HUGO THOMAS

CIFRE Ph.D. student at Sorbonne Université, Ecole Normale Supérieure and Quandela

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Education

2023 – now **CIFRE (industrial) Ph.D. student in quantum machine learning for photonic**, Sorbonne Université, ENS and Quandela, Paris
Advisors: Elham Kashefi (LIP6), Ulysse Chabaud (DIENS), Pierre-Emmanuel Emeriau (Quandela)

2021 – 2023 **Master's degree in Quantum Information**, Sorbonne Université, Paris—*with highest honours*
Master's thesis: *Links between quantum circuits amplitudes and matrix permanents*
Master's thesis advisors: Rawad Mezher (Quandela) and Pierre-Emmanuel Emeriau (Quandela)

2018 – 2021 **Bachelor's degree in Computer Sciences**, Université de Paris-Diderot, Paris—*with highest honours*
First year at Université de Tours, Tours, France

Internships

June – August 2022 Quantum algorithms for matrix approximation and interior points methods, IRIF, Paris
Advisor: Simon Apers

Academic papers

Publications **Hugo Thomas**, Pierre-Emmanuel Emeriau, Elham Kashefi, Harold Ollivier and Ulysse Chabaud, *Role of coherence for quantum computational advantage*. Phys. Rev. Lett. 135, 150602.

Léo Monbroussou, Eliott Z Mamon, **Hugo Thomas**, Verena Yacoub, Ulysse Chabaud and Elham Kashefi, *Towards quantum advantage with photonic state injection*. Phys. Rev. Research 7, 033051.

Preprints **Hugo Thomas**, Ulysse Chabaud and Pierre-Emmanuel Emeriau, *Shedding light on classical shadows: learning photonic quantum states*.

Hugo Thomas, Pierre-Emmanuel Emeriau and Rawad Mezher, *Connecting quantum circuit amplitudes and matrix permanents through polynomials*.

Dissemination

Talks *Shedding light on classical shadows: learning photonic quantum states*, 8^{th} International Conference for Young Quantum Information Scientists (YQIS25), Barcelona, Spain

On the role of coherence for quantum computational advantage, the International Conference on Quantum Computing 2025 (ICoQC2025), Paris, France.

Towards quantum advantage with photonic state injection, the International Conference on Quantum Technology for High-Energy Physic (QT4HEP 2025), CERN, Switzerland (presenter: Léo Monbroussou).

On the role of coherence for quantum computational advantage, the 2^{nd} Colloquium on Quantum Technologies (GdR-TeQ 2024), Paris, France.

Workshops *Towards quantum advantage with photonic state injection*, the 2^{nd} Quantum Energy Initiative Workshop (QEI 2025), Grenoble, France (presenter: Léo Monbroussou).

Towards quantum advantage with photonic state injection, Quantum Software Lab Anniversary Workshop 2024, Edinburgh, U.K.

Posters *On the role of coherence for quantum computational advantage*, Quantum Computing Theory in Practice (QCTiP25), Berlin, Germany.

Last update: October 11, 2025

Connecting quantum circuit amplitudes and matrix permanents through polynomials, the 7th International Conference for Young Quantum Information Scientists (YQIS24), Paris, France.

Connecting quantum circuit amplitudes and matrix permanents through polynomials, Quantum Computing Theory in Practice (QCTiP 2024), the University of Edinburgh, U.K.

Quantum algorithms for matrix spectral approximation and interior point methods, 2022 Bad Honnef Summer School on Quantum Computing, Germany.

Invited Seminar — *On the role of coherence for quantum computational advantage*, LaBRI, Université de Bordeaux, France.

Public outreach — *Roundtable: "Quantum revolution: the next tech breakthrough that no one understands (yet).*", Maison Mousse, Nantes, France

CEA Quantum Hub Discussion, CEA, France

Review Activity

Journal — Quantum Journal

Conferences — QTML 2024, QPL 2025, QIP 2025

Summer schools

June 2025 — LMS Research School Quantum Machine Learning and Hamiltonian Simulation, Sabhal Mor Ostaig, Isle of Skye

August 2022 — Bad Honnef Summer School on Quantum Computing, Physikzentrum Bad Honnef, Germany