Sonner, **AL**, D. Abanin
Characterizing many-body localization via exact disorder-averaged quantum noise
[Phys. Rev. B **105**, L020203 \(2022\)](#) (selected as Editors' suggestion)
16. K. Seetharam, **AL**, R. Fazio, J. Marino
Correlation engineering via non-local dissipation
[Phys. Rev. Research **4**, 013089 \(2022\)](#)
15. **AL**, M. Sonner, D. Abanin
Scaling of temporal entanglement in proximity to integrability
[Phys. Rev. B **104**, 035137 \(2021\)](#)
14. M. Sonner, **AL**, D. Abanin
Influence functional of many-body systems: temporal entanglement and MPS representation
[Annals of Physics **431**, 168552 \(2021\)](#)
13. **AL**, M. Sonner, D. Abanin
Influence matrix approach to many-body Floquet dynamics
[Phys. Rev. X **11**, 021040 \(2021\)](#)
12. F. M. Surace, **AL**
Scattering of mesons in quantum simulators
[New J. Phys. **23** 062001 \(2021\)](#) (Fast Track Communication)
11. **AL**, S. Pappalardi
Bridging entanglement dynamics and chaos in semiclassical systems
[Phys. Rev. A **102**, 032404 \(2020\)](#)
10. F. M. Surace, P. P. Mazza, G. Giudici, **AL**, A. Gambassi, M. Dalmonte
Lattice gauge theories and string dynamics in Rydberg-atom quantum simulators
[Phys. Rev. X **10**, 021041 \(2020\)](#)
9. **AL**, F. Surace, P. P. Mazza, G. Perfetto, M. Collura, A. Gambassi
Quasilocalized dynamics from confinement of quantum excitations
[Phys. Rev. B **102**, 041118\(R\) \(2020\)](#) (selected as Editors' suggestion)
8. **AL**, S. Pappalardi
Origin of the slow growth of entanglement entropy in long-range interacting spin systems
[Phys. Rev. Research **2**, 012041\(R\) \(2020\)](#)
7. **AL**, B. Žunkovič, A. Silva, A. Gambassi
Quasilocalized excitations induced by long-range interactions in homogeneous quantum spin chains
[Phys. Rev. B **99**, 121112\(R\) \(2019\)](#)
6. P. P. Mazza, G. Perfetto, **AL**, M. Collura, A. Gambassi
Suppression of transport in non-disordered quantum spin chains due to confined excitations
[Phys. Rev. B **99**, 180302\(R\) \(2019\)](#)
5. **AL**, J. Marino, A. Gambassi, A. Silva
Prethermal quantum many-body Kapitza phases of periodically driven spin systems
[Phys. Rev. B **100**, 104306 \(2019\)](#) (selected as Editors' suggestion)

4. **AL**, B. Žunkovič, J. Marino, A. Gambassi, A. Silva
Impact of nonequilibrium fluctuations on prethermal DPTs in long-range interacting spin chains
[Phys. Rev. B **99**, 045128 \(2019\)](#)
3. **AL**, J. Marino, B. Žunkovič, A. Gambassi, A. Silva
Chaotic dynamical ferromagnetic phase induced by nonequilibrium quantum fluctuations
[Phys. Rev. Lett. **120**, 130603 \(2018\)](#)
2. V. K. Varma, **AL**, F. Pietracaprina, J. Goold, A. Scardicchio
Energy diffusion in the ergodic phase of a many body localizable spin chain
[J. Stat. Mech. **053101** \(2017\)](#) (based on Master thesis)
1. **AL**, A. Sanzeni, A. Carati, L. Galgani
Classical microscopic theory of polaritons in ionic crystals
[Eur. Phys. J. D **68**, 35 \(2014\)](#) (based on Bachelor thesis)