

Giulio Vampa, Ph.D.

National Research Council of Canada
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Email
Web presence
h-index, citations

gvampa@uottawa.ca
[Google Scholar](#), [LinkedIn](#)
20 (since 2020), 4723

EMPLOYMENT

Research Officer, National Research Council of Canada, Ottawa, Canada	9/2020 – present
Adjunct Professor, Department of Physics, University of Ottawa, Canada	9/2020 – present
Fellow, Joint Center for Extreme Photonics, Ottawa, Canada	9/2020 - present

EDUCATION

Stanford PULSE Institute, Menlo Park, CA 11/2016 – 7/2020

- Post-doctoral fellow, advisor: David Reis
- Nanoscale sources of high harmonics
- High harmonic generation at interfaces
- Awards: W. M. Keck Foundation (\$1M/3 years, proposal I co-wrote with David Reis).

University of Ottawa, Ottawa, Canada 2011 – 05/2016

- Graduate research with Paul Corkum (co-supervised by Thomas Brabec)
- *Ph.D., Physics* (finalist of the Carl E. Anderson Division of Laser Science Dissertation Award competition, American Physical Society).

Thesis: "Role of electron-hole recollisions in high harmonic generation from bulk crystals"

- Fundamentals of high harmonic generation from solids.
- High harmonic generation from micro- and nano-structured semiconductors
- Plasmonic enhancement for high harmonics
- Generation and characterization of few-cycle phase-stable infrared pulses from an Optical Parametric Amplifier for generation of isolated attosecond pulses.
- Amplification of broadband and widely tunable infrared pulses by Kerr instabilities for applications of strong-field physics in solids.

Universita' degli Studi di Trieste, Trieste, Italy 2004 – 2010

- Undergraduate research with Fulvio Parmigiani
- *M.Sc., Solid State Physics* (Graduated *Summa cum Laude*) – Sept. 2010
- *B. Sc., Physics* – July 2008

M.Sc. Thesis: "Towards the observation of ultrafast demagnetization by high harmonic generated ultraviolet coherent pulses"

B.Sc. Thesis: "Generation of light pulses in the extreme ultraviolet (30-60 nm)"

- Magnetic dichroism on Fe and Ni M-edges with a high harmonic source.
- Infrared photoluminescence from quantum wells.
- X-Ray Photoemission spectroscopy, Low Energy Electron Diffraction.

