



Dr. Federico Vismarra

myquantumreality.github.io

in [federico vismarra](#) [github page](#) ORCID:0000-0002-2348-2749

About me

I am a scientist and physics engineer with expertise in attosecond physics, soft X-ray science and laser technologies. My research spans from ultrafast physics of atoms and molecular systems to strong-field light-matter interactions, with the goal of uncovering hidden aspects of electronic motion in matter at the shortest timescale modern technology allows.

Research Experience and Employment

SLAC/Stanford University, Project Scientist

Menlo Park, USA

- Working on the Attosecond Science program at Free Electron Laser LCLS and LCLS-II

April 2026 –

ETH Zürich, Postdoctoral Fellow

Zürich, Switzerland

- Co-principal investigator and **coordinator** of multiple international projects at free-electron laser facilities.
- Development of a table-top attosecond **soft X-ray beamline** in the water window, employing soliton self-compressed high-energy femtosecond pulses.
- Commissioning of a Mott detector for spin-resolved measurements, and electron time-of-flight spectrometers for **attosecond metrology**.

April 2024 – April 2026

Politecnico di Milano, Postdoctoral Researcher

Milano, Italy

- Design of an attosecond beamline for ultrafast spectroscopy of optoelectronic molecular systems.
- Laser engineering: generation, characterisation and control of extreme ultraviolet (EUV) isolated attosecond pulses via attosecond streaking metrology.
- Development of attosecond **quantum-physics simulation tools** for attosecond setup engineering and for fundamental studies.

January 2024 – March 2024

Lund University, Visiting Researcher

Lund, Sweden

- Spatial-temporal control of high-order harmonic generation for **spatial diagnosis** of nanostructure and for high-intensity EUV physics.

August 2022 – December 2022

Main Achievements

First author of 5 peer-reviewed papers, including *Nature Chemistry* [1], *Ultrafast Science* [4], *Light: Science & Applications* [2], and *Physical Review Letters* [5]; corresponding author on 3 of them. Co-author of the textbook *High-Intensity Lasers for Nuclear and Physical Applications* [11], adopted in MSc curricula at Politecnico di Milano.

Table-top Attosecond Physics

Visiting researcher in Prof. Anne L’Huillier’s (Nobel 2023) and Prof. Per Eng-Johnsson’s group at Lund University (fall 2022). Co-led a study with ASML on spatial aberrations in HHG (*Ultrafast Science*, Jan. 2024 [4]), enabling nanometric EUV spatial metrology and intense attosecond sources. Contributed to the discovery of a universal scaling law for HHG phase matching (*Opt. Exp.*, Sept. 2023 [9]). Demonstrated EUV isolated attosecond pulse generation in semi-infinite gas cells (*Light: Science & Applications*, Aug. 2024 [2]). Planned and led experimental campaigns as principal investigator at the European Laser facility (ELI-ALPS, Hungary) (*Phys. Rev. Lett.*, July 2025 [5]). Development of novel water-window soft-X-ray attosecond transient absorption beamlines driven by light transient pulses at ETH Zurich (*Optica* [12] and *Nat. Photonics* [13], both Nov. 2025).

Few-femtoseconds Charge Transfer in Molecules

Probed for the first time electron-nuclear dynamics in donor-acceptor systems with few-femtosecond resolution. Pub-

lished in *Nature Chemistry* (2024) [1], providing new insights into fundamental charge transfer with theoretical support from a world-leading theoretician in attosecond chemistry.

Ultrafast Laser Technology Development

Developed and characterised the first few-femtosecond tunable UV sources [7], and designed a compact femtosecond UV-XUV spectroscopy beamline [8], enabling applications in photovoltaics and photocatalysis.

Academic Visibility and Service

Invited speaker

Invited talks at major international conferences: MDGAS April 2024 (Hamburg, Germany), ELI-ERIC user meeting June 2024 (Prague, Czech Republic), IMAMPC May 2025 (Caen, France), LPHYS July 2025 (Szeged, Hungary); Multiphoton Process GRC, June 2026 (Boston USA), IWP-RIXS July 2026 (Berkeley, USA); and at leading research institutions: Lund University Nov. 2022 (Sweden), Photon Science Seminar at SLAC Aug. 2023 (Menlo Park, USA), ETH Zurich Oct. 2023 (Switzerland), Laser Science Department SLAC April 2025 (California), University of Freiburg May 2025 (Germany), Politecnico di Milano December 2025 (Italy), Lund University February 2026 (Sweden), University of Zurich March 2026, TU Wien March 2026 (Austria).

