Curriculum Vitae

(Revised August 29th, 2024)

Thibault J.-Y. Derrien

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Date of birth, **status**: 20.11.1984; French citizen; permanent resident in Czech Republic.

Education

"DEUG" University Diploma of Mathematics & Computations applied to Natural Sciences
Paris-Saclay University (2002-2003).

"Licence" & "Maitrise"
Bachelor and Master 1 of Fundamental Physics
Paris-Saclay University (2004-2007).

MSc in Physics
Hot plasma and nuclear fusion sciences,
University Paris-Saclay (2007-2008),
Laboratory of Physics and Technologies of Plasmas of the Ecole Polytechnique & CEA INSTN Cadarache.

Ph.D. in Physics, Chemistry & Nanosciences
Aix-Marseille University, Doctoral School of Material Sciences
Laboratory of Lasers, Plasmas and Photonics Processes (LP3) (2008-2012)

Appointments

Feb. 2021 – present	Head of research group "Ultrafast Photonics", HiLASE Centre, FZU Institute of Physics (Academy of Sciences of the Czech Republic), Prague, Czech Republic.
Oct. 2017 – present	Researcher of Department of Scientific Laser Applications, HiLASE Centre, FZU Institute of Physics (Academy of Sciences of the Czech Republic), Prague, Czech Republic.
Mar. 2018 – Feb. 2019	Post-doctoral fellow (Max Planck Society) of Theory Department (Prof. Angel Rubio), Max Planck institute for Structure and Dynamics of matter (MPSD), Hamburg, Germany.
Feb. 2016 – Feb. 2018	Guest scientist (Marie Sklodowska Curie Actions) in Theory Department (Prof. Angel Rubio) Max Planck institute for Structure and Dynamics of matter (MPSD) Hamburg, Germany.
Oct. 2015 – Sept. 2017	Marie Sklodowska Curie Individual Fellow of the European Union HiLASE Centre, FZU Institute of Physics, Academy of Sciences of the Czech Republic, Prague, Czech Republic.
Jul. 2014 – Sept. 2017	Post-doctoral researcher, HiLASE Centre, FZU Institute of Physics (Academy of Sciences of the Czech Republic), Prague, Czech Republic.

Feb. 2013 – Apr. 2014	Post-doctoral fellow “Adolf Martens”, BAM Federal Institute for Materials Research and Testing, Berlin, Germany.
Feb. 2012 – Dec. 2013	Post-doctoral contract National Research Agency (ANR), Laboratory Hubert Curien, St-Etienne, France.
Oct. 2008 – Feb. 2012	PhD student, Laboratory of Lasers, Plasmas and Photonic Processes (LP3), Marseille, France.

Professional visits and Activities

- Supervision of MSc. Kristyna Gazdova since 2021.
- Supervision of MSc. Filip Preucil, 2018 (2 publications).
- Supervision of PhD student MSc. Krystof. Hlinomaz since 2017 (3 publications).
- Qualified as supervisor by the Czech Technical University (CVUT).
- Qualified as lecturer by the French Council of Universities (2013, 2024).

- Invited guest scientist, 3 weeks, CSIC Instituto de Optica, Madrid, Spain, Sept. 2023.
- Marie Curie Scientific stay, RISE “ATLANTIC”, 1 month, Universidad de Cuyo, Mendoza, Argentina, Nov. 2022.
- Marie Curie Scientific stay, RISE “ATLANTIC”, 1 month, Center for Computational Sciences, University of Tsukuba, Tsukuba, Japan, 2019.
- Block-lecturer in plasmonics (35h + written examination), Master Erasmus Mundus, University of Bochum (Germany).
- Scientific stay at the Joint Institute for High Energy Densities (JIHED), Bilateral programme Hubert Curien “Kolmogorov”, Moscow, Russian Federation, 2 weeks, 2011.

- Collection Advisor in Photonics, Open Research Europe (ORE), since 2021.
- Associate editor for *Optics Express* (Optica – former Optical Society of America), since 2019.

