

Personal details

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Education

2008-2015 Ph.D. in Physics with *summa cum laude/ highest distinction*, Max Planck Institute of Quantum Optics and Ludwig-Maximilian-University, Munich, Germany; Chair of Prof. Ferenc Krausz
2005-2007 M.Sc. in Physics, Sharif University of Technology, Teheran, Iran
2001-2005 B.Sc in Physics, University of Zanjan, Zanjan, Iran

Scientific career

2022, Associated Investigator for the Topic "Quantum Optics and Ultrafast Dynamics", Erlangen Graduate School in Advanced Optical Technologies (SAOT), Germany
2020, Principal Investigator, IMPRS Physics of Light, Max Planck Institute for the Science of Light, Erlangen, Germany
2020, Lecturer at Master Program in Advanced Optical Technology, Erlangen, Germany
2020, Independent Group Leader (W2 equivalent position), Max Planck Institute for the Science of Light, Erlangen, Germany
2019-2020 Visiting Scientist, Harvard University, Cambridge, USA; Chair of Prof. Sunney Xie
8.2017-2.2018 Visiting Scientist, Oxford University, Oxford, UK; Chair of Prof. Philipp Kukura
6.2017-7.2017 Konstanz University, Konstanz, Germany; Chair of Prof. Alfred Leitenstorfer
2017-2019 MINERVA Group Leader, Max Planck Institute of Quantum Optics, Munich, Germany
2015-2017 Postdoctoral Scientist, Max Planck Institute of Quantum Optics, Munich, Germany; Chair of Prof. Ferenc Krausz

Research topics

Mid-infrared, overtones, and stimulated Raman fieldoscopy/ Advancing sensitive, field-resolved metrologies/ Development of mid-infrared and near-infrared few-cycle sources/ Development of nonperturbative, non-invasive (sub)-cellular imaging techniques.

Four major research accomplishments

Femtosecond molecular Fieldoscopy

Detecting the electromagnetic field of molecular responses when excited by near-infrared femtosecond pulses for the first time.

Petahertz field-resolved technology

Advancing the frontiers of ambient-air field-resolved technology to petahertz frequencies.

Third-generation femtosecond technology

Advancing the frontiers of high-energy few-cycle pulses towards sub-cycle regime by field synthesis.

Advancing Yb:YAG thin-disk laser technology

towards the higher peak and average power.

Awards and appointments

2023 Nominated for the " The Photonics 100: The industry's most innovative people"
2021, Member of the [Max Planck Quantum Alliance](#), Germany
2020, Fellow of [Max Planck School of Photonics](#), Germany
2020, Max Planck Research Group Leader, Erlangen, Germany

- 2019 Selected as the best lecturer by students in the Siegman International Summer School on lasers, Rochester
- 2018, Selected as a member of the [Elisabeth-Schiemann Kolleg](#), Max Planck Society
- 2017-2019 Minerva fast-track position of Max Planck Society, Munich, Germany
- 2016-2019 Co-coordinator of the International Max Planck Research School of Advanced Photon Science ([IMPRS-APS](#)), Munich, Germany
- 2016, Fellow of [Max Planck Center for Extreme and Quantum Photonics](#), Ottawa, Canada
- 2008-2012 PhD scholarship, International Max Planck Research School of Advanced Photon Science

