Emilio Pisanty

Royal Society University Research Fellow

Photonics & Nanotechnology Group · King's College London, UK

emilio.pisanty@kcl.ac.uk | episanty.github.io | E Pisanty | E Pisanty | episanty | E.P.

Education

- **PhD in Controlled Quantum Dynamics**, Imperial College London, UK *2012-2016*
- **MRes in Controlled Quantum Dynamics** with Distinction, Imperial College London, UK *2011-2012*
- **Licenciatura en Física (BSc in Physics)** with Honours and 9.80/10 GPA, F. Ciencias, UNAM, Mexico *2006-2011*

Research Experience

King's College London — *London*

Royal Society University Research Fellow · Photonics & Nanotechnology group *2022 - present*

- Working on strong-field physics and attosecond science, and their intersections with structured light, catastrophe optics, and quantum electrodynamics

Max Born Institute for Nonlinear Optics and Short-Pulse Spectroscopy — *Berlin*

Wissenschaftliche Mitarbeiter · group leader: Olga Smirnova *2020 - 2021*

- Settled the question on the existence optical skyrmions by providing explicit constructions

ICFO – The Institute of Photonic Sciences — *Barcelona*

Postdoctoral Researcher · group leader: Maciej Lewenstein *2017 - 2020*

- Discovered and characterized a novel type of optical polarization vortex with new symmetries and topologies of light
- Designed the first nonlinear optical polarization tomography experiment, in collaboration with experimentalists
- Developed novel methods, and advanced existing ones, to analyze strong-field interactions for atoms and solids
- Directed the development, as an MSc supervisor, of a fully-quantum-optical framework for high-harmonic generation
- Discovered a natural definition of the cutoff for high-order harmonic generation

Max Born Institute for Nonlinear Optics and Short-Pulse Spectroscopy — *Berlin*

Wissenschaftliche Mitarbeiter · group leader: Misha Ivanov *2016 - 2017*

- Designed a method to prevent the Lorentz-force suppression of high harmonics in the long-wavelength regime
- Implemented complex-trajectory methods on a rotating frame to understand the chirality of high-harmonic emission

Imperial College London — *London*

Postgraduate Researcher · advisor: Misha Ivanov *2011 - 2016*

PhD Thesis: Electron dynamics in complex space and complex time
MRes Thesis: Under-the-barrier electron-ion interaction during tunnel ionization

- Characterized the role of the complex-valued quantum orbits in semiclassical treatments of strong-field ionization
- Used analytical tools to describe kinematical origins for Zero-Energy Structures in above-threshold ionization
- Clarified the conservation of spin angular momentum in high-order harmonic generation

Instituto de Ciencias Nucleares, UNAM — *Mexico City*

Estudiante asociado · advisor: Eduardo Nahmad-Achar *2010 - 2011*

BSc Thesis: Generalized coherent states and the analytic structure of the annihilation operator

- Researched the quantum optics of field quadratures in a truncated photon basis, leading to a first-author undergraduate publication

Awards

- King's Undergraduate Research Fellowship funding for one undergraduate intern, King's College London, 2022
- Postgraduate Research International Fee Waiver for overseas PhD student, King's College London, 2022-2025
- Research Fellows Enhanced Research Expenses, Royal Society, 2022-2024
- University Research Fellowship, Royal Society, 2022-2026
- Emerging Leaders 2021 award, *Journal of Optics*, 2021
- Cellex-ICFO-MPQ Postdoctoral Fellowship, Cellex Foundation, 2018-2020
- Rector's Scholarship Fund Award, Imperial College London, 2012 - 2015
- Sir Peter Knight prize for MRes performance, Centre for Doctoral Training in Controlled Quantum Dynamics, Imperial College London, 2012
- Mexican National Council for Science and Technology (CONACYT) foreign scholarship, 2011 - 2016
- Mexican Secretary of Education (SEP) postgraduate complementary scholarship, 2011 - 2012
- Diploma for academic performance (second place of 283 by grade average), Facultad de Ciencias, Universidad Nacional Autónoma de México, 2011