Contributing speaker

Contributing talks at over 10 conferences, including CLEO Europe July 2023 (Munich), ATTOchem Young Sept. 2023 (Vienna), ATTO-X July 2025 (Sweden), ACS Meetings San Diego March 2025 (California), selected talk at Lindau Nobel Laureate Meeting in Physics June 2024 (Germany), UCL London July 2022 (UK).

Peer reviewer

Peer reviewer for major international journals: *Nature Portfolio*, *Optica Publishing Group*, *Laser & Photonics Reviews*, and the *Journal of the European Optical Society*. An up-to-date list can be found here: [ORCID link](#). Guest editor for topical collection in Springer [EPJ Techniques and Instrumentation](#).

Professional Memberships

Early Career Member of the Optica Society (formerly OSA), the European Physical Society (EPS), the American Chemistry Society (ACS), the American Physical Society (APS), SPIE (the international society for optics and photonics), and the Italian Physics Society (SIF).

Science outreach and Leadership

Conference organisation and point of contact for IMAMPC2026, PSI/ETH Zurich, July 2026.

Co-founder and President (2021–2024) of the SPIE Student Chapter at Politecnico di Milano, where I coordinated and organised, as part of the OPTICA-EPS-SPIE Politecnico di Milano chapters, multiple events connecting academia and industry for Bachelor's, Master's, and PhD students as well as early-career researchers.

Awards and Fellowship

Scientific Exchanges Grant

Swiss National Science Foundation funds for IMAMPC2026

March 2026

The Nova 111 List-Italy Award

NGOs, Public Service and Research

April 2025

Dieter Schwarz Stiftung Fellowship

Selected for 73rd Lindau Nobel Laureate Meeting

June 2024

Doctor Europeus in Physics

Lund University and Politecnico di Milano

March 2024

Mobility Travel Grant, Erasmus+

European Union travel grant

July 2022

High-Merit Scholarships

Politecnico di Milano high-merit scholarship

Nov. 2017 - July 2020

Best Freshmen Student

Politecnico di Milano award

October 2015

Education

BcS Politecnico di Milano, Engineering Physics

Sep. 2015 – Sep. 2018

- Final grade: *110/110 cum laude*

MSc	Politecnico di Milano , Engineering Physics: Photonics and Nano-Optics	Sep. 2018 – Oct. 2020
	• Final grade: <i>110/110 cum laude</i>	
	Politecnico di Torino , Physics of complex systems	Sep. 2019 – Dec. 2021
	• Final grade: <i>110/110 cum laude</i>	
	Alta Scuola Politecnica , Diploma in Business and innovation	Jan. 2019 – July 2020
	• Engineering and Entrepreneurship multidisciplinary track	
PhD	Politecnico di Milano , PhD in Physics	Nov. 2020 – Mar. 2024
	• Ph.D. cum laude. Dissertation: Harnessing attosecond pulse generation for applications in spectroscopy of optoelectronic molecules	

Teaching and Mentoring Activities

Teaching Assistant and Instructor — Politecnico di Milano (2021–2024)

- Taught **General Physics** (Classical Mechanics & Electromagnetism) in practical sessions, 4 h/week across 5 semesters. Including theory review and exercises.
- Delivered lectures to classes of 30–70 students per year, supporting both lectures and exam preparation.
- Gained extensive experience in course design, assessment, and interactive teaching.

Textbook Co-Author — MSc Curriculum in Physics and Engineering

- Author to *High-Intensity Lasers for Nuclear and Physical Applications*, a graduate-level textbook adopted in MSc courses in Physics Engineering, Materials Science, and Nuclear Engineering at Politecnico di Milano.
- Material directly integrated into master’s curricula, with interactive teaching elements.

Student Supervision

- Co-supervised 2 MS theses at Politecnico di Milano, Fall 2023 and Fall 2024.
- Supervised 6 BSc theses at Politecnico di Milano, 2021–2024.
- Supervised 1 BSc thesis at ETH Zürich, Fall 2025.
- Supervised 3 BSc theses and 2 MS theses at ETH Zürich, Spring 2026.