Supervision activities

Supervised Thesis

- Michael Küblböck, M.Sc, Solar pumped Nd:YAG laser, 2023, FAU
- Kilian Scheffter, M.Sc, Accelerating terahertz field-resolved spectroscopy, 2022, FAU
- Anni Li, M.Sc, Towards single-Cycle Pulse Generation from high power Yb:YAG Oscillator, 2022, FAU
- Soyeon Jun, M.Sc, Characterizing Photodamage in Zebrafish at Multiple Wavelengths and Pulse Durations, 2022, FAU
- Mehran Bahri, M.Sc, Watt-level Sub-100 Femtosecond Pulses at 2 μm , 2022, FAU
- Mohammad Sadegh Vafaienezhad, M.Sc., Single-shot characterization of ultrashort near-infrared pulses using space-time duality, 2021, FAU
- Gaia Barbiero, Ph.D., Efficient nonlinear compression of a high-power Yb: YAG oscillator to the sub-10 fs regime and its applications, 2021, LMU
- Mahdi Mohammadi Bidhendi, M.Sc., Controlling Temporal Jitter in Direct Electric-Filled Sampling, 2021, FAU
- Max Kieker, B.Sc, Temporal characterization of femtosecond near-infrared pulses, 2021, FAU
- Ayman Alismail, Ph.D., Multi-octave, CEP-stable source for high-energy field synthesis, 2020, LMU
- Haochuan Wang, Ph.D., High-Energy and High-Power Multi-Octave Pulse Generation, 2020, LMU
- Naeem Raja Ahmed, M.Sc., Towards Generation of Single-Cycle High Power Laser Pulses, 2019, LMU
- Maximilian Wendl, M.Sc., Towards attosecond, X-ray pulse generation, 2018, LMU
- Theresa Buberl, M.Sc., Direct generation of an Ultra-broadband spectrum from ytterbium-doped thin-disk lasers, 2016, TUM

Current students

PhD: Anchit Srivastava, Andreas Herbst, Soyeon Jun, Kilian Scheffter, Anni Li, Michael Küblböck

M.Sc: Seowon Choi, Elaheh Afshar, Steffen Gommel

B.Sc: Jonathan Will

Former Postdoctoral Researchers and other co-workers

Jonathan Brons, Jonas Meyer, Mohammad Nouredin, Zhenguo Dou

Teaching experience

- Fundamentals of Photonics, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), 2020/2021/2022/2023
- Advanced Nonlinear Optics/Advanced Spectroscopy, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), 2020/2021/2022/2023
- Nonlinear Optics, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), 2022
- Photonics II, tutorial, Ludwig Maximilian University (LMU), 2017/2018
- Photonics I, tutorial, Ludwig Maximilian University (LMU), 2016/2017
- Computational Photonics, Ludwig Maximilian University (LMU), 2015/2016

Professional activities

- 2024 Chair of the technical program committee of IEEE Photonics Conference, Rome
 - 2024 Member of the technical program committee of CLEO, San Jose
 - 2023 Co-chair of the technical program committee of IEEE Photonics Conference, Orlando
 - 2023 Member of the technical program committee of CLEO Europe, Munich
 - 2023 Member of the technical program committee of UFO XIII, Bariloche
 - 2022 Co-chair of the technical program committee of IEEE Photonics Conference, Vancouver
 - 2021 Member of the technical program committee of EOSAM, Rome
 - 2021 Member of the technical program committee of IEEE Photonics Conference, Vancouver
 - 2021 Member of the technical program committee of CLEO Europe, Munich
 - 2020 Member of the technical program committee of IEEE Photonics Conference, Vancouver
 - 2019 Co-organizer of a special symposium, CLEO-Europe: Novel Techniques for molecular sensing
 - 2018 Organizer of the Theodor Maiman seminars at Max Planck Institute of Quantum Optics
 - 2018 Organizer of the PhD carrier day, Ringberg castle in Munich
 - 2017 Member of the technical program committee for UFO XI, Jackson Hole
 - 2016 Co-organizer of a special symposium, CLEO US: Ultrafast Dynamics in Solids, San Jose
 - 2016 Co-organizer of a special workshop, CLEO US: Attosecond Nonlinear Optics, San Jose
 - 2015 Organizer of trilogy workshops: [Future of Ultrashort Pulses](#)
- Founder of the [Green room Book Club](#)
- Co-founder of the podcast series: [LIGHT WAVE](#)

