# Jun.-Prof. Hélène Seiler, Ph.D.

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Birthday : 23.04.1988
Citizenship : Swiss, born in Lausanne
Civil status: married, two children (2020, 2022)

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Google scholar: Hélène Seiler

Languages: French (native), English (IELTS 8.5), German (C1), Chinese (HSK3), Spanish (basic)

## Education

Ph.D. in Chemistry (CGPA 3.9/4.0) 01/2013 – 02/2018
McGill University, Canada

M.Sc. in Environmental Policy (with Distinction, in top 5 students) 09/2011 - 11/2012
London School of Economics, United Kingdom

M.Sc. in Physics (5.65/6.00, ranked 3rd of graduating year) 09/2009 - 01/2011
Swiss Institute of Technology Lausanne (EPFL), Switzerland

B.Sc. in Physics (5.00/6.00, cum laude) 09/2006 - 07/2009
Swiss Institute of Technology Lausanne (EPFL), Switzerland
Third year spent at Imperial College London, United Kingdom

## Academic research positions

Tenure-track Professor in experimental physics (W1-TT-W2) Since 10/2022
Freie Universität Berlin, Germany
- Head of the Ultrafast Dynamics in Nanomaterials Group
- Maternity leave from 12.2022-03.2023 + 60% part-time from 03.23-09.2023

Postdoctoral fellow, Ernstorfer Lab 04.2018 – 09.2022
Fritz Haber Institute of the Max Planck Society, Germany
- Performed Femtosecond Electron Diffraction experiments on 2D materials and organic/inorganic heterostructures
- Maternity leave from 12.2020-06.2021

Ph.D. student, Kambhampati Lab 01.2013 – 02.2018
McGill University, Canada
- Developed new methods in 2D spectroscopy at optical frequencies and applied them to colloidal nanocrystals

M.Sc. Student, European Institute for Energy Research 09.2010 - 02.2011
Karlsruhe Institute of Technology, Germany
- Performed modelling of degradation processes in fuel cells

B.Sc. Student, Schultz Lab 09.2008 – 05.2009
Imperial College London, United Kingdom

- Implemented a maximum entropy algorithm for neural decoding

## Other work experience

Optical Scientist 08.2017 – 02.2018
Airy 3D Inc., Canada
- Designed transmission diffractive optical elements for single-sensor 3D applications
- Helped raise US$10M in Series A funding round led by Intel Capital

Diplomatic Intern, Swiss Embassy to China 03.2011 – 09.2011
Beijing, China
- Organized diplomatic meetings and Embassy events, including visits of 2 Federal Ministers
- Wrote the official 2011 Embassy reports on air, water and the environment in China

## Publications

32 publications (9 as first author, 2 as last author, 2 of which generated media coverage), see my google scholar or ORCID profile for more details.