- Member of decision panel for *Nanoscience Foundry and Fine Analysis* (NFAA.eu), since 2024.
- Member of organizational committee, *Laser Precision Microfabrication* (LPM) conference, 2023.
- Secretary of IT4Innovation Users’ council, since 2021.
- Expert referee for American Chemical Society (1 project reviewed)
- Expert referee for National Research, Development and Innovation Office of Hungary (1 project reviewed)
- Expert referee for a tenure at Lahore University, Pakistan.
- Expert referee of IT4Innovation OPEN calls, since 2016.
- Member of organizational committee *Advanced Laser Technologies* 2019.
- Member of international scientific committee (*LIPSS workshop*) 2014 – 2024.
- Member of organizational committee LIPSS workshop, 2015.
- Member of organizational committee LIPSS workshop, 2014.
- Member of European Physical Society (EPS).
- Member of French Physical Society.

- Teacher at “Optica Writing Masterclass”, Charles University of Prague (Czech Republic) Dec. 2022, University of Wrocław (Poland) Jul. 2024.

- Mentor of 1 PhD student of Marie Curie Alumni Association (MCAA), Marie Curie ITN program.

- Reviewer for scientific journals: Scientific Reports, Physical Review (Letters, A, B, E, X, Research), Physical Chemistry and Chemical Physics, Physica Scripta, Optica, Optics Express, Journal of Applied Physics, Applied Physics A, New Journal of Physics. Non-exhaustive list is available at https://www.webofscience.com/wos/author/record/775200.

Research interests

Light-matter interaction, ultrafast phenomena, polaritonics, photonics, numerical modeling, high performance computing, quantum computing, density functional theory, density functional tight binding.

Awards and Fellowships

Feb. 2013 – Jan. 2014 "Adolf Martens Fellowship", Ministry of Economy and Technology, Germany, 1 year funding.

Oct. 2015 – Sept. 2017 Marie Sklodowska-Curie Actions, Individual Fellowship, 142,000 EUR. Supervision: Prof. N. M. Bulgakova. 2 years funding.

Mar. 2019 – Feb. 2024 Marie Sklodowska-Curie Actions, Research and Innovation Staff Exchange (RISE), "Advanced theoretical network for modeling light matter interactIon." (ATLANTIC), 220,000 EUR for FZU Institute of Physics (Academy of Sciences of the Czech Republic).

- Award of the best proposal submitted to the European Research Council, Academy of Sciences of the Czech Republic, November 2022, 50,000 CZK.
- "Top1% most cited publication in the academic field of physics" (2019), Web of Science.
- "Top1% peer reviewer in Physics" (2016), Publons.org.
- Roger Kelly Award in the Best Student Presentation competition in the Rising Star category, Venice International School on Lasers in Materials Sciences (SLIMS), Venice, Italy, 2016.
- Outstanding paper award, Conference of Laser Processing of Materials (LPM 2014, Vilnius).
- Second best poster award, Spring Meeting of European Materials Research Society (EMRS 2011), Symposium J.
- Featured publication, Nano Research **13**, 2332 (2020), IF 8.90.
- Featured publication, MRS Bulletin **41**, 960 (2016), IF. 6.06.
- Featured publication, J. Appl. Phys. **116**, 074902 (2014).

Invited, keynote talks and lectures

1. "Benchmark of Octopus code on a variety of European supercomputers",
IT4Innovation Users Meeting
Ostrava, Czech Republic
October 30th, 2023

2. "Excitation of band-gap materials from first principles: studying the role of laser polarization using real-space and real-time time-dependent density functional theory (TDDFT)"
IT4Innovation Users Meeting
Ostrava, Czech Republic
November 3rd, 2022

3. "Ultrafast excitation of electrons in crystals: insights from non-equilibrium band structure calculations"
CECAM Workshop "Light-matter interaction and ultrafast nonequilibrium dynamics in plasmonic materials"
University of Warwick
United Kingdom
July 2022

4. "Ultrafast excitation of electrons in crystals: insights from non-equilibrium band structure calculations"
FemtoMat
Workshop of Erwin Schrödinger Society
3Mauterndorf, Austria
March 14th, 2022

5. "Ultrafast excitation of electrons in crystals: insights from non-equilibrium band structure calculations"
Ultrafast Light (conference of the Lebedev Institute of Moscow, Russian Federation)
October 4th, 2021

6. "Assessment of the time-dependent density functional theory for investigating femtosecond laser energy absorption by several metals"
Advanced Laser Technologies (ALT21, conference of the Prokhorov Institute of Moscow, Russian Federation)
September 2021

7. "Nonlinear excitation of solids and transient band gap dynamics upon femtosecond laser irradiation of secmiconductors"
Ultrafast Light Moscow, 2020