PUBLICATIONS (h-index = 20, 3138 citations since 2020 – Google Scholar)	
2024	<ul style="list-style-type: none"> • J. Phys. Photonics, 7, 015008 – “Characterizing ultrashort pulses with photon energies above 1.12 eV based on transient absorption in silicon thin films”, M. Kumar, S. Mokhtari, T. Guay, A. Leblanc, K. Oubrierie, S. A. Jalil, E. Haddad, G. Jargot, P. Lassonde, H. Ibrahim, G. Vampa and F. Légaré • Opt. Expr., 32.21, 37635-37644 – “Inline-delay Fourier transform imaging spectrometer for mid-IR ultrashort pulses”, D. N. Purschke, A. Korobenko, A. Staudte, A. Yu Naumov, D. M. Villeneuve, G. Vampa. • IEEE JSTQE, 30, 6 – “Advancing High-Power Hollow-Core Fiber Pulse Compression”, M. Ivanov, E. Doiron, M. Scaglia, P. Abdolghader, G. Tempea, F. Legare, C. A. Trallero-Herrero, G. Vampa, B. E. Schmidt.
2023	<ul style="list-style-type: none"> • Nature Communications, 14(1), 8421 – “Orbital perspective on high-harmonic generation from solids”, A. J. Galan, C. Bossaer, G. Ernotte, A. Parks, R. E. F. Silva, D. Villeneuve, A. Staudte, T. Brabec, A. Luican-Mayer, G. Vampa. • Phys. Rev. A 108, L051103 – “Microscopic mechanism of high-order wavemixing in solids”, D. N. Purschke, A. Jimenez-Galan, T. Brabec, A. Y. Naumov, A. Staudte, D. M. Villeneuve, G. Vampa. • Optica 10(5), 642-649 – “In situ high-harmonic microscopy of a nanostructured solid”, A. Korobenko, S. Rashid, A. Y. Naumov, D. M. Villeneuve, D. A. Reis, P. Berini, P. B. Corkum, G. Vampa. • Laser & Photonics Reviews, 2300448 – “Spectroscopic signatures of plasmonic near-fields on high-harmonic emission”, S. A. Jalil, K. M. Awan, J. Bazxter, G. Bart, D. N. Purschke, T. Fennel, D. M. Villeneuve, A. Staudte, P. Berini, T. Brabec, L. Ramunno, G. Vampa.
2022	<ul style="list-style-type: none"> • Phys. Rev. X 12, 041036 – “In-situ nanoscale focusing of extreme ultraviolet solid-state high harmonics”, A. Korobenko, S. Rashid, C. Heide, A. Yu Naumov, D. A. Reis, P. Berini, P. B. Corkum, G. Vampa. • Optica 9, 987-991 – “Controlling the polarization and phase of high-order harmonics with a plasmonic metasurface.”, S. Jalil, K. M. Awan, I. A. Ali, S. Rashid, J. Baxter, A. Korobenko, G. Ernotte, A. Anumov, D. M. Villeneuve, A. Staudte, P. Berini, L. Ramunno, G. Vampa. • Phys. Rev. A. 106.1, 013106 – “Disentangling interferences in the photoelectron momentum distribution from strong-field ionization.”, T. Wang, Z. Dube, Y. Mi, G. Vampa, D. M. Villeneuve, P. B. Corkum, X. Liu and A. Staudte.
2021	<ul style="list-style-type: none"> • Optics Express 29, 24161-24168 – “Generation of structured coherent extreme ultraviolet beams from an MgO crystal”, A. Korobenko, S. Rashid, C. Heide, A. Naumov, D. A. Reis, P. Berini, P. Corkum, G. Vampa.
2020	<ul style="list-style-type: none"> • Comm. Phys. 3, 1-6 – “Beating absorption in solid-state high harmonics”, H. Liu, G. Vampa, J. L. Zhang, Y. Shi, S. Buddhiraju, S. Fan, J. Vuckovic, P. H. Bucksbaum, D. A. Reis. • J. Phys. B: At. Mol. And Opt. Physics – “Attosecond synchronization of extreme ultraviolet high harmonics from crystals”, G. Vampa, J. Liu, Y. S. You, D. Baykusheva, M. Wu, H. Liu, K. Schafer, M. Gaarde, D. A. Reis and S. Ghimire.
2019	<ul style="list-style-type: none"> • Physics Reports 833, 1-52 – “Saddle point approaches in strong field physics and generation of attosecond pulses”, A Nayak et al. • Optica 6, 553-556 – “Disentangling interface and bulk contributions to high-harmonic emission from solids”, G. Vampa, H. Liu, T. F. Heinz, D. A. Reis. • Optics Letters 44, 259-262 – “Characterization of high-harmonic emission from ZnO up to 11 eV pumped with a Cr: ZnS high-repetition-rate source”, G. Vampa, S. Vasilyev, H. Liu, M. Mirov, P. H. Bucksbaum, D. A. Reis.
2018	<ul style="list-style-type: none"> • Journal of Optics 20, 110201 – “Emerging attosecond technologies”, J. Mauritsson, G. Vampa, C. Vozzi. • Nature Physics 14, 1006-1010 – “Enhanced high-harmonic generation from an all-dielectric metasurface”, H. Liu, C. Guo, G. Vampa, J. L. Zhang, T. Sarmiento, M. Xiao, P. H. Bucksbaum, J. Vuckovic, S. Fan, D. A. Reis. • Nature Photonics 12, 465-468 – “Strong-field optoelectronics in solids” - G. Vampa, T. J. Hammond, M.