1. Y. Pan, P.-N. Hildebrandt, D. Zahn, M. Zacharias, Y. W. Windsor, R. Ernstorfer, F. Caruso*, and **H. Seiler***: Experimental evidence for dynamical screening of electron-phonon coupling, ACS Nano 19(11), 11381 (2025).
2. H. Jung*, S. Dong, D. Zahn, T. Vasileiadis, **H. Seiler**, R. Schneider, S. Michaelis de Vasconcellos, V.C.A. Taylor, R. Bratschitsch, R. Ernstorfer, Y. W. Windsor*: Element-specific ultrafast lattice dynamics in monolayer $WSe_2$, Nano Letters, 24 (43), 13671 (2024.)
3. J. P. Brosseau, D. Jasrasaria, A. Ghosh, **H. Seiler**, S. Palato, P. Kambhampati*: Two-Dimensional Electronic Spectroscopy Reveals Dynamics within the Bright Fine Structure of CdSe Quantum Dots. JPCL 15 (6), 1702 (2024).
4. A. Neef*, M. Rossi, M. Wolf, R. Ernstorfer, and **H. Seiler***: On the Role of Nuclear Motion in Singlet Exciton Fission: The Case of Single-Crystal Pentacene. PSS (a) 221 (1), 2300304 (2024).
5. J. Müller, M. Heyl, T. Schultz, K. Elsner, M. Schloz, S. Rühl, **H. Seiler**, N. Koch, E. J.W. List-Kratochvil, and C. T. Koch: Probing Crystallinity and Grain Structure of 2D Materials and 2D-Like Van der Waals Heterostructures by Low-Voltage Electron Diffraction. PSS (a) 221 (1), 2300148 (2024).
6. P. Brosseau, A. Ghosh, **H. Seiler**, D. Strandell, and P. Kambhampati*: Exciton–polaron interactions in metal halide perovskite nanocrystals revealed via two-dimensional electronic spectroscopy. JCP 159 (18), 184711 (2023).
7. T. Pincelli*, T. Vasileiadis, S. Dong, S. Beaulieu, M. Dendzik, D. Zahn, S.-E. Lee, **H. Seiler**, Y. Qi, R. P.Xian, J. Maklar, E. Coy, N. S. Mueller, Y. Okamura, S. Reich, M.Wolf, L. Rettig, and R.Ernstorfer*: Observation of Multi-Directional Energy Transfer in a Hybrid Plasmonic–Excitonic Nanostructure, Advanced Materials 35 (9), 2209100 (2023).
8. P. Brosseau, **H. Seiler**, S. Palato, C. Sonnichsen, H. Baker, E. Socie, D. Strandell, and P. Kambhampati: Perturbed free induction decay obscures early time dynamics in two-dimensional electronic spectroscopy: The case of semiconductor nanocrystals. JCP 158(8), 084201 (2023).
9. **H.Seiler***, D. Zahn, V. C. A. Taylor, M. I. Bodnarchuk, Y. W. Windsor, M. V. Kovalenko, and R. Ernstorfer*: Direct Observation of Ultrafast Lattice Distortions during Exciton–

Polaron Formation in Lead Halide Perovskite Nanocrystals. ACS Nano 17(3), 1979 (2023).