Grants and Projects

- 2023 ERC Consolidator Grant, "Beyond the visible", PI, 2 Mi€ (approved for the waiting list)
- 2021 Horizon European Commission Program, "Twisted Nano", Co-PI, 700 k€
- 2020 Research Grant, Max Planck Society, "Femtosecond Molecular Fieldoscopy", PI, 2 Mi€
- 2016 Research Grant, Max Planck Society, "Attosecond Metrology 2.0", Co-PI, 4 Mi€

Invited talks

- 2024, Aug Optica Advanced Photonics Congress, Quebec City, Canada
- 2024, July Laser Physics Workshop (LPHYS24), Sao Carlos, Brazil
- 2024, March HILAS conference, Vienna, Austria
- 2024, Jan Physics of Quantum Electronics (QPE), Texas, USA
- 2024, Jan Double Feature at SPIE Photonics West, San Francisco, USA
- 2023, Nov UltrafastX, Xian, China
- 2023, Aug Keynote at DocDoc, Jena, Germany
- 2023, July University of Glasgow, Glasgow, Scotland
- 2023, July lecture at SUSSP 79 summer school, St Andrews, Scotland
- 2023, May CLEO, San Jose, USA
- 2023, Jan Colloquium, Ruhr University, Aachen, Germany
- 2022, Sep ICO25 conference, Dresden, Germany
- 2022, June Bothe Colloquium, MPI for Nuclear Physics, Heidelberg, Germany
- 2022, May Colloquium, University of Rochester, Rochester, USA
- 2022, April SPIE meeting, Strasbourg, France
- 2021, Oct Schawlow-Towns Symposium, Ottawa, Canada
- 2020, July Invited lecturer in the Siegman International Summer School on lasers, Virtual
- 2020, June Colloquium, Virtual, Stuttgart, Germany
- 2020, May Photonics North, Virtual

2019, Oct	Max Planck Society section symposium, Berlin, Germany
2019, July	Invited lecturer in the Siegman International Summer School on lasers, Rochester, USA
2019, May	CLEO, San-Jose, USA
2018, Oct	Attosecond Physics at the Nanoscale, Daejeon, Korea
2017, Dec	Imperial College London, London, UK
2017, Oct	UFO XI, Wyoming, USA
2016, Oct	FIO conference, Rochester, USA
2015, May	CLEO, San Jose, USA

Professional affiliations

2016,	Member of the German Physical Society (DPG)
2015-2021	Member of the executive committee of Short Wavelength Sources and Attosecond /High Field Physics Technical Group of the Optical Society of America (Optica)
2015-2017	Young Professional member of the Optical Society of America (Optica)
2009,	Member of the Optical Society of America (Optica)

Patents

H. Fattahi, "Method and apparatus for creating a microscopic sample image of a molecular vibrational response of a sample, " PCT/EP2020/075849 and US Patent App. 18/024,120 (2023).

H. Fattahi, F. Krausz, "Pulse light source device and method for creating cep stable fs laser pulses, " PCT/EP2016/000965, WO2017211374A1.

H. Fattahi, F. Krausz, M. Huber, I. Pupeza, M. Zigman, "Methods and devices for measuring changes in the polarization response of a sample by time-domain infrared spectroscopy, " PCT/EP2017/056705, WO2018171869A1.

Book chapters

2016	H. Fattahi, "High energy and short pulse lasers", ISBN 978-953-51-4758-9
2015	H. Fattahi, "Third-generation femtosecond technology", ISBN 978-3-319-20024-8
2013	R. Tahvildari, H. Fattahi, A. Amjadi, "Cataract Surgery", ISBN 978-953-51-0975-4