	<p>Taucer, X. Ding, X. Ropagnol, T. Ozaki, S. Delprat, M. Chaker, N. Thire, B. Schmidt, F. Legare, D. D. Klug, A. Yu Naumov, D. M. Villeneuve, A. Staudte, P. B. Corkum.</p> <ul style="list-style-type: none"> • Optics Express 26, 12210 – “Observation of backward high-harmonic emission from solids”, G. Vampa, Y. S. You, H. Liu, S. Ghimire, D. A. Reis. • Optica 5, 271-278 – “Theory of Kerr instability amplification”, M. Nesrallah, G. Vampa, G. Bart, P. B. Corkum, C. R. McDonald, T. Brabec. • Science 359, 673-675 – “Light amplification by seeded Kerr instability”, G. Vampa, T. J. Hammond, M. Nesrallah, T. Brabec, P. B. Corkum.
2017	<ul style="list-style-type: none"> • Nature Photonics 11, 594 – “Integrating solids and gases for attosecond pulse generation”, T.J. Hammond, S. Monchoce, C. Zhang, G. Vampa, D. D. Klug, A. Yu Naumov, D. M. Villeneuve, P. B. Corkum. • Science 357, 303-306 – “Tailored semiconductors as building blocks for high-harmonic optoelectronics”, M. Sivi, M. Taucer, G. Vampa, K. Johnston, A. Staudte, A. Yu Naumov, D. M. Villeneuve, C. Ropers, P. B. Corkum. • Phys. Rev. B 96, 195420 – “Non-perturbative harmonic generation in graphene from intense mid-infrared pulsed light”, M. Taucer, T. J. Hammond, C. A. Couture, N. Thire, B. Schmidt, H. Selvi, N. Unsuree, B. Hamilton, T. J. Echtermeyer, F. Legare, M. A. Denecke, P. B. Corkum, G. Vampa. • Phys. Rev. Lett., 118, 173601 – “Intense laser solid state physics – unraveling the difference between semiconductors and dielectrics”, C. R. McDonald, G. Vampa, P. B. Corkum, T. Brabec. • Nature Photonics 11, 210-212 – “Nonlinear optics: attosecond nanophotonics”, G. Vampa, H. Fattahi, J. Vuckovic, F. Krausz. • Nature Physics – “Plasmon-enhanced high-harmonic generation from silicon”, G. Vampa, B. G. Ghamsari, S. Siadat Mousavi, T. J. Hammond, A. Olivieri, E. Lisicka-Skrek, A. Yu Naumov, D. M. Villeneuve, A. Staudte, P. Berini and P. B. Corkum (advanced online publication) • Optics Letters 42, 1113-1116 – “Harmonic generation in solids with direct fiber laser pumping”, K. Lee, X. Ding, T. J. Hammond, M. E. Ferman, G. Vampa, P. B. Corkum • (<i>invited</i>) J. Phys. B: At. Mol. And Opt. Physics 50, 083001 – “Merge of high harmonic generation from gases and solids and its implications for attosecond science”, G. Vampa and T. Brabec.
2015	<ul style="list-style-type: none"> • Phys. Rev. Lett. 115, 193603 – “All-optical reconstruction of crystal band structure”, G. Vampa, T. J. Hammond, N. Thiré, B. E. Schmidt, F. Légaré, C. R. McDonald, T. Brabec and P. B. Corkum. • Phys. Rev. A 92.3, 033845 – “Interband Bloch oscillation mechanism for high-harmonic generation in semiconductor crystals”, C. R. McDonald, G. Vampa, P. B. Corkum and T. Brabec. • Nature Physics 11.7, 529-530 – “High-harmonic generation: To the extreme”, G. Vampa and D. M. Villeneuve. • Nature 522, 462-464 – “Linking high harmonics from gases and solids”, G. Vampa, T. J. Hammond, N. Thiré, B. E. Schmidt, F. Légaré, C. R. McDonald, T. Brabec and P. B. Corkum • (<i>invited</i>) IEEE Journal of Selected Topics in Quantum Electronics, 21.5, 1-10 – “High-Harmonic Generation in Solids: Bridging the Gap Between Attosecond Science and Condensed Matter Physics”, G. Vampa, C. McDonald, A. Fraser and T. Brabec. • J. Phys. B: At. Mol. Opt. Phys. 48, 061001 – “Attosecond lighthouse driven by sub-two-cycle 1.8μm laser pulses”, C. Zhang, G. Vampa, D. Villeneuve and P. B. Corkum • Phys. Rev. B 91.6, 064302 – “Semiclassical analysis of high harmonic generation in bulk crystals”, G. Vampa, C. R. McDonald, G. Orlando, P. B. Corkum and T. Brabec.
2014	<ul style="list-style-type: none"> • Phys. Rev. Lett. 113, 073901 – “Theoretical analysis of high-harmonic generation in solids”, G. Vampa, C.R. McDonald, G. Orlando, D. D. Klug, P. B. Corkum and T. Brabec • J. Phys. B 47, 204002 – “Tunnelling time, what does it mean?”, G. Orlando, C. R. McDonald, N. H. Protik, G. Vampa and T. Brabec
2013	<ul style="list-style-type: none"> • Phys. Rev. Lett. 111, 090405 – “Tunnel ionization dynamics of bound systems in laser fields: how long does it take for a bound electron to tunnel?”, C. R. McDonald, G. Orlando, G. Vampa and T. Brabec