10. Y. Qi*, N. Chen, T. Vasileiadis, D. Zahn, **H. Seiler**, X. Li, and R. Ernstorfer*: Photoinduced Ultrafast Transition of the Local Correlated Structure in Chalcogenide Phase-Change Materials. Physical Review Letters 129 (13), 135701 (2022).
11. Y. Qi*, M. Guan, D. Zahn, T. Vasileiadis, **H. Seiler**, Y. W. Windsor, H. Zhao, S. Meng, and R. Ernstorfer*: Traversing Double-Well Potential Energy Surfaces: Photoinduced Concurrent Intralayer and Interlayer Structural Transitions in XTe2 (X= Mo, W). ACS Nano 16, 11124−11135 (2022).
12. D. Zahn*, F. Jakobs, **H. Seiler**, T. A. Butcher, D. Engel, J. Vorberger, U. Atxitia, Y. W. Windsor, and R. Ernstorfer*: Intrinsic energy flow in laser-excited ferromagnets. Physical Review Research 4 (1), 013104 (2022).
13. D. Zahn*, **H. Seiler**, Y. W. Windsor, and R. Ernstorfer*: Ultrafast lattice dynamics and electron–phonon coupling in platinum extracted with a global fitting approach for time-resolved polycrystalline diffraction data. Structural Dynamics 8 (6), 064301 (2021). **Editor's pick**.
14. M. Zacharias*, **H. Seiler**, F. Caruso, D. Zahn, F. Giustino, P. C. Kelires, and R. Ernstorfer*: Efficient first-principles methodology for the calculation of the all-phonon inelastic scatter-ing in solids. Phys. Rev. Lett. 127 (20), 207401 (2021). **Editor's suggestion**.
15. M. Zacharias*, **H. Seiler**, F. Caruso, D. Zahn, F. Giustino, P. C. Kelires, and R. Ernstorfer*: Multiphonon diffuse scattering in solids from first principles: Application to layered crystals and two-dimensional materials. Phys. Rev. B 104 (20), 205109 (2021).
16. **H. Seiler***, D. Zahn, M. Zacharias, P. Hildebrandt, T. Vasileiadis, Y. W. Windsor, Y. Qi, C. Carbogno, C. Draxl, R. Ernstorfer, and F. Caruso*: Accessing the anisotropic non-thermal phonon populations in black phosphorus. Nano Letters 21 (14), 6171 (2021).
17. **H. Seiler***, M. Krynski, D. Zahn, Y. W. Windsor, T. Vasileiadis, S. Hammer*, J. Pflaum, M. Rossi*, R. Ernstorfer, and H. Schwoerer*: Nuclear dynamics of singlet exciton fission in pentacene single crystals. Science Advances 7 (6), eabg0869 (2021).
18. D. Zahn*, F. Jakobs, Y. W. Windsor, **H. Seiler**, T. Vasileiadis, T. A. Butcher, Y. Qi, D. Engel, U. Atxitia, J. Vorberger, and R. Ernstorfer*, Lattice dynamics and ultrafast energy flow between electrons, spins, and phonons in a 3d ferromagnet, Physical Review Research 3 (2), 023032 (2021).
19. Y. W. Windsor*, D. Zahn, R. Kamrla, J. Feldl, **H. Seiler**, C.-T. Chiang, M. Ramsteiner, W. Widdra, R. Ernstorfer, and L. Rettig*, Exchange-striction driven ultrafast nonthermal lattice dynamics in NiO, Physical Review Letters 126 (14), 147202 (2021).
20. P. Brosseau, S. Palato, **H. Seiler**, H. Baker, and P. Kambhampati*, Fifth-order two-quantum absorptive two-dimensional electronic spectroscopy of CdSe quantum dots, Journal of Chemical Physics 153(23), 234703 (2020).
21. S. Palato, **H. Seiler**, H. Baker, C. Sonnichsen, R. Zifkin, J. McGowan, and P. Kambhampati*: An analysis of hollow-core fiber for applications in coherent femtosecond spectroscopies, Journal of Applied Physics 128 (10), 103107 (2020).
22. D. Zahn*, P.N. Hildebrandt, T. Vasileiadis, Y.W. Windsor, **H. Seiler**, and R. Ernstorfer*: Anisotropic non-equilibrium lattice dynamics of black phosphorus, Nano Letters 20(5), 3728 (2020).
23. S. Palato, **H. Seiler**, H. Baker, C. Sonnichsen, P. Brosseau, and P. Kambhampati*: Investigating the electronic structure of confined multiexcitons with nonlinear spectroscopies, Journal of Chemical Physics 152(10), 104710 (2020).
24. S. Palato, **H. Seiler**, P. Nijjar, O. Prezdho, and P. Kambhampati*: Atomic fluctuations in electronic materials revealed by dephasing. Proceedings of the National Academy of Sciences 117(22), 11940 (2020).
25. **H. Seiler**, S. Palato, C. Sonnichsen, H. Baker, E. Socie, D. Strandell and P. Kambham-pati*: Two-dimensional electronic spectroscopy reveals liquid-like lineshape dynamics in CsPbI3 perovskite nanocrystals. Nature communications 10 (1) 4962 (2019). **Editor's suggestion**.
26. **H. Seiler**, S. Palato, C. Sonnichsen, H. Baker, and P. Kambhampati*: Seeing Multiexcitons through Sample Inhomogeneity: Band-Edge Biexciton Structure in CdSe

Nanocrystals Revealed by Two-Dimensional Electronic Spectroscopy, Nano Letters 18(5), 2999 (2018).
27. **H. Seiler**, S. Palato, and P. Kambhampati*: Investigating exciton structure and dynamics in colloidal CdSe quantum dots with two-dimensional electronic spectroscopy, Journal of Chemical Physics 149(7), 074702 (2018)
28. S. Palato, **H. Seiler**, L. McGovern, T. Mack, L. Jethi, and P. Kambhampati*: Electron Dynamics at the Surface of Semiconductor Nanocrystals, J. Phys. Chem. C 121(47), 26519 (2017).
29. **H. Seiler**, S. Palato, and P. Kambhampati*: Coherent multi-dimensional spectroscopy at optical frequencies in a single beam with optical readout, Journal of Chemical Physics 147(9), 094203 (2017).
30. **H. Seiler**, S. Palato, B. Schmidt, and P. Kambhampati*: Simple fiber-based solution for coherent multi-dimensional spectroscopy in the visible regime, Optics Letters 42(3),643 (2017).
31. **H. Seiler**, B. Walsh, S. Palato, A. Thai, V. Crozatier, N. Forget, and P. Kambhampati*: Kilohertz generation of high contrast polarization states for visible femtosecond pulses via phase-locked acousto-optic pulse shapers, Journal of Applied Physics 118(10), 103110 (2015).
32. L. Tsikonis*, S. Diethelm, **H. Seiler**, A. Nakajo, J. Van Herle, and D. Favrat: Investigating Reliability on Fuel Cell Model Identification. Part II: An Estimation Method for Stochastic Parameters, Fuel Cells Journal 5 (12), 685 (2012).