Professional experience

Teaching experience

- Supervising one PhD student, Anne Weber (project: Caustics and catastrophes in strong-field processes), King's College London, 2022-2025
- Supervising one KURF undergraduate student, Siu Tiung Wong (project: Shaping electron trajectories by tailoring the polarization state of ultra-intense laser drivers), King's College London, 2022
- Co-supervised two MSc students, Javier Rivera Deán (thesis: *Quantum-optical analysis of high-order harmonic generation*) and Masudur Rahman (thesis: *Quantum simulations of attosecond physics*), ICFO, 2019
- Contributed to the supervision of one PhD student, Noslen Suárez (thesis: *Strong-field processes in atoms and polyatomic molecules*), ICFO, 2017
- Designed and taught a course on Quantum Key Distribution for high-school students as part of the Barcelona International Youth Science Challenge, ICFO, 2019
- Developed and presented ICFO Theory Lectures series "Complex Analysis and Saddle-Point Methods for Strong-Field Physics and Beyond", ICFO, 2018
- Postgraduate Teaching Assistant, Imperial College London. Tutorials and Professional Skills seminars for 1st and 2nd year physics: Vector Calculus, Electromagnetism, Quantum Mechanics, Optics, Atomic Physics; Mathematica course for MRes students, 2012 - 2016
- Teaching Assistant, Universidad Nacional Autónoma de México. Analytic Geometry, Linear Algebra and Introduction to Electromagnetism; 1st and 2nd year physics and mathematics, 2010 - 2011

Open-Source Software

- ComplexFocus: Non-paraxial vector beams in Mathematica, a flexible and robust implementation of analytical solutions for describing tightly-focused laser beams (GPL)
- LISSAFIRE: Lissajous-Figure Reconstruction for nonlinear polarization tomography of bichromatic fields (GPL, CC-BY-SA)
- RB-SFA: High Harmonic Generation in the Strong Field Approximation via Mathematica, a leading open-source implementation of the quantum-orbit and numerical-integration approaches to high-harmonic generation (GPL, CC-BY-SA)
- QuODD: Quantum-Orbits Dynamic Dashboard, for visualizing quantum orbits on complex time and complex space (MIT)
- ARMSupport, an open-source implementation of Analytical *R*-Matrix theory for atomic and molecular strong-field photoionization (GPL, CC-BY-SA)

Science communication

- Active contributor at Physics Stack Exchange, with ∼2600 posts reaching an estimated audience of 5.3 million views, 2012-present. Samples: Chirped Pulse Amplification; Unit realizations in the New SI; Oscillating charge in the hydrogen atom
- Presented outreach talks at high-school level as part of the *Matí de la Reserca* 2019
- On-site coordinator with the Lightyear Foundation for the establishment of the Lab_13 Ghana practical-science teaching space, 2015
- Conducted practical-science education workshops in Ghana with the Lightyear Foundation, 2013
- Extensive science busking experience with Imperial College London and with the Lightyear Foundation, including the Green Man festival, the Big Bang Fair, and the Cheltenham Literature Festival; 2012-2016
- Presented outreach talks "Boat wakes", 2012, and "Chirp", 2014, Imperial College London

Professional service

- Referee for *Sci. Rep.*, *J. Phys. B*, *Eur. Phys. J. D*, *Phys. Rev. Lett.*, *Mol. Phys.*, *New J. Phys.*, *Nat. Commun.* and *Phys. Rev. A*, 2013-2022
- Student editor for the Centres for Doctoral Training Newsletter, Imperial College London, 2012
- Organizing committee, Summer School on Quantum Information, Computing and Control (QuICC) 2012

Additional experience

- Experience with web-based 3D figures and with 3D printing for visualization, communication and publication of complex geometrical concepts
- Experience with Wolfram Mathematica in both research, package development, and teaching roles
- Developed LaTeX article and poster templates; experience with git and mercurial for software and project management
- Black belt in Kung-fu Wu-shu, 1st and 2nd degree. Asociación Calmecac, Mexico City. 2006, 2008
- Bilingual in Spanish and English, intermediate-level German, beginner Russian and Catalan

Publications

Selected publications

- M Lewenstein, MF Ciappina, E Pisanty, J Rivera-Dean, T Lamprou, P Tzallas. Generation of optical Schrödinger cat states in intense laser–matter interactions. *Nat. Phys.* 17, 1104 (2021), arXiv:2008.10221, (citations: 19 / WOS 9 / Scopus 9).