Selected publications

- [1] Federico Vismarra, Francisco Fernández-Villoria, Daniele Mocci, Jesús González-Vázquez, Yingxuan Wu, Lorenzo Colaizzi, Fabian Holzmeier, Jorge Delgado, José Santos, Luis Bañares, Laura Carlini, Mattea Carmen Castrovilli, Paola Bolognesi, Robert Richter, Lorenzo Avaldi, Alicia Palacios, Matteo Lucchini, Maurizio Reduzzi, Rocío Borrego-Varillas, Nazario Martín, Fernando Martín, and Mauro Nisoli. “Few-femtosecond electron transfer dynamics in photoionized donor- π^* acceptor molecules”. en. In: *Nature Chemistry* (Sept. 2024). Publisher: Nature Publishing Group, pp. 1–8. ISSN: 1755-4349. DOI: [10.1038/s41557-024-01620-y](https://doi.org/10.1038/s41557-024-01620-y). URL: <https://www.nature.com/articles/s41557-024-01620-y>.
- [2] Federico Vismarra, Marina Fernández-Galán, Daniele Mocci, Lorenzo Colaizzi, Víctor Wilfried Segundo, Roberto Boyero-García, Javier Serrano, Enrique Conejero-Jarque, Marta Pini, Lorenzo Mai, Yingxuan Wu, Hans Jakob Wörner, Elisa Appi, Cord L. Arnold, Maurizio Reduzzi, Matteo Lucchini, Julio San Román, Mauro Nisoli, Carlos Hernández-García, and Rocío Borrego-Varillas. “Isolated attosecond pulse generation in a semi-infinite gas cell driven by time-gated phase matching”. en. In: *Light: Science & Applications* 13.1 (Aug. 2024). Publisher: Nature Publishing Group, p. 197. ISSN: 2047-7538. DOI: [10.1038/s41377-024-01564-5](https://doi.org/10.1038/s41377-024-01564-5). URL: <https://www.nature.com/articles/s41377-024-01564-5>.
- [3] F. Vismarra, R. Borrego-Varillas, Y. Wu, D. Mocci, M. Nisoli, and M. Lucchini. “Ensemble effects on the reconstruction of attosecond pulses and photoemission time delays”. en. In: *Journal of Physics: Photonics* 4.3 (June 2022). Publisher: IOP Publishing, p. 034006. ISSN: 2515-7647. DOI: [10.1088/2515-7647/ac7991](https://doi.org/10.1088/2515-7647/ac7991). URL: <https://dx.doi.org/10.1088/2515-7647/ac7991>.
- [4] Marius Plach, Federico Vismarra, Elisa Appi, Vénus Poulain, Jasper Peschel, Peter Smorenburg, David P. O’Dwyer, Stephen Edward, Yin Tao, Rocío Borrego-Varillas, Mauro Nisoli, Cord L. Arnold, Anne L’Huillier, and Per Eng-Johnsson. “Spatial Aberrations in High-Order Harmonic Generation”. In: *Ultrafast Science* 4 (Jan. 2024). Publisher: American Association for the Advancement of Science, p. 0054. DOI: [10.34133/ultrafastscience.0054](https://doi.org/10.34133/ultrafastscience.0054). URL: <https://spj.science.org/doi/full/10.34133/ultrafastscience.0054>.