INVITED TALKS

- Photonics North 2024 (nano focused XUV) May 2024
- Advanced Laser Light Source workshop, Quebec September 2023
- Canadian Banknote Company, Ottawa May 2023
- Nexus for Quantum Technologies, University of Ottawa October 2023
- OASIS 8, Tel-Aviv (IL) September 2022
- OPTICA incubator on “high-field nanophotonics”, Organizer & chair July 2022
- ATTO conference, Orlando (USA) July 2022
- KPS Fall meeting, Korea (virtual) October 2021
- Max Planck-uOttawa yearly symposium (virtual) October 2021
- COST Action Atto-chem conference (virtual) September 2021
- Winter school for attosecond technologies, SmartX project (virtual) 8-11 March 2021
- ALLS users workshop (virtual) 22-23 March 2021
- META conference, New York (USA) 28 Sept – 3 Oct 2020
- Schawlow-Townes symposium, Ottawa (Canada) Oct 2020
- 50th Physics of Quantum Electronics (PQE), Snowbird (USA) 7-10 January 2020
- IEEE Photonics Conference, San Antonio (USA) 1 October 2019
- Attosecond science and Extreme Photonics, ICFO Schools on the frontiers of light, Casteldefels (Spain) 10 July 2019
- APS DAMOP, Milwaukee (USA) 31 May 2019
- International workshop on Attosecond physics at the nanoscale, Institute of Basic Science, Daejeon (Korea) 2 November 2018
- Photonics North, Montreal (Canada) 5-8 June 2018
- Symposium on 25 years of recollision physics, DPG Spring meeting, Erlangen (Germany) 5-9 March 2018
- QUTIF meeting, Dresden (Germany) 28 February 2017
- Annual Attosecond MURI grant Meeting, Tucson, Arizona (USA) 17 November 2016
- Frontiers In Optics 2016, Rochester (USA) 20 October 2016
- Carl E. Anderson for Outstanding Doctoral Dissertation Award final competition, Frontiers In Optics & Laser Science, Rochester (USA) 18 October 2016
- Cleo Conference, San Jose, California (USA) 5-10 June 2016
- Photonics North, Quebec city, Quebec (Canada) 25 May 2016
- SPIE Bandgap Photonics conference, Baltimore, Maryland (USA) 17-21 April 2016
- High Intensity Lasers and High Field Phenomena (HILAS) conference, Long Beach, California (USA) 20-22 March 2016
- McGill university, Montréal, Québec (Canada) 24 January 2016
- annual meeting of University of Ottawa Max Planck center for extreme and quantum photonics, Ottawa, Ontario (Canada) 6 October 2015
- UltraFastOptics X conference, Beijing (China) 18 August 2015
- Advanced Laser Light Source (ALLS) users workshop, Mt. Saint-Sauveur, Québec (Canada) June 2015
- MURI Kick-off meeting, Berkeley, California (USA)
- SFPUP conference, Zhangjiajie (China) 18 November 2014
- Extreme Photonics summer school, Ottawa, Ontario (Canada) 4 November 2014
27 June 2014

