

Philippe St-Jean

Assistant professor
MEI Research chair in quantum photonics
Department of Physics
Université de Montréal
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RESEARCH POSITIONS

2021- Assistant professor, Université de Montréal
2020-2021 Quantum scientist, *Anyon Systems, inc.*
2016-2020 Postdoctoral fellow, CNRS - Université Paris-Saclay, *Centre de Nanosciences et de Nanotechnologies*
2009-2016 Graduate student, Polytechnique Montréal,

EDUCATION

2016 *PhD*, Polytechnique Montréal, Canada
Thesis title: *Recombination dynamics of excitonic complexes bound to isoelectronic centers: toward the realization of optically addressable qubits*
2010 *MSc*, Polytechnique Montréal, Canada
2009 *BSc*, Université de Montréal, Canada

FUNDING, FELLOWSHIPS AND AWARDS

Funding

2022 **INTRIQ** – Research grant, co-PI (with B. Coish, McGill) (42k\$ / 2 years)
2022 **NSERC** - Discovery Launch Supplement, PI (12.5k\$ / 1 year)
2022 **NSERC** - Discovery grant, PI (165k\$ / 5 years)
2022 **PQ2** - Research grant, PI (150k\$ / 2 years)
2021 **MEI** – Research chair in quantum photonics, PI (570k\$ / 3 years)

Fellowships

2018 **Marie Skłodowska-Curie** – EU postdoctoral fellowship
2016 **NSERC** – Canadian postdoctoral fellowship
2011 **NSERC** – Postgraduate scholarship for PhD
2011 **FRQNT** – Postgraduate scholarship for PhD (*declined*)
2009 **FRQNT** – Postgraduate scholarship for MSc
2009 **NSERC** – Postgraduate honour scholarship for MSc

Awards

2015 **Polytechnique Montréal** – Best lecturer (Engineering physics)
2014 **Polytechnique Montréal** – Best demonstrator (Engineering physics)

TEACHING EXPERIENCE

Université de Montréal

2021- Quantum optics (PHY 3320)

Polytechnique Montréal

2013-2015 *Lecturer* – Advanced classical mechanics

2012-2015 *Demonstrator* – Advanced classical mechanics

2010-2016 *Teaching assistant* – Evaluation, lab supervision, redaction of lab protocols in various courses:

- Homogeneous semiconductors and quantum hetero-structures
- Electronic devices
- Spectroscopy
- Electromagnetism

PUBLICATIONS

Articles published as 1st author: 3 *Nat. Photon.*, 1 *Nat. Phys.*, 2 *Phys. Rev. Lett.*, 1 *Opt. Lett.*, 2 *Phys. Rev. B*, 1 *Appl. Phys. Lett.*, 1 *Opt. Photon. News* and 1 *J. Phys: Photonics*

Published or accepted manuscripts

* indicates equal contribution

1. **P. St-Jean**. A crystal of light vortices. *Nat. Photon.* **16**, 340–342 (2022)
<https://www.nature.com/articles/s41566-022-00996-y>
2. P. M. Walker, T. Kuriakose, T. Dowling, **P. St-Jean**, N. Carlon Zambon, A. Lemaitre, I. Sagnes, L. LeGratiet, A. Harouri, S. Ravets, M. S. Skolnick, J. Bloch, D. N. Krizhanovskii. Few-photon all-optical phase rotation in a quantum-well micropillar cavity. *Nat. Photon.* **16**, 566-569 (2022)
<https://www.nature.com/articles/s41566-022-01019-6>
3. N. Pernet*, **P. St-Jean***, D. D. Solnyshkov, G. Malpuech, A. Lemaître, A. Harouri, L. LeGratiet, I. Sagnes, S. Ravets, A. Amo, J. Bloch. Gap solitons in a one-dimensional driven-dissipative topological lattice. *Nat. Phys.* **18**, 678–684 (2022) - <https://www.nature.com/articles/s41567-022-01599-8>
4. B. Real, N. Carlon Zambon, **P. St-Jean**, I. Sagnes, A. Lemaître, L. Le Gratiet, A. Harouri, S. Ravets, J. Bloch, A. Amo. Chiral emission induced by optical Zeeman effect in polariton micropillars. *Phys. Rev. Res.* **3**, 043161 (2021) - <https://journals.aps.org/prresearch/abstract/10.1103/PhysRevResearch.3.043161>
5. H. Price et al. Roadmap on topological photonics. *J. Phys. Photonics* **4**, 032501 (2022)
<https://iopscience.iop.org/article/10.1088/2515-7647/ac4ee4>
6. **P. St-Jean**, A. Dauphin, P. Massignan, A. Lemaître, A. Harouri, L. LeGratiet, I. Sagnes, B. Real, O. Jamadi, S. Ravets, J. Bloch, A. Amo. Measuring topological invariants in a polaritonic analogue of graphene. *Phys. Rev. Lett.* **126**, 127403 (2021) (**Editors' suggestion**)
<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.126.127403>
7. D. Solnyshkov, G. Malpuech, **P. St-Jean**, S. Ravets, J. Bloch, A. Amo. Microcavity polaritons for topological photonics. *Opt. Mater. Express.* **11**, 1119-1142 (2021) - <https://opg.optica.org/ome/fulltext.cfm?uri=ome-11-4-1119&id=449253>