- [5] Federico Vismarra, Mattias Bertolino, Elisa Appi, Marius Plach, Lénárd Gulyás Oldal, Tímea Grósz, Gian Luca Dolso, Vénus Poulain, Daniele Mocci, Giacomo Inzani, Chinmoy Biswas, Massimo De Marco, Gabriele Zeni, Fabio Frassetto, Luca Poletto, Maurizio Reduzzi, Rocío Borrego-Varillas, Hans Jakob Wörner, Zoltán Filus, Imre Seres, Péter Jójárt, Balázs Major, Tamás Csizmadia, Mauro Nisoli, Per Eng-Johnsson, Jan Marcus Dahlström, and Matteo Lucchini. “Dynamic Interference of Chirped Photoelectrons”. In: *Physical Review Letters* 135.3 (July 2025). Publisher: American Physical Society, p. 033202. DOI: [10.1103/73t1-w87y](https://doi.org/10.1103/73t1-w87y). URL: <https://link.aps.org/doi/10.1103/73t1-w87y>.
- [6] Matteo Lucchini, Fabio Medeghini, Yingxuan Wu, Federico Vismarra, Rocío Borrego-Varillas, Aurora Crego, Fabio Frassetto, Luca Poletto, Shunsuke A. Sato, Hannes Hübener, Umberto De Giovannini, Ángel Rubio, and Mauro Nisoli. “Controlling Floquet states on ultrashort time scales”. en. In: *Nature Communications* 13.1 (Nov. 2022). Publisher: Nature Publishing Group, p. 7103. ISSN: 2041-1723. DOI: [10.1038/s41467-022-34973-4](https://doi.org/10.1038/s41467-022-34973-4). URL: <https://www.nature.com/articles/s41467-022-34973-4>.
- [7] M. Reduzzi, M. Pini, L. Mai, F. Cappenberg, L. Colaizzi, F. Vismarra, A. Crego, M. Lucchini, C. Brahmms, J. C. Travers, R. Borrego-Varillas, and M. Nisoli. “Direct temporal characterization of sub-3-fs deep UV pulses generated by resonant dispersive wave emission”. EN. In: *Optics Express* 31.16 (July 2023). Publisher: Optica Publishing Group, pp. 26854–26864. ISSN: 1094-4087. DOI: [10.1364/OE.494879](https://doi.org/10.1364/OE.494879). URL: <https://opg.optica.org/oe/abstract.cfm?uri=oe-31-16-26854>.
- [8] Aurora Crego, Stefano Severino, Lorenzo Mai, Fabio Medeghini, Federico Vismarra, Fabio Frassetto, Luca Poletto, Matteo Lucchini, Maurizio Reduzzi, Mauro Nisoli, and Rocío Borrego-Varillas. “Sub-20-fs UV-XUV beamline for ultrafast molecular spectroscopy”. en. In: *Scientific Reports* 14.1 (Oct. 2024). Publisher: Nature Publishing Group, p. 26016. ISSN: 2045-2322. DOI: [10.1038/s41598-024-77841-5](https://doi.org/10.1038/s41598-024-77841-5). URL: <https://www.nature.com/articles/s41598-024-77841-5>.
- [9] E. Appi, R. Weissenbilder, B. Nagyillés, Z. Diveki, J. Peschel, B. Farkas, M. Plach, F. Vismarra, V. Poulain, N. Weber, C. L. Arnold, K. Varjú, S. Kahaly, P. Eng-Johnsson, and A. L’Huillier. “Two phase-matching regimes in high-order harmonic generation”. EN. In: *Optics Express* 31.20 (Sept. 2023). Publisher: Optica Publishing Group, pp. 31687–31697. ISSN: 1094-4087. DOI: [10.1364/OE.488298](https://doi.org/10.1364/OE.488298). URL: <https://opg.optica.org/oe/abstract.cfm?uri=oe-31-20-31687>.
- [10] Daniele Mocci, Juan Reino González, Yingxuan Wu, Jesús González Vázquez, Federico Vismarra, Francisco Fernández-Villoria, Javier Urieta-Mora, Alicia Palacios, Pedro Recio, Javier Cachon, Luis Bañares, Matteo Lucchini, Maurizio Reduzzi, Rocío Borrego-Varillas, Nazario Martín, Fernando Martín, and Mauro Nisoli. “Ultrafast Structural Reorganization and Charge Dynamics in a Photoionized Donor–Acceptor Biphenyl Molecule”. In: *Ultrafast Science* 5 (Aug. 2025). Publisher: American Association for the Advancement of Science, p. 0108. DOI: [10.34133/ultrafastscience.0108](https://doi.org/10.34133/ultrafastscience.0108). URL: <https://spj.science.org/doi/full/10.34133/ultrafastscience.0108>.
- [11] Margherita Zavelani-Rossi and Federico Vismarra. *High-Intensity Lasers for Nuclear and Physical Applications*. en. Google-Books-ID: 16paEAAAQBAJ. Società Editrice Esculapio, Jan. 2022. ISBN: 9791220890328.
- [12] Tristan Kopp, Leonardo Redaelli, Joss Wiese, Giuseppe Fazio, Valentina Utrio Lanfaloni, Federico Vismarra, Tadas Balčiūnas, and Hans Jakob Wörner. “Field-resolved measurements of soliton self-compressed single-cycle pulses and their application to water-window high-harmonic generation”. EN. In: *Optica* 12.11 (Nov. 2025). Publisher: Optica Publishing Group, pp. 1767–1774. ISSN: 2334-2536. DOI: [10.1364/OPTICA.564265](https://doi.org/10.1364/OPTICA.564265). URL: <https://opg.optica.org/optica/abstract.cfm?uri=optica-12-11-1767>.
- [13] Valentina Utrio Lanfaloni, Federico Vismarra, Emir Ardali, Nicholas Monahan, Joss Wiese, Tristan Kopp, Fernando Ardana-Lamas, Giuseppe Fazio, Leonardo Redaelli, Yoann Pertot, Kristina Zinchenko, Tadas Balčiūnas, and Hans Jakob Wörner. “Self-compressed waveform-stable light transients enabling water-window attosecond spectroscopy”. en. In: *Nature Photonics* (Nov. 2025). Publisher: Nature Publishing Group, pp. 1–8. ISSN: 1749-4893. DOI: [10.1038/s41566-025-01802-1](https://doi.org/10.1038/s41566-025-01802-1). URL: <https://www.nature.com/articles/s41566-025-01802-1>.