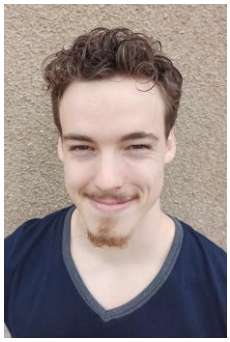
Ismaël Septembre



Nationality: French
Birthdate: 23/03/1998
Phone number: +4915566086408
E-mail adress: ismael.septembre@uni-siegen.de
Website: https://ismaelseptembre.owlstown.net/
Orcid: https://orcid.org/0000-0001-7675-6937
Scholar: https://scholar.google.com/citations?user=_XJpsNYAAAAJ

Personal profile

Post-doctoral fellow in **quantum information theory** at the University of Siegen, Germany, in the group of Theoretical Quantum Optics under the supervision of Otfried Gühne.

Ph.D. in **condensed matter physics** (June 2023).

Keywords: theoretical physics, topological photonics, quantum fluids of light, quantum information.

13 publications (1st author of 7), including 1 *Nat. Commun*., 1 *Optica*, 3 *PRL*, 6 *PRB*.

1 preprint (1st author).

7 conference talks, including **1 invited**.

5 undergraduate students supervised.

Current position

01/06/2024 – 31/06/2025 – **Post-doctoral fellow** at the University of Siegen, Germany.

Topic: Quantum information theory: quantum information theory, quantum optics theory

Supervisor: Otfried Gühne

Past research experience

01/07/2023 – 30/05/2024 – Post-doctoral researcher in the project “Topolight”, Institut Pascal, Clermont-Ferrand (France). Supervisors: Guillaume Malpuech, Dmitry Solnyshkov

01/09/2020 – 30/06/2023 – Ph.D. “Topological polariton lasers and circuits”, Institut Pascal, Clermont-Ferrand (France). Supervisors: Guillaume Malpuech, Dmitry Solnyshkov, Hai Son Nguyen, Xavier Letartre.

10/02/2020 – 30/06/2020 – Internship at Institut Pascal, Clermont-Ferrand (France): Theoretical study of polaritonic Andreev reflection in 1D. Supervisors: Dmitry Solnyshkov and Guillaume Malpuech.

01/05/2020 – 30/07/2020– Internship at UNamur and UMons (Belgium): experimental study of the superhydrophobicity of silicon nanostructures. Supervisors: Olivier Deparis and Michel Voué.

Education

30/06/2023 – **Ph.D. in physics** “Topological polariton lasers and circuits”.

Institut Pascal, CNRS, Université Clermont Auvergne, Clermont-Ferrand, France.

Supervisors: Guillaume Malpuech, Dmitry Solnyshkov, Hai Son Nguyen, Xavier Letartre.

Committee: Hannah Price and Cristiano Ciuti (reviewers), Anna Minguzzi (examiner), Thierry Guillet (committee director)

30/06/2020 – **Master’s degree** in physics with honours, major in nanophysics, minor in quantum mechanics, Université Grenoble Alpes, Grenoble (France).

30/06/2020 – **Engineering degree** with honours, major in photonics, electronics, and materials, Grenoble Institute of Technology: Phelma (Physics, Electronics, Materials), Grenoble (France).

30/06/2018 – **Bachelor's degree** with honours, major in physical engineering and materials, Grenoble Institute of Technology: Phelma (Physics, Electronics, Materials), Grenoble (France).
10/08/2015 – Scientific **Baccalauréat**, with highest honours, Guéret (France).

Publications

(^ co-first author, * corresponding author)