Publication list

1. A.Srivastava, A. Herbst, M. M. Bidhendi, M. Kieker, F. Tani, H. Fattahi, "Near-Petahertz Fieldoscopy of Liquid," arXiv preprint arXiv:2310.20512 (2023).
2. S. Jun, A. Herbst, K. Scheffter, N. John, J. Kolb, D. Wehner, H. Fattahi, "Highly Nonlinear Dynamics of Deep Tissue upon in vivo Interaction with Femtosecond Laser Pulses at 1030 nm," arXiv preprint arXiv:2307.11692 (2023).
3. K. Scheffter, J. Will, C. Riek, H. Jusselin, S. Coudreau, N. Forget, H. Fattahi, "Time-domain Compressed Sensing," arXiv preprint arXiv:2307.11692 (2023).
4. A. Herbst, K. Scheffter, M. M. Bidhendi, M. Kieker, A. Srivastava, H. Fattahi, "Recent advances in petahertz electric field sampling," Journal of Physics B, 55, 172001 (2022).
5. G. Barbiero, H. Wang, M. Graßl, S. Gröbmeyer, D. Kimbaras, M. Neuhaus, V. Pervak, T. Nubbemeyer, H. Fattahi, M. F Kling, "Efficient nonlinear compression of a thin-disk oscillator to 8.5 fs at 55 W average power," Optics Letters, 53, 125601 (2021).
6. G. Barbiero, H. Wang, J. Brons, B. Chen, V. Pervak, H. Fattahi, "Broadband terahertz solid-state emitter driven by Yb:YAG thin-disk oscillator," Journal of Physics B, 46 (21), 5304 (2020).
7. Alismail, H. Wang, G. Barbiero, N. Altwaijry, S. Hussain, V. Pervak, W. Schweinberger, A. Azzeer, F. Krausz, H. Fattahi, "Multi-octave, CEP-stable source for high-energy field synthesis," Science Advances 6, eaax 3408 (2020).
8. H. Wang, A. Alismail, G. Barbiero, R. N. Ahmad, H. Fattahi, "High Energy, Sub-Cycle, Field Synthesizers," IEEE Journal of Selected Topics in Quantum Electronics, (2019).