INTELLECTUAL PROPERTY

US 2016/9496681, "Apparatus and method for tunable generation of coherent radiation"
 US 2017/9746748, "Generation of high harmonics from silicon"
 US 2018/10107846, "Apparatus and method for strong-field probing of electric fields
 in solid-state electronic circuits"

AWARDS AND HONORS

- "Excellence in attracting new client interest", NRC-SDT 2023
- "Research breakthrough of the year", NRC-SDT
- OPTICA award to the "Short Wavelength Sources and attosecond/high-field physics" technical group, 2022
during my tenure as chair
- "Team leader", NRC-SDT 2021
- Honorable mention – Bernard J. Couillaud prize, The Optical Society (OSA) 2019
- Finalist of Carl E. Anderson Division of Laser Science Dissertation Award competition, APS 2016

SCHOLARLY AND PROFESSIONAL ACTIVITIES

- Adjunct professor, University of Ottawa Sept 2020 – present
- Adjunct professor, Institut National de la Recherche Scientifique Sept 2022 - present
- American Physical Society 2016 - present
- Organized and chaired OPTICA Incubator meeting on "On-chip high-field nanophotonics", Washington DC, USA May 2020 – July 2022
- OSA Technical group on "Short wavelength sources and attosecond/high field physics". Organized several events.
Chair 2019 – 2022
Executive Board member 2015 – 2018
- Ottawa-Carleton OSA Student chapter, *President* 2011 – 2016

SUPERVISION AND TRAINING

- Katarzyna Kowalczyk (PDF) Jan 2025 - present
- Christopher Kouton (undergraduate)
- Sean Bougoussou (undergraduate)
- Vedran Jelic (PDF) Nov 2023 - present
- Samuel Lemieux (PDF) May 2023 – Oct 2024

Sohail Jalil (PDF)	Sept 2020 – April 2024
David Purschke (PDF)	Sept 2021 – present
Alvaro Jimenez Galan (PDF)	Sept 2021 – 2023
Laurent David (undergraduate)	
Michael Weil (undergraduate)	
Saadat Mokhtari (PhD)	Sept 2020 – present
Chandler Bossaer (PhD)	Sept 2020 – present
Parnia Bastani (PhD)	Sept 2022 – present
Idriss Amadou Ali (coop)	Jan 2021 – Sept 2021
Aleksey Korobenko (co-supervision, PDF)	Sept 2020 – Nov 2023
Jason McLaurin (coop)	Jan 2021 – Sept 2022
Sebastian Pachon Quesada (coop)	May 2022 – Sept 2022

National and International committee participation

- Member, NFFA Europe, review panel committee Jan 2025 - present
- member, uOttawa MOVCD facility advisory board Sept 2024 - present
- Selection committee, Couillaud prize on Ultrafast lasers, OPTICA 2023
- Committee member, International program committee of ATTO conference Sept 2022 - present

INTERVIEWS & MEDIA COVERAGE

"Strong IR laser fields for measuring the band structure of solids", SPIE Newsroom	31 August 2016
"All-optical reconstruction of crystal band structure", 2Physics	3 January 2016
"All-optical technique shines light on electronic band structure", Physics World	18 November 2015
"Synopsis: light sees electronic bands", APS Physics	5 November 2015