Bastien Lapierre

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Google scholar
arXiv

Professional Experience

Since 10/2023	**Postdoctoral Fellow, Princeton University, USA** Advisor: Prof. Shinsei Ryu
10/2019 – 08/2023	**Graduate Research Assistant, University of Zürich, Switzerland** Advisor: Prof. Titus Neupert

Education

10/2019 – 08/2023	**Ph.D. Physics, University of Zürich, Switzerland** Thesis title: *Inhomogeneous and Disordered Quantum Systems: From Dynamics to Topology* Supervisor: Prof. Titus Neupert
09/2017 – 09/2019	**M.Sc. Physics, ETH Zürich, Switzerland** Thesis title: *Heating Dynamics in Floquet Conformal Field Theory* Supervisor: Prof. Titus Neupert *Honors*: Diploma with highest distinction, 5.91/6
09/2014 – 06/2017	**B.Sc. Physics, University of Geneva, Switzerland** *Honors*: Prize for the best B.Sc. in Physics

Skills

Programming	Python, Wolfram Alpha, Latex, Bash.
Coding softwares	QuSpin (exact diagonalization), TeNPy (tensor networks) Qskit (IBM quantum computing software), PyTorch, Mathematica. Experience with high-performance computing environment (HPC) and Slurm Workload Manager.
Soft skills	Communication skills, scientific writing, teamwork, structuring and management of research projects.
Languages	English (fluent), French (mother tongue), German (intermediate), Spanish (basic).

Mentoring experience

Since 11/2023	Co-supervision of graduate research projects of Zhi-Xing Lin, Princeton University Project titles: *1) Chiral instabilities in driven-dissipative Luttinger liquids* *2) Entanglement phase transitions from driven impurities*
09/2022-03/2023	Co-supervision of M.Sc. thesis of Valerio Pagni, ETH Zürich Thesis title: *Heating in a driven disordered gapless field theory*

Mentoring experience (continued)

10/2021-04/2021	Supervision of B.Sc. thesis of Johannes Christmann, University of Zürich Thesis title: *Disorder and topology in quantum materials*
10/2020-03/2021	Supervision of B.Sc. thesis of Fabian Jaeger, University of Zürich Thesis title: *Floquet dynamics of critical systems in one and higher dimensions*

Teaching experience

09/2022-02/2023	Teaching assistant for graduate course *General Relativity*, ETH Zürich.
02/2022-06/2022	Teaching assistant for graduate course *Advanced Field Theory*, ETH Zürich.
09/2021-02/2022	Teaching assistant for graduate course *Quantum Field Theory I*, ETH Zürich.
02/2021-06/2021	Teaching assistant for undergraduate course *Proseminar of Theoretical Physics*, University of Zürich.
09/2020-02/2021	Teaching assistant for undergraduate course *Analysis I*, University of Zürich.
02/2020-06/2020	Teaching assistant for undergraduate course *Linear Algebra II*, University of Zürich.

Grants and awards

2025 *Philippe Meyer Junior Research Chair*: 2+1 years independent postdoctoral fellowship awarded by the Philippe Meyer Institute at École Normale Supérieure, France.

2023 *SNSF Postdoc Mobility Fellowship*: 2 years postdoctoral fellowship awarded by the Swiss National Science Foundation, hosted by Prof. Shinsei Ryu at Princeton University, USA.

2017 *Charles-Eugène Guye Prize*: awarded to the best B.Sc. degree in physics each year at the University of Geneva, Switzerland.

Research Publications

Preprints

Lapierre, **B.**, Pelliconi, P., Ryu, S., & Sonner, J. (2025). Driven non-unitary dynamics of quantum critical systems. arXiv:2505.01508.

Lapierre, **B.**, Trifunovic, L., Neupert, T., & Brouwer, P. W. (2024). Topology of ultra-localized insulators and superconductors. arXiv:2407.07957.

Lapierre, **B.**, Numasawa, T., Neupert, T., & Ryu, S. (2024). Floquet engineered inhomogeneous quantum chaos in critical systems. arXiv:2405.01642.

Journal Articles

Moosavi, P., Oblak, B., **Lapierre**, **B.**, Estienne, B., & Stéphan, J.-M. (2025). Quantum hall edges beyond the plasma analogy. *Phys. Rev. Res.*, *7*, 023134.

Lin, Z.-X., **Lapierre**, **B.**, Moosavi, P., & Ryu, S. (2025). Chiral instabilities in driven-dissipative quantum liquids. *Phys. Rev. B*, *111*, 165131, Editors' Suggestion.

Oblak, B., **Lapierre**, **B.**, Moosavi, P., Stéphan, J.-M., & Estienne, B. (2024). Anisotropic quantum Hall droplets. *Phys. Rev. X*, *14*, 011030.