8. B. Real, O. Jamadi, M. Milicevic, N. Pernet, **P. St-Jean**, T. Ozawa, G. Montambaux, I. Sagnes, A. Lemaître, L. Le Gratiet, A. Harouri, S. Ravets, J. Bloch, A. Amo. Semi-Dirac transport and directional localization in polariton honeycomb lattices. *Phys. Rev. Lett.* **125**, 186601 (2020)
<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.125.186601>
9. N. Carlon Zambon, S.R.K. Rodriguez, A. Lemaître, A. Harouri, L. LeGratiet, I. Sagnes, **P. St-Jean**, S. Ravets, A. Amo, J. Bloch. Optical parametric oscillations in coupled nonlinear microcavities. *Phys. Rev. A* **102**, 023526 (2020) - <https://journals.aps.org/prl/abstract/10.1103/PhysRevA.102.023526>
10. N. Carlon Zambon*, **P. St-Jean***, A. Lemaître, A. Harouri, L. LeGratiet, I. Sagnes, S. Ravets, A. Amo, J. Bloch. Orbital angular momentum bistability in a microlaser. *Opt. Lett.* **44**, 4531 (2019)
<https://opg.optica.org/ol/abstract.cfm?uri=ol-44-18-4531>
11. N. Carlon Zambon*, **P. St-Jean***, M. Milicevic, A. Lemaître, A. Harouri, L. LeGratiet, O. Bleu, D.D. Solnyshkov, G. Malpuech, I. Sagnes, S. Ravets, A. Amo, J. Bloch. Optically controlling the emission chirality of microlasers. *Nat. Photon.* **13**, 283 (2019)
<https://www.nature.com/articles/s41566-019-0380-z>
12. **P. St-Jean**, J. Bloch, A. Amo, H. Zhao, L. Feng, H. Schomerus, R. El-Ganainy. The advent of topological microlasers. *Opt. & Photon. News* **29**, 36 (2018)
https://www.optica-opn.org/home/articles/volume_29/december_2018/extras/the_advent_of_topological_microlasers/
13. G. Éthier-Majcher, **P. St-Jean**, S. Francoeur. Energy reversal of light- and heavy-hole excitons bound to isoelectronic quantum defects. *Phys. Rev. B* **98**, 115431 (2018)
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.98.115431>
14. **P. St-Jean**, V. Goblot, E. Galopin, A. Lemaître, T. Ozawa, L. LeGratiet, I. Sagnes, J. Bloch, A. Amo. Lasing in topological edge states of a 1D lattice. *Nat. Photon.* **11**, 651 (2017)
<https://www.nature.com/articles/s41566-017-0006-2>
15. **P. St-Jean**, G. Éthier-Majcher, R. André, S. Francoeur. High-fidelity and ultrafast initialization of a hole-spin qubit bound to a Te isoelectronic center in ZnSe. *Phys. Rev. Lett.* **117**, 167401 (2016)
<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.117.167401>
16. G. Éthier-Majcher, **P. St-Jean**, S. Francoeur. Light- and heavy-hole trions bound to isoelectronic centers. *Phys. Rev. B* **92**, 155436 (2015) - <https://journals.aps.org/prb/abstract/10.1103/PhysRevB.92.155436>
17. **P. St-Jean**, G. Éthier-Majcher, S. Francoeur. Dynamics of excitons bound to isoelectronic centers in GaAs. *Phys. Rev. B* **91**, 115201 (2015) (*Editor's suggestion*) - <https://journals.aps.org/prb/abstract/10.1103/PhysRevB.91.115201>
18. G. Éthier-Majcher, **P. St-Jean**, G. Boso, A. Tosi, J.F. Klem, S. Francoeur. Complete quantum control of exciton qubits bound to isoelectronic centres. *Nat. Commun.* **5**, 3980 (2014)
<https://www.nature.com/articles/ncomms4980>
19. **P. St-Jean**, G. Éthier-Majcher, Y. Sakuma, S. Francoeur. Recombination dynamics of excitons bound to nitrogen isoelectronic centers in δ -doped GaP. *Phys. Rev. B* **86**, 075308 (2014)
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.89.075308>
20. G. Éthier-Majcher, **P. St-Jean**, A. Bergeron, A.L. Phaneuf-L'Heureux, S. Roorda, S. Francoeur. Photoluminescence from single nitrogen isoelectronic centers in gallium phosphide produced by ion implantation. *J. Appl. Phys.* **114**, 034307 (2013)
<https://aip.scitation.org/doi/10.1063/1.4815883>
21. **P. St-Jean**, G.A. Seryogin, S. Francoeur. Band gap of sphalerite and chalcopyrite phases of epitaxial ZnSnP₂. *Appl. Phys. Lett.* **96**, 231913 (2010) - <https://aip.scitation.org/doi/10.1063/1.3442917>