8. "Assessment of the time-dependent density functional theory for investigating femtosecond laser energy absorption by several metals"
Ultrafast Light Moscow, 2020

9. "Nonlinear excitation of solids and transient band gap dynamics upon femtosecond laser irradiation of semiconductors"
ALT19 (Advanced Laser Technologies), Prague (Czech Republic)
September 15th, 2019

10. "Predicting laser surface nanostructuring using dispersion laws in the complex plane."
Workshop on nonlinear response in laser-matter interaction.
Kansai Photon Institute, Nara (Japan)
July 8th, 2019

11. "Surface Plasmon Polaritons: their properties for different metals and the constitutive role in ultrafast laser processing"
Ultrafast Optics conference. Lebedev Institute, Moscow (Russian Federation)
October 2017

12. "Multi-wavelength, multi-material prediction tools for the LIPSS community"
6th international LIPSS workshop, Heraklion, Crete (Greece)
November 2016

13. "Transient electron-hole dynamics at the surface of silicon upon femtosecond laser irradiation in modification regime"
Progress in Electromagnetic Research Symposium (PIERS) 2016, Shanghai (China)
August 2016

14. “Role of the electron-hole pair dynamics in modification of silicon upon femtosecond laser irradiation”,
European Materials Research Society (EMRS) Spring Meeting 2016, Lille (France).
5th May 2016,

15. "Lifetime, period and excitation conditions of Surface Plasmon Polaritons in absorbing materials",
5th international LIPSS workshop,
November 2015, St-Etienne (France)

16. “Investigation of Instabilities in Femtosecond Laser Irradiated Semiconductors Using Numerical Modeling and Dispersion Relations”,
Progress in Electromagnetic Research Symposium (PIERS 2015),
8th July 2015, Praha Chodov, Czech Republic

List of Publications by T. J.-Y. Derrien

(28+ publications and 3 chapters in English in area of laser micro- and nanotechnologies, and laser–matter interaction; cited works according to Web of Science on August 28th 2024 are marked by asterisk with the number of citations and 5-year impact factor; H-index 14)

Patents

1. I. Gnilitskyi, L. Orazi, **T. J.-Y. Derrien**, N. M. Bulgakova, T. Mocek, Method of ultrafast laser writing of highly-regular periodic structures on metallic materials, Industrial Property Office of Czech Republic, No. CZ000424 (2016). Application date: 11th July 2016. Granted.
2. I. Gnilitskyi, L. Orazi, **T. J.-Y. Derrien**, N. M. Bulgakova, T. Mocek, Method of ultrafast laser writing of highly-regular periodic structures on metallic materials, No. WO18010707 / EP 3481583. Application date: 11th July 2017. Granted in 2021.

Book chapters

1. A. I. Bertoni, **T. J.-Y. Derrien**, C. G. Sanchez, “Density Functional Based Tight Binding”, in *Density Functional Theory: Fundamental Theory, Key methods, and Applications* (Ed. A. Kuznetsov), Elsevier (2024).
2. **T. J.-Y. Derrien**, Y. Levy, N. M. Bulgakova, "Insights into laser-matter interaction from inside: wealth of processes, multiplicity of mechanisms and possible roadmaps for energy localization", Chapter 1 in *Ultrafast Laser Nanostructuring: The Pursuit of Extreme Scales*, Springer Series in Optical Sciences 229, Eds. J. Bonse and R. Stoian (2023), https://link.springer.com/book/9783031147517.
3. M. Shugaev, M. He, S. A. Lizunov, Y. Levy, **T. J.-Y. Derrien**, V. P. Zhukov, N. M. Bulgakova, L. Zhigilei, "Insights into laser-materials interaction through modeling on atomic and macroscopic scales", Chapter 5 in *Advances in the Application of Lasers in Materials Science*, Ed. P.M. Ossi. Springer (2018), 274, 107-148.