9. Alismail, H. Wang, G. Barbiero, S. A. Hussain, W. Schweinberger, F. Krausz, and H. Fattahi, "Near-infrared molecular fieldoscopy of water," Proceedings Volume 10882, Multiphoton Microscopy in the Biomedical Sciences XIX; 1088231 (2019).
10. M. Wendl, M. Hoegner, H. Fattahi, "Theoretical Study: High Harmonic Generation by Light Transients," Applied Science 8, 728 (2018).
11. H. Fattahi, Z. Fattahi, A. Ghorbani, "Prospects of Third-generation Femtosecond Laser Technology in biological spectromicroscopy," Journal of Optics 20, 5 (2018).
12. Alismail, H. Wang, J. Brons, H. Fattahi, "20 mJ, 1 ps Yb:YAG Thin-disk Regenerative Amplifier," J. Vis. Exp. 125, 55717 (2017).
13. H. Wang, A. Alismail, G. Barbiero, M. Wendl, H. Fattahi, "Cross-polarized, multi-octave supercontinuum generation," Optics Letters 42, 2595 (2017).
14. Alismail, H. Wang, N. Altwaijry, H. Fattahi, "Carrier-envelope phase stable, 5.4 μ J, broadband, mid-infrared pulse generation from a 1-ps, Yb:YAG thin-disk laser," Applied Optics 56, 4990 (2017).
15. G. Vampa, H. Fattahi, J. Vučković, and F. Krausz, "Nonlinear optics: Attosecond nanophotonics," Nature Photonics 11, 210 (2017).
16. T. Nubbemeyer, M. Kaumanns, M. Ueffing, M. Gorjan, A. Alismail, H. Fattahi, J. Brons, O. Pronin, H. G. Barros, Z. Major, T. Metzger, D. Sutter, and F. Krausz, "1 kW, 200 mJ picosecond thin-disk laser system," Optics Letters 42, 1381 (2017).
17. H. Fattahi, H. Wang, A. Alismail, G. Arisholm, V. Pervak, A. Azzeer, and F. Krausz, "Near-PHz-bandwidth, phase-stable continua generated from a Yb:YAG thin-disk amplifier," Optics Express 24, 24337 (2016).
18. H. Fattahi, "Sub-cycle light transients for attosecond, X-ray, four-dimensional imaging," Invited Article, The Contemporary Physics Journal, 57, 1 (2016).
19. T. Amotchkina, H. Fattahi, A. Yuriy, M. Trubetskov, and V. Pervak, "Broadband beamsplitter for high intensity laser applications in the infra-red spectral range," Optics Express 24, 16752 (2016).
20. A. Sommer, E. M. Bothschafter, S. A. Sato, C. Jakubeit, T. Latka, O. Razskazovskaya, H. Fattahi, M. Jobst, W. Schweinberger, V. Shirvanyan, V. S. Yakovlev, R. Kienberger, K. Yabana, N. Karpowicz, M. Schultze, and F. Krausz, "Attosecond nonlinear polarization and energy transfer in dielectrics," Nature 534, 86 (2016).
21. T. Buberl, A. Alismail, H. Wang, N. Karpowicz, and H. Fattahi, "Self-compressed, spectral broadening of Yb:YAG thin-disk amplifier," Optics Express 24, 10286 (2016).
22. H. Fattahi, A. Alismail, H. Wang, J. Brons, O. Pronin, T. Buberl, L. Vámos, G. Arisholm, A. M. Azzeer, and F. Krausz, "High-power, 1-ps, all Yb:YAG thin-disk regenerative amplifier," Optics Letters 41, 1126 (2016).
23. H. Fattahi, A. Schwarz, X. T. Geng, S. Keiber, D. Kim, F. Krausz, and N. Karpowicz, "Decoupling chaotic amplification and nonlinear phase in high-energy thin-disk amplifiers for stable OPCPA pumping," Optics Express 22, 31440 (2014).
24. H. Fattahi, H. Barros, M. Gorjan, T. Nubbemeyer, B. Alsaif, C. Y. Teisset, M. Schultze, S. Prinz, M. Haefner, M. Ueffing, A. Alismail, L. Vámos, A. Schwarz, O. Pronin, J. Brons, X. T. Geng, G. Arisholm, M. Ciappina, V. S. Yakovlev, D. Kim, A. M. Azzeer, N. Karpowicz, D. Sutter, Z. Major, Thomas Metzger, and F. Krausz, "Third-generation femtosecond technology," Optica 1, 45 (2014).
25. H. Fattahi, A. Schwarz, S. Keiber, and N. Karpowicz, "Efficient, octave-spanning difference-frequency generation using few-cycle pulses in simple collinear geometry," Optics Letters 20, 4216 (2013).
26. Y. Deng, A. Schwarz, H. Fattahi, M. Ueffing, X. Gu, M. Ossiander, T. Metzger, V. Pervak, H. Ishizuki, T. Taira, T. Kobayashi, G. Marcus, F. Krausz, R. Kienberger, and N. Karpowicz, "Carrier-envelope-phase-stable, 1.2 mJ, 1.5 cycle laser pulses at 2.1 μ m," Optics Letters 37, 4973 (2012).

27. H. Fattahi, C. Y. Teisset, O. Pronin, A. Sugita, R. Graf, V. Pervak, X. Gu, T. Metzger, Z. Major, F. Krausz, and A. Apolonski, "Pump-seed synchronization for MHz repetition rate, high-power optical parametric chirped pulse amplification," Optics Express 20, 9833 (2012).
28. A. Schwarz, M. Ueffing, Y. Deng, X. Gu, H. Fattahi, T. Metzger, M. Ossiander, F. Krausz, and R. Kienberger, "Active stabilization for optically synchronized optical parametric chirped pulse amplification," Optics Express 20, 5557 (2012).
29. R. Tahvildari, H. Fattahi, and A. Amjadi, "Thermal analysis of different tips for various operating modes of phacoemulsification system," Journal of Biomedical Science and Engineering 03, 727 (2010).