22. S. Marcet, C. Ouellet-Plamondon, G. Éthier-Majcher, **P. St-Jean**, R. André, J.F. Klem, S. Francoeur. Charged excitons and biexcitons bound to isoelectronic centers. *Phys. Rev. B.* **82**, 235311 (2010)
<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.82.235311>

INVITED TALKS

1. *CAP congress*. Hamilton, Canada (June 2022)
2. *Photonics North*. Niagara Falls, Canada (May 2022)
3. *PLMCN-2020*. Clermont-Ferrand, France (October 2020)
4. *PQE conference*. Snowbird, US (January 2020)
5. *Terametano-4*. Lecce, Italy (May 2019)
6. *ICSCE9*. Montreal, Canada (July 2018)
7. *IEEE Summer Topical Meetings*. Kona, US (June 2018)
8. *Photonic topological insulators*. Banff, Canada (September 2017)

INVITED SEMINARS

1. *McGill University*. Montréal, Canada (Novembre 2021)
2. *RQMP*. Online seminar (Octobre 2021)
3. *INTRIQ*. Online seminar (Juin 2021)
4. *Université Paris-Diderot (MPQ)*. Paris, France (October 2019)
5. *Université de Sherbrooke*. Sherbrooke, Canada (July 2019)
6. *Université de Montréal*. Montréal, Canada (October 2018)
7. *Institut d'Optique*. Palaiseau, France (June 2018)
8. *University of Cambridge*. Cambridge, UK (November 2017)
9. *Laboratoire de photonique et de nanostructures*. Marcoussis, France (April 2016)
10. *GERAD - Université de Montréal*. Montréal, Canada (May 2015)

SELECTED CONTRIBUTED TALKS

(1ST AUTHOR ONLY)

1. *CLEO*, Munich, Germany (2021)
2. *CLEO*, Munich, Germany (2019)
3. *NOEKS14*, Berlin, Germany (2018)

4. *CLEO*, Munich, Germany (2017)
5. *APS - March Meeting*, San Antonio, US (2015)
6. *APS - March Meeting*, Baltimore, US (2013)
7. *APS - March Meeting*, Boston, US (2012)
8. *APS - March Meeting*, Portland, US (2010)

ACADEMIC AND SOCIAL WORK

Referee for: *Nature Photonics*, *Nature Communications*, *Communication Physics* (npg), *Light: science and applications* (npg), *Physical Review Letters*, *Physical Review X*, *Physical Review A*, *Physical Review B*, *Physical Review Research*, *Physical Review Applied*, *Optica*, *Optics Express*, *European Physics Letters*, *Applied Physics Letters*, *Journal of Applied Physics*, *ACS Photonics*, *Laser and Photonics Reviews*, *Advanced Optical Materials* et *Annalen der Physik*

2015-2020 Scientific consultant for the scientific TV show *Génial!* at Télé-Québec

2011-2013 Board member of the Université de Montréal alpine ski team (Carabins)