1. **I. Septembre**, C. Leblanc, D. D. Solnyshkov, and G. Malpuech, Topological moiré polaritons, *Phys. Rev. Lett.* **133**, 266602 (2024)
2. H. Souissi, M. Gromovyi, **I. Septembre**, *et al.*, Mode-locked waveguide polariton laser, *Optica* **11**, 962 (2024)
3. Z. Zhang*, S. Liang, **I. Septembre**, *et al.*, Non-Hermitian delocalization in a two-dimensional photonic quasicrystal, *Phys. Rev. Lett.* **132**, 263801 (2024)
4. **I. Septembre***, I. Fudjo, V. Develay, T. Guillet, S. Bouchoule, J. Zúñiga-Pérez, D. D. Solnyshkov, and G. Malpuech, Soliton formation in an exciton-polariton condensate at a bound state in the continuum, *Phys. Rev. B* **109**, 205302 (2024)
5. D. D. Solnyshkov*, **I. Septembre**, and G. Malpuech, Towards analogue black hole merger, *Comptes Rendus. Physique* **25**, 1 (2024)
6. D. D. Solnyshkov, **I. Septembre**, K. Ndiaye, and G. Malpuech, Analog of Foucault precession in two-dimensional quantum harmonic oscillators with Berry curvature, *Phys. Rev. B* **108**, 144306 (2023)
7. **I. Septembre***, D. D. Solnyshkov, and G. Malpuech, Angle-dependent Andreev reflection at an interface with a polaritonic superfluid, *Phys. Rev. B* **108**, 115309 (2023)
8. **I. Septembre***, C. Leblanc, L. Hermet, H. S. Nguyen, X. Letartre, D. D. Solnyshkov, and G. Malpuech, Design of a room-temperature topological exciton-polariton laser in a ZnO/TiO_2-photonic crystal slab, *Phys. Rev. B* **107**, 155304 (2023)
9. **I. Septembre***, J. S. Meyer, D. D. Solnyshkov, and G. Malpuech, Weyl singularities in polaritonic multi-terminal Josephson junctions, *Phys. Rev. B* **107**, 165301 (2023)
10. M. Kròl, **I. Septembre**^, P. Oliwa, *et al.*, Annihilation of exceptional points from different Dirac valleys in a 2D photonic system, *Nat. Commun.* **13**, 5340 (2022)
11. D. D. Solnyshkov, C. Leblanc, **I. Septembre**, and G. Malpuech, Domain-wall topology induced by spontaneous symmetry breaking in polariton graphene, *Phys. Rev. Lett* **129**, 066802 (2022)
12. **I. Septembre**, S. Koniakhin, J. S. Meyer, D. D. Solnyshkov, and G. Malpuech, Parametric amplification of topological interface states in synthetic Andreev bands, *Phys. Rev. B* **103**, 214504 (2021)
13. M. Sarrazin*, **I. Septembre**, A. Hendrickx, *et al.*, Toward an experimental proof of superhydrophobicity enhanced by quantum fluctuations freezing on a broadband absorber metamaterial, *J. Appl. Phys.* **128**, 204303 (2020)

Preprint

(^ co-first author, * corresponding author)

Z. Zhang*, **I. Septembre***^, Z. Liu^, P. Kokhanchik, S. Lian, F. Liu, C. Li, H. Wang, M. Liu, Y. Zhang, M. Xia, G. Malpuech*, D. Solnyshkov*, Beam dynamics induced by the quantum metric of exceptional rings, arXiv:2410.14428 (2024).

Conferences

Invited talk:

1. "Numerical methods for topological polaritonics", 13th International Conference on Metamaterials, Photonic Crystals and Plasmonics (META2023), Paris, France, 2023.

Contributed talks:

1. “Annihilation of exceptional points from different Dirac valleys” 22nd International Conference on Physics of Light-Matter Coupling in Nanostructures (PLMCN2022), Varadero, Cuba, 2022.
2. “Weyl points in a polaritonic topological multi-terminal Josephson junction”, Journées de la matière condensée (JMC2022), Lyon, France, 2022.
3. “Non-Hermitian topological transition: Annihilation of exceptional points from different Dirac valleys”, Journées de la matière condensée (JMC2022), Lyon, France, 2022.
4. “Topological synthetic Andreev bands in a polaritonic analogue of multi-terminal Josephson junctions”, Scientific days of the doctoral school for basic science, Clermont-Ferrand, France 2023.
5. “Polariton superfluids as an analogue topological superconductor”, 18th International Conference of Optics of Excitons in Confined Systems (OECS18), Lecce, Italy, 2023.
6. “Quantum geometry and dynamics of non-Hermitian Hamiltonians”, Geometry of quantum dynamics workshop, Siegen, Germany, 2024.