Experimental and theoretical collaboration showing the measurement of the Wigner function of an intense laser pulse, together with other quantum properties of the light pulse, after it has driven high-harmonic generation in a gas jet.

- R Gutiérrez-Cuevas, E Pisanty. Optical polarization skyrmionic fields in free space. *J. Opt.* 2, 024004 (2021), arXiv:2101.09254, (citations: 13 / WOS 11 / Scopus 9).

  Recent work on structured light inspired by strong-field and attosecond physics, showing skyrmion structures discovered in optical polarization vortices during a search for exotic polychromatic topologies of light. Published in the Emerging Leaders 2021 collection of *J. Opt.*

- E Pisanty, MF Ciappina and M Lewenstein. The imaginary part of the high-harmonic cutoff. *J. Phys: Photon.* 2, 034013 (2020), arXiv:2003.00277, (citations: 9 / WOS 7 / Scopus 7).

  Presents, for the first time in 35 years, a rigorous and universal definition for the harmonic cutoff for high-harmonic generation, showing that it is the 'bifurcation set' of a caustic, and constructing a natural imaginary part for the cutoff which controls the interference between quantum pathways near the cutoff.

- L Rego, KM Dorney, NJ Brooks, Q Nguyen, C-T Liao, J San Román, DE Couch, A Liu, E Pisanty, M Lewenstein, L Plaja, HC Kapteyn, MM Murnane and C Hernández-García. Generation of extreme-ultraviolet beams with time-varying orbital angular momentum. *Science* 364, aaw9486 (2019), arXiv:1901.10942 (citations: 142 / WOS 89 / Scopus 99).

  Highest-cited paper, and covered in a variety of news outlets including National Geographic, New Scientist and El País. Theoretical and experimental collaboration that used the time-domain perspectives of ultrafast science to discover the 'self-torque', a novel property of light.

- E Pisanty, GJ Machado, V Vicuña-Hernández, A Picón, A Celi, JP Torres and M Lewenstein. Knotting fractional-order knots with the polarization state of light. *Nat. Photon.* 13, 569 (2019), arXiv:1808.05193 (citations: 48 / WOS 37 / Scopus 36).

  Presents novel symmetries, topologies, and conserved quantities in light that are only seen when one studies light using polychromatic optics from the time-domain perspective.

- E Pisanty, L Rego, J San Román, A Picón, KM Dorney, HC Kapteyn, MM Murnane, L Plaja, M Lewenstein and C Hernández-García. Conservation of torus-knot angular momentum in high-order harmonic generation. *Phys. Rev. Lett.* 122, 203201 (2019), arXiv:1810.06503 (citations: 39 / WOS 25 / Scopus 25).

  Shows the rich structures of light that arise in high-harmonic generation driven by complex polychromatic optical polarization vortices.

- E Pisanty and M Ivanov. Slalom in complex time: emergence of low-energy structures in tunnel ionization via complex time contours. *Phys. Rev. A* 94, 043408 (2016), arXiv:1507.00011 (citations: 43 / WOS 30 / Scopus 31).

  Core theory-development PhD paper, exploring the interplay between the atomic Coulomb potential and the complex-time trajectory dynamics that arise in semiclassical treatments of strong-field physics, and showing that the position itself must also be considered as a complex quantity.

- E Pisanty, S Sukiasyan and M Ivanov. Spin conservation in high-order-harmonic generation using bicircular fields. *Phys. Rev. A* 90, 043829 (2014), arXiv:1404.6242 (citations: 95 / WOS 77 / Scopus 81).

  Highest-cited first-author paper. Establishes the conservation of spin angular momentum in high-harmonic generation by analyzing the optical response to polychromatic tailored polarizations – the basic object later used in Nat. Photon. (2019).

Full publication list

35 publications (31 peer-reviewed) with h-index 14 (Google Scholar) / 11 (Web of Science) / 11 (Scopus). Total citation count: 904 (Google Scholar) / 568 (Web of Science) / 591 (Scopus), cited in 294 (WOS) / 465 (Scopus) publications.