## Submitted publications

1. P. Trofimov, S. Jürgensen, A. Dewambrechies Fernández, K. Bolotin, S. Reich and **H. Seiler***: Directed light emission from monolayers on 2D materials via optical interferences. Submitted (2025).

## Patents

1. P. Kambhampati, S. Palato, **H. Seiler**, Method and system for tuning an output optical pulse, US Patent No. 10,527,908 B2 (issued).

## Talks

Gave 21 talks at international conferences (14 invited), 6 posters at international conferences, 17 talks in workshops and university colloquia (13 invited)

## Academic Distinctions

*Awards and Fellowships:*

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|---|---|
| Member of the Lindau Nobel Laureate Meetings Alumni Network | Since 2022 |
| Swiss National Science Foundation (Early Postdoc.Mobilty) | 02.2019-09.2020 |
| Whitehead Award for Excellence in Research, McGill University | 2015 |
| Swiss National Science Foundation (Doc.Mobility) | 01.2015-07.2016 |
| Support of Schweizerische Studienstiftung (Swiss Study Foundation) | 07.2006-07.2016 |

*Third Party Funding (awarded and submitted)*

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|---|---|
| DFG Grossgeräte Antrag (GZ: INST 130/1289-1): Setup for coherent multidimensional electronic spectroscopy (720k EUR) | Since 2023 |
| TRR 227 2nd funding period: Exciton dynamics in 2D Magnets and spintronic heterostructures, Project B11 ("Nachantrag", about 160k EUR) | 01.2024- 12.2025 |

DFG Forschungsgruppe "Optical control of quantum materials" (OPTIMAL), Project P4 (306k EUR) 01.2025-01.2029
Part of proposed CRC 1772 "Heterostructures of molecules & 2D materials", Project A2 submitted

## Teaching

Ultrafast Nanoscience (M.Sc., English) Since 2022
main lecturer (class created from scratch)
Freie Universität Berlin, Physics Department, Germany

Solid State Physics (B.Sc., German) Since 2024
main lecturer in tandem with Prof. Dr. Weinelt
Freie Universität Berlin, Physics Department, Germany

Teaching assistant for advanced spectroscopy laboratories (M.Sc.) 01/2013 - 01/2015
McGill University, Chemistry Department, Canada

Teaching assistant for molecular properties and structure (B.Sc.) 01/2013 - 07/2013
McGill University, Chemistry Department, Canada

Teaching assistant for physical chemistry laboratories (B.Sc.) 09/2014 – 01/2015
McGill University, Chemistry Department, Canada

Teaching assistant in classical mechanics (B.Sc.) 09/2009 – 09/2010
EPFL, Life Sciences and Technologies Department, Switzerland

Teaching assistant for general physics laboratories (B.Sc.) 09/2009 – 09/2010
EPFL, Faculty of Medecine of University of Lausanne, Switzerland

## Activities in the Research System (selected)

- Organized and gave multiple talks at outreach events (e.g. Girls' days, Campustag at FU Berlin, panel discussion at DPG meeting, ...)
- Contributing to "AG young Leaders in Physics" of the DFG, aiming to foster the career of newly independent researchers. Co-organization of "Physics and Pizza", a monthly seminar targeting BSc and MSc physics students.
- I frequently serve as a referee for journals (Nature, Nature Physics, Nano Letters, Physical Review Letters, Advanced materials, Optics Express, Journal of Chemical Physics, Journal of the American Chemical Society, Structural Dynamics ...) and foundations of science from various countries.

## Supervision of early career phase researchers (completed +ongoing)

- 0 + 1 postdoctoral fellow (at FU Berlin)
- 0 + 2 Ph.D. students (at FUB)
- 4 + 2 master's students (1 at FHI and 5 at FUB)