Datta, S., **Lapierre**, **B.**, Moosavi, P., & Tiwari, A. (2023). Marginal quenches and drives in Tomonaga-Luttinger liquids. *SciPost Phys.*, *14*, 108.

Molignini, P., **Lapierre**, **B.**, Chitra, R., & Chen, W. (2023). Probing Chern number by opacity and topological phase transition by a nonlocal Chern marker. *SciPost Phys. Core*, *6*, 059.

Lapierre, **B.**, Neupert, T., & Trifunovic, L. (2022). Topologically localized insulators. *Phys. Rev. Lett.*, *129*, 256401.

Choo, K., **Lapierre**, **B.**, Kuhlenkamp, C., Tiwari, A., Neupert, T., & Chitra, R. (2022). Thermal and dissipative effects on the heating transition in a driven critical system. *SciPost Physics*, *13*(5).

Lapierre, **B.**, Neupert, T., & Trifunovic, L. (2021). N-band Hopf insulator. *Phys. Rev. Research*, *3*, 033045.

Lapierre, **B.**, & Moosavi, P. (2021). Geometric approach to inhomogeneous Floquet systems. *Phys. Rev. B*, *103*, 224303.

Lapierre, **B.**, Choo, K., Tiwari, A., Tauber, C., Neupert, T., & Chitra, R. (2020). Fine structure of heating in a quasiperiodically driven critical quantum system. *Phys. Rev. Research*, *2*, 033461.

Lapierre, **B.**, Choo, K., Tauber, C., Tiwari, A., Neupert, T., & Chitra, R. (2020). Emergent black hole dynamics in critical Floquet systems. *Phys. Rev. Research*, *2*, 023085.

Conference talks

06/2024 Workshop on Non-equilibrium Many-body Physics Beyond the Floquet Paradigm, Max Planck Institute for the Physics of Complex Systems, Germany, *"Fractal entanglement transitions in a quasiperiodic non-unitary circuit"*.

03/2024 APS March Meeting 2024, Minneapolis, USA, *"Anisotropic Quantum Hall Droplets"*.

07/2023 Workshop on Mathematical Aspects of Condensed Matter Physics, ETH Zürich, Switzerland, *"Topologically localized phases"*.

06/2022 Workshop on Out-of-equilibrium and collective dynamics of quantum many-body systems, ETH Zürich, Switzerland, *"Marginal quenches and drives in Tomonaga-Luttinger liquids"*.

06/2021 Workshop on Low dimensional quantum many-body systems, Heidelberg, Germany, *"Geometry and black holes in periodically driven critical quantum systems"*.

03/2021 APS March Meeting 2021, online, *"Geometry and black holes in periodically driven critical quantum systems"*.

Invited Talks

01/2025 Condensed Matter Seminar, LPTM, CY Cergy Paris Université, France, host: Jean Avan.

08/2024 Group Seminar, Collège de France, France, host: Marco Schiro.

07/2024 Condensed Matter Seminar, LPMMC, Université Grenoble Alpes, France, host: Adolfo Grushin.

06/2024 Group Seminar, European Center for Quantum Sciences, Université de Strasbourg, France, host: Jerome Dubail.

Invited Talks (continued)

05/2024 Leeds-Loughborough-Nottingham Non-Equilibrium Seminar Series, United Kingdom, host: Jiannis Pachos, Youtube link.

04/2024 Mathematical Physics Seminar, Université de Montreal, Canada, host: William Witczak-Krempa.

02/2024 Theoretical Physics Seminar, Ecole Normale Supérieure de Lyon, France, host: Jean-Marie Stéphan.

11/2023 Quantum Initiative Seminar, Princeton University, USA, host: Shinsei Ryu.

01/2023 Condensed Matter Seminar, Freie Universität Berlin, Germany, host: Piet Brouwer.

10/2021 Speakers' Corner, online, host: Anton Akhmerov, Youtube link.

04/2021 Condensed Matter Seminar, IFW Dresden, Germany, host: Jeroen van den Brink.

10/2019 Condensed Matter Seminar, University of Zürich, Switzerland, host: Titus Neupert.

06/2019 Group Seminar, ETH Zürich, Switzerland, host: Ramasubramanian Chitra.

Scientific outreach

06/2024 Jury at Princeton Research Day 2024: My role was to grade the research projects of undergraduate and graduate students, and give them feedback on their scientific communication skills.

03/2024 Outreach talk at Princeton Postdoctoral Council Seminar Series, "*Emergent Black Hole Dynamics in Quantum Matter*";
Audience: Postdocs from Princeton University across all departments;
Awarded best talk of the semester.

11/2022 Outreach talk on the 2022 Physics Nobel prize, as part of the nanoTalks series from Reatch, Zürich, Switzerland.