- M Luttmann, M Vimal, M Guer, J-F Hergott, AZ Khoury, C Hernández-García, E Pisanty, T Ruchon. Conservation of a half-integer angular mmentum in nonlinear optics with a polarization Möbius strip. arXiv:2209.00454 (2022).
- M Lewenstein, N Baldelli, U Bhattacharya, J Biegert, MF Ciappina, U Elu, T Grass, PT Grochowski, A Johnson, Th Lamprou, AS Maxwell, A Ordóñez, E Pisanty, J Rivera-Dean, P Stammer, I Tyulnev, P Tzallas. Attosecond physics and quantum information science. arXiv:2208.14769 (2022).
- M Khokhlova, E Pisanty, S Patchkovskii, O Smirnova, M Ivanov. Enantiosensitive steering of free-induction decay. *Sci. Adv.* 8, eabq1962 (2022), arXiv:2109.15302.
- P Stammer, J Rivera-Dean, T Lamprou, E Pisanty, MF Ciappina, P Tzallas, M Lewenstein. High photon number entangled states and coherent state superposition from the extreme-ultraviolet to the far infrared. *Phys. Rev. Lett.* 128, 123603 (2022), arXiv:2107.12887, (citations: 4).
- J Rivera-Dean, T Lamprou, E Pisanty, P Stammer, AF Ordóñez, AS Maxwell, MF Ciappina, M Lewenstein, P Tzallas. Quantum optics of strongly laser–driven atoms and generation of high photon number optical cat states. *Phys. Rev. A* 105, 033714 (2022), arXiv:2110.01032, (citations: 3).
- J Rivera-Dean, P Stammer, E Pisanty, T Lamprou, P Tzallas, M Lewenstein, MF Ciappina. New schemes for creating large optical Schrödinger cat states using strong laser fields. *J. Comput. Electron.* 128, 2111 (2021), arXiv:2107.12811, (citations: 7 / Scopus 2).
- M Lewenstein, MF Ciappina, E Pisanty, J Rivera-Dean, T Lamprou, P Tzallas. Generation of optical Schrödinger cat states

in intense laser–matter interactions. *Nat. Phys.* 17, 1104 (2021), arXiv:2008.10221, (citations: 19 / WOS 9 / Scopus 9).