Posters:

1. “Parametric amplification of topological interface states in synthetic Andreev bands”, 21st International Conference on Physics of Light-Matter Coupling in Nanostructures (PLMCN2020), Clermont-Ferrand, France, 2020.
2. “Parametric amplification of topological interface states in polaritonic synthetic Andreev bands”, Wavecomplexity International Networking Event (WINE), online, 2021.
3. “Parametric amplification of topological interface states in polaritonic synthetic Andreev bands”, Topological Matter School (TMS21), Donostia San Sebastian, Spain (remotely), 2021.
4. “Parametric amplification of topological interface states in polaritonic synthetic Andreev bands”, 17th International Conference of Optics of Excitons in Confined Systems (OECS17), **Young researcher award**, TU Dortmund, Germany (remotely), 2021.
5. “Topological synthetic Andreev bands in a polaritonic analogue of multi-terminal Josephson junctions”, Workshop on out-of-equilibrium physics with photons and atoms, Les Houches, France, 2023.
6. “Polariton superfluids as an analogue topological superconductor”, Workshop on Topological Photonics (TopoPhoto23), **Young researcher award**, Madrid, Spain, 2023.

Prizes and awards

2024 – PhD award from Fondation Université Clermont Auvergne

2023 – Young researcher award of the workshop TopoPhoto23

2021 – Young researcher award of the conference OECS17

Grants, funding, scholarships

2024 – Marie Skłodowska-Curie actions (post-doctoral fellowship): project ‘’HyperEQCO’’ (2 years, ~200k€ asked, no answer yet)

2024 – Humbold foundation Post-doctoral fellowship: project ‘’Hypergraph states for quantum advantage’’ (2 years, ~200k€ asked, no answer yet)

2020 – I-Site CAP 20-25 Internship scholarship (Master 2nd year) (~2.5 k€)

2019 – Grenoble INP Internship scholarship (Master 1st year) (~1 k€)

Teaching experience

2024-2025 – Teaching assistant, University of Siegen, Siegen, Germany

24h Seminars, Quantum mechanics, Master students

2020-2023 – Teaching assistant, Université Clermont Auvergne, Clermont-Ferrand, France

96h Laboratory courses, Bachelor in Technology.

48h Lectures+Seminars, Optics, undergraduate students.

24h Lectures+Seminars, Fluid mechanics, undergraduate students.

12h Seminars, Electromagnetics, undergraduate students.

5h Lectures+Seminars, Electromagnetics, undergraduate students.

Supervision activities

2024: 2 undergraduate students (L. Bernaerts, P. Störck), 2 months

2023: 3 undergraduate students (I. Foudjo, A. Agbo Bidi, S. Fanel), 5 months

Popularisation events

2024 – Presentation of quantum mechanics and my research to high school pupils, Lycée Jean Favard, Guéret, France

2024 – Exercises of quantum mechanics for high school pupils, Lycée Jean Favard, Guéret, France

2024 – Topological polariton lasers and circuits (popularisation of my PhD thesis to the lay public), Prix Jeune chercheurs de la ville de Clermont-Ferrand, France

2023 – Organisation of a workshop on fluid mechanics for pupils during Fête de la science (one full day), Clermont-Ferrand, France

2022 – Participation in a workshop on fluid mechanics for pupils during Fête de la science (one full day), Clermont-Ferrand, France

Reviews

Physical Review Letters, Physical Review B, Physical Review Research, Quantum, Optics express

Languages and skills

Languages – French (native), English (working proficiency), German (intermediate)

Softwares – COMSOL Multiphysics, Lumerical, Matlab, Origin, Mathematica, Overleaf, Affinity Designer, Blender, Powerpoint

References

Postdoc supervisor:

Otfried Gühne, otfried.guehne@uni-siegen.de

Ph.D. and postdoc supervisors:

Guillaume Malpuech, guillaume.malpuech@uca.fr

Dmitry Solnyshkov, dmitry.solnyshkov@uca.fr

Post-doc co-supervisor:

Matthias Kleinmann, matthias.kleinmann@uni-siegen.de

Ph.D. co-supervisors:

Hai Son Nguyen, hai-son.nguyen@ec-lyon.fr

Xavier Letartre, xavier.letarte@ec-lyon.fr

Master internship supervisors:

Olivier Deparis, olivier.deparis@unamur.be

Michel Voué, michel.voue@umons.be