- Emilio Pisanty. Knotted topologies in the polarization state of bichromatic light. Proc. SPIE 11818, Laser Beam Shaping XXI 11818809 (2021) [conference proceedings].
- GSJ Armstrong, MA Khokhlova, M Labeye, AS Maxwell, E Pisanty, M Ruberti. Dialogue on analytical and *ab initio* methods in attoscience. *Eur. Phys. J. D* 75, 209 (2021), arXiv:2102.07453, (citations: 8 / WOS 2 / Scopus 3).
- Y Kang, E Pisanty, M Ciappina, M Lewenstein, C Figueira de Morisson Faria, AS Maxwell. Conservation laws for electron vortices in strong-field ionisation. *Eur. Phys. J. D* 75, 199 (2021), arXiv:2102.07453, (citations: 6 / WOS 1 / Scopus 9).
- Th Lamprou, R Lopez-Martens, S Haessler, I Liontos, S Kahaly, J Rivera-Dean, P Stammer, E Pisanty, MF Ciappina, M Lewenstein, P Tzallas. Quantum-optical spectrometry in relativistic laser–plasma interactions using the high-harmonic generation process: a proposal. *Photonics* 8, 192 (2021), (citations: 8 / WOS 4 / Scopus 5).
- EG Neyra, P Vaveliuk, E Pisanty, AS Maxwell, M Lewenstein, MF Ciappina. Principal frequency of an ultrashort laser pulse. *Phys. Rev. A* 103, 053124 (2021), arXiv:2101.10526, (citations: 3 / WOS 1 / Scopus 1).
- R Gutiérrez-Cuevas, E Pisanty. Optical polarization skyrmionic fields in free space. *J. Opt.* 2, 024004 (2021), arXiv:2101.09254, (citations: 13 / WOS 11 / Scopus 9).
- AP Woźniak, M Lesiuk, DK Efimov, M Mandrysz, JS Prauzner-Bechcicki, M Ciappina, E Pisanty, J Zakrzewski, M Lewenstein, R Moszyński. A systematic construction of Gaussian basis sets for the description of laser field ionization and high-harmonic generation. *J. Chem. Phys.* 154, 094111 (2021), arXiv:2007.10375, (citations: 7 / WOS 4 / Scopus 6).
- AS Maxwell, GSJ Armstrong, MF Ciappina, E Pisanty, Y Kang, AC Brown, M Lewenstein, C Figueira de Morisson Faria. Manipulating twisted electrons in strong-field ionization. *Faraday Discuss.* 228, 394 (2021), arXiv:2010.08355, (citations: 11 / WOS 4 / Scopus 4).
- A Chacón, D Kim, W Zhu, SP Kelly, A Dauphin, E Pisanty, AS Maxwell, A Picón, MF Ciappina, DE Kim, C Ticknor, A Saxena and M Lewenstein. Circular dichroism in high-order harmonic generation: Heralding topological phases and transitions in Chern insulators. *Phys. Rev. B* 102, 134115 (2020), arXiv:1807.01616, (citations: 79 / WOS 34 / Scopus 34).
- E Pisanty, MF Ciappina and M Lewenstein. The imaginary part of the high-harmonic cutoff. *J. Phys: Photon.* 2, 034013 (2020), arXiv:2003.00277, (citations: 9 / WOS 7 / Scopus 7).
- S Mitra, S Biswas, J Schötz, E Pisanty, B Förg, GA Kavuri, C Burger, W Okell, M Högner, I Pupeza, V Pervak, M Lewenstein, P Wnuk and MF Kling. Suppression of individual peaks in two-colour high harmonic generation *J. Phys. B: At. Mol. Opt. Phys.* 53, 134004 (2020), arXiv:2007.15450 (citations: 6 / WOS 5 / Scopus 5).
- J Schoetz, Z Wang, E Pisanty, M Lewenstein, MF Kling and MF Ciappina. Perspective on Petahertz Electronics and Attosecond Nanoscopy. *ACS Photonics* 6, 3057 (2019), arXiv:1912.08574, (citations: 39 / WOS 27 / Scopus 27).
- K Amini, J Biegert, F Calegari, A Chacón, MF Ciappina, A Dauphin, DK Efimov, C Figueira de Morisson Faria, K Giergiel, P Gniewek, AS Landsman, M Lesiuk, M Mandrysz, AS Maxwell, R Moszyński, L Ortmann, JA Pérez-Hernández, A Picón, E Pisanty, J Prauzner-Bechcicki, K Sacha, N Suárez, A Zaïr, J Zakrzewski and M Lewenstein. Symphony on Strong Field Approximation. *Rep. Prog. Phys.* 82, 116001 (2019), arXiv:1812.11447 (citations: 95 / WOS 63 / Scopus 63).
- L Rego, KM Dorney, NJ Brooks, Q Nguyen, C-T Liao, J San Román, DE Couch, A Liu, E Pisanty, M Lewenstein, L Plaja, HC Kapteyn, MM Murnane and C Hernández-García. Generation of extreme-ultraviolet beams with time-varying orbital angular momentum. *Science* 364, aaw9486 (2019), arXiv:1901.10942 (citations: 142 / WOS 89 / Scopus 99).
- E Pisanty, GJ Machado, V Vicuña-Hernández, A Picón, A Celi, JP Torres and M Lewenstein. Knotting fractional-order knots with the polarization state of light. *Nat. Photon.* 13, 569 (2019), arXiv:1808.05193 (citations: 48 / WOS 37 / Scopus 36).
- E Pisanty, L Rego, J San Román, A Picón, KM Dorney, HC Kapteyn, MM Murnane, L Plaja, M Lewenstein and C Hernández-García. Conservation of torus-knot angular momentum in high-order harmonic generation. *Phys. Rev. Lett.* 122, 203201 (2019), arXiv:1810.06503 (citations: 39 / WOS 25 / Scopus 25).
- VE Nefedova, MF Ciappina, O Finke, M Albrecht, J Vábek, M Kozlová, N Suárez, E Pisanty, M Lewenstein and J Nejdl. Determination of the spectral variation origin in high-order harmonic generation in noble gases. *Phys. Rev. A* 98, 033414 (2018), arXiv:1806.03974 (citations: 14 / WOS 10 / Scopus 11).
- E Pisanty, D Hickstein, BR Galloway, CG Durfee, HC Kapteyn, MM Murnane and M Ivanov. High harmonic interferometry of the Lorentz force in strong mid-infrared laser fields. *New J. Phys.* 20, 053036 (2018), arXiv:1606.01931 (citations: 20 / WOS 11 / Scopus 11).
- N Suárez, A Chacón, E Pisanty, L Ortmann, AS Landsman, A Picón, J Biegert, M Lewenstein and MF Ciappina. Above-threshold ionization in multicenter molecules: the role of the initial state. *Phys. Rev. A* 97, 033415 (2018), arXiv:1709.04366 (citations: 13 / WOS 7 / Scopus 7).
- Á Jiménez-Galán, N Zhavoronkov, D Ayuso, F Morales, S Patchkovskii, M Schloz, E Pisanty, O Smirnova and M Ivanov. Control of attosecond light polarization in two-color bi-circular fields. *Phys. Rev. A* 97, 023409 (2017), arXiv:1805.02250 (citations: 43 / WOS 33 / Scopus 35).
- E Pisanty and Á Jiménez-Galán. Strong-field approximation in a rotating frame: high-order harmonic emission from *p* states in bicircular fields. *Phys. Rev. A* 96, 063401 (2017), arXiv:1709.00397 (citations: 25 / WOS 22 / Scopus 23).
- BR Galloway, D Popmintchev, E Pisanty, DD Hickstein, MM Murnane, HC Kapteyn and T Popmintchev. Lorentz drift compensation in high harmonic generation in the soft and hard X-ray regions of the spectrum. *Opt. Express* 24, 21818 (2016) (citations: 19 / WOS 9 / Scopus 10).
- E Pisanty and M Ivanov. Kinematic origin for near-zero energy structures in mid-IR strong field ionization. *J. Phys. B: At. Mol. Opt. Phys.* 49, 105601 (2016) (citations: 6 / WOS 3 / Scopus 4).

- E Pisanty and M Ivanov. Slalom in complex time: emergence of low-energy structures in tunnel ionization via complex time contours. *Phys. Rev. A* 94, 043408 (2016), arXiv:1507.00011 (citations: 43 / WOS 30 / Scopus 31).
- E Pisanty, S Sukiasyan and M Ivanov. Spin conservation in high-order-harmonic generation using bicircular fields. *Phys. Rev. A* 90, 043829 (2014), arXiv:1404.6242 (citations: 95 / WOS 77 / Scopus 81).
- M Ivanov and E Pisanty. High-harmonic generation: Taking control of polarization. *Nat. Photon.* 8, 501 (2014) [News & Views] (citations: 44 / WOS 34 / Scopus 33).
- E Pisanty and M Ivanov. Momentum transfers in correlation-assisted tunnelling. *Phys. Rev. A* 89, 043416 (2014), arXiv: 1307.4765 (citations: 11 / WOS 7 / Scopus 6).
- E Pisanty and E Nahmad-Achar. On the spectrum of field quadratures for a finite number of photons. *J. Phys. A: Math. Theor.* 45, 395303 (2012), arXiv:1109.5724 (citations: 4 / WOS 2 / Scopus 2).

Presentations

Invited conference presentations

- The imaginary part of the high-order harmonic cutoff. Invited talk, 30th Annual International Laser Physics Workshop, online, 2022.
- Knotted topologies in the polarization state of bichromatic light. Invited talk, Laser Beam Shaping XXI, hybrid (San Diego, online), 2021.
- *Ab-initio* vs analytical methods. Invited 'battle' round-table discussion, Quantum Battles in Attoscience, online, 2020.
- Creating and multiplying knotted topologies in the polarization state of light. Invited talk, International Workshop on Atomic Physics, MPI-PKS, 2019.
- Slalom in complex time: semiclassical trajectories in strong-field ionization and their analytical continuations. Invited talk, BIRS Workshop on Mathematical and Numerical Methods for Time-Dependent Quantum Mechanics, Oaxaca, 2017.

Oral presentations

- The imaginary part of the high-order harmonic cutoff. Poster Highlight, ATTO VIII, Orlando, 2022.
- Three-dimensional polychromatic knots and skyrmionic textures via tightly-focused beams. Accepted talk, 6th ICOAM, Tampere, 2022.
- The imaginary part of the high-order harmonic cutoff. Contributed talk, International Conference on Photonic, Electronic and Atomic Collisions, online, 2021.
- Conservation of Torus-Knot Angular Momentum in High-Harmonic Generation Driven by Fields with Spin-Orbit Mixing. Contributed talk, DAMOP 2020, online, 2020.
- Conservation of Torus-Knot Angular Momentum in High-Harmonic Generation Driven by Fields with Spin-Orbit Mixing. Accepted talk, USTS 2019 Meeting, Madrid, 2019.
- Knotted topologies in the polarization state of bichromatic light. Accepted talk, 5th ICOAM, Ottawa, 2019.
- Knotting fractional-order knots with light's polarization. ICFODay Research Talk, 2017; Contributed talk, QUTIF Young Researcher meeting, 2018; Invited Seminar, MPQ, CEA-Saclay, UCL, King's College London, Imperial College London, Lund University, 2018-2020.
- Haces de luz con nudos de polarización. Invited Seminar, University of Salamanca, 2017; Invited Seminar, ICN-UNAM, 2018.
- Slalom in complex time: semiclassical trajectories in strong-field ionization and their analytical continuations. Invited Seminar, ICN-UNAM, 2017.
- Strong-field dynamics with a 360° view. Symfonia Grant Meeting, Warsaw, 2017.
- High-harmonic interferometry of the Lorentz force in strong mid-IR laser fields. QUTIF Young Researcher Meeting, Göttingen, 2016.
- Complex trajectories for quantum orbits. Invited seminar, Rostock University, 2016.
- Polarization effects in non-collinear bicircular HHG. Max-Born Institute seminar, 2016.
- Electron dynamics in complex time and complex space. ICFO invited seminar, 2016.
- Probing non-dipole effects in HHG using noncollinear beams. XLIC Meeting, Belgium, 2016.
- Complex time contours in tunnel ionization and low-energy structures. APS March Meeting, San Antonio, 2015.
- Spin conservation in bicircular HHG. 1st XLIC WG1 meeting, UCL, 2014.
- Spin conservation in bicircular HHG: a photon exchange model. 5th TaDEM, ICF-UNAM, 2014.
- The role of correlations in tunnel ionization. Invited seminar, Azpuru-Guzik group, Harvard University, 2013.
- Momentum transfers in correlation-assisted tunnel ionization. 3rd AQuA Student Congress, Imperial College, 2013.
- Interactions during the tunnel effect. II Symposium of CONACYT Scholars and Ex-scholars in Europe, Strasbourg, 2012.

Poster presentations

- The imaginary part of the high-order harmonic cutoff. ATTO VIII, Orlando, 2022.
- The imaginary part of the high-order harmonic cutoff. DAMOP 2020, online, 2020.
- Conservation of torus-knot angular momentum in high-harmonic generation driven by fields with spin-orbit mixing. ATTO2019, Szeged, 2019.

- Creating and multiplying knots in the polarization state of light. ICAP, Barcelona, 2018.
- Conservation of torus-knot angular momentum in high-harmonic generation. GRC Multiphoton Processes, Providence, 2018.
- Anatomy of high-order harmonic emission from *p* states in bicircular fields. ICOMP 14, Budapest, 2017.
- Recovering high-harmonic emission from Lorentz-force effects using noncollinear counter-rotating beams. International Workshop on Atomic Physics, MPI-PKS, 2016.
- Slalom in complex time: dealing with the imaginary position of a quantum orbit. ATTO2015, Saint-Sauveur, 2015; 3rd XLIC General Meeting, Debrecen, 2015; International Workshop on Atomic Physics, MPI-PKS, 2015; QUTIF Research School, Rostock, 2016
- Spin transfer in bicircular HHG: a photon exchange model. CORINF 2014 Summer School, Cargèse, 2014; GRC Multiphoton Processes, Waltham, 2014; Quantum Optics VII, Mar del Plata, 2014.
- Angular distributions for correlation-assisted tunnelling. ICOLS 2013, Berkeley; GRC Quantum Control of Light and Matter, Mount Holyoke College; ATTO2013, Paris, 2013.
- Channel jumping inside a tunnel ionization barrier. ATTOFEL Winter School, Bormio, 2013.
- Under-the-barrier electron-ion interaction during tunnel ionization. QuICC 2012, Aberystwyth, 2012.
- Quadrature (pseudo)eigenstates for finite photon numbers. QuICC 2012. Aberystwyth, 2012.
- Analytical Structure of the Annihilation Operator. IV Annual Meeting of the Quantum Information Division (DICU), Querétaro, 2011.