Journal articles

1. A. Gindl, P. Suthar, F. Trojánek, P. Maly, **T. J.-Y. Derrien**, M. Kozak, Attosecond control of solid-state high harmonic gneration using ω-3ω fields, *submitted to Nat. Photonics*.
2. P. Suthar, F. Trojánek, P. Malý, **T. J.-Y. Derrien**, M. Kozak, Momentum-dependent intraband high harmonic generation in a photodoped indirect semiconductor, *Commun. Phys.* **7**, 104 (2024) (IF 5.5).
3. M. Zukerstein, V. P. Zhukov, **T. J.-Y. Derrien**, N. M. Bulgakova, *Opt. Express* **32**, 12882 (2024) (IF 3.8).
4. *J. Sladek, K. Hlinomaz, I. Mirza, Y. Levy, **T. J.-Y. Derrien**, N. Cimrman, S. S. Nagisetty, J. Cermak, T. H. Stuchlikova, J. Stuchlik, N. M. Bulgakova, Highly regular LIPSS on thin molybdenum films: optimization and generic criteria, *Materials* (MDPI) **16**, 2883 (2023) (4 citations, IF 3.8).
5. *P. Suthar, F. Trojánek, P. Malý, **T. J.-Y. Derrien** and M. Kozák, Role of Van Hove singularities and effective mass anisotropy in polarization-resolved high harmonic spectroscopy of silicon, Commun. Phys. **5**, 288 (2022) (6 citations, IF 6.1).
6. *J. Sladek, Y. Levy, **T. J.-Y. Derrien**, Z. Bryknar, N. M. Bulgakova, Silicon surface patterning by regular stripes of laser-induced periodic surface structures, *Appl. Surf. Sci.* **605**, 154664 (2022) (11 citations, IF 6.2).
7. *K. Hlinomaz, Y. Levy, **T. J.-Y. Derrien**, N. M. Bulgakova, Modeling thermal response of Mo thin films upon single femtosecond laser irradiation: dynamics of film melting and substrate softening, *Int. J. Heat Mass Trans.* **196**, 123292 (2022) (4 citations, IF 5.2).
8. ***T. J.-Y. Derrien**, N. Tancogne-Dejean, V. P. Zhukov, H. Appel, A. Rubio, N. M. Bulgakova, Photoionization and transient Wannier-Stark ladder in silicon: first-principle simulation versus Keldysh theory, *Phys. Rev. B* **104**, L241201 (2021). (7 citations, IF. 3.6)
9. *K. A. Drogowska-Horna, I. Mirza, A. Rodriguez, P. Kovaricek, J. Sladek, **T. J.-Y. Derrien**, M. Gedvilas, G. Raciukaitis, O. Frank, N. M. Bulgakova, M. Kalbac. Periodic surface functional group density on graphene via laser-induced substrate patterning at Si/SiO2 surface, *Nano Res.* **13**, 2332 (2020) (14 citations, IF 9.2)
10. *A. V. Dostovalov, **T. J.-Y. Derrien**, V. P. Korolkov, S. A. Babin, & N. M. Bulgakova, LIPSS on thin metallic films: New insights from multiplicity of laser-excited electromagnetic modes and efficiency of metal oxidation, *Appl. Surf. Sci.* **491**, 650 (2019) (42 citations, IF 6.2).

11. *K. Hlinomaz, Y. Levy, **T. J.-Y. Derrien**, N. M. Bulgakova, Modeling the melting threshold of Mo films upon ultrashort laser irradiation, *MM Science* (Czech editor) Vol. 2019, pp; 3585-3593 (2019) (2 citations, IF 0.7).
12. *S. Gräf, C. Kunz, S. Engel, **T. J.-Y. Derrien**, F. A. Müller, Femtosecond laser-induced periodic surface structures on fused silica: the impact of the initial substrate temperature, *Materials* **11**, 8 (2018) (35 citations, IF 3.8).
13. *I. Gnilitskyi, **T. J.-Y. Derrien**, Y. Levy, N. M. Bulgakova, T. Mocek, L. Orazi, High-speed manufacturing of highly regular laser-induced periodic surface structures on metals: physical origin of the regularity, *Sci. Rep.* **7**, 8485 (2017) (255 citations, IF 4.9, "Highly cited Top1% in the field of physics", WOS).
14. *S. Maragkaki, **T. J.-Y. Derrien**, Y. Levy, N. M. Bulgakova, A. Ostendorf, E. L. Gurevich, Wavelength dependence of picosecond laser-induced periodic surface structures on copper, *Appl. Surf. Sci.* 417, 88-92 (2017) (26 citations, IF 6.2)
15. ***T. J.-Y. Derrien**, N. M. Bulgakova, Modeling of silicon in femtosecond laser-induced modification regimes: accounting for ambipolar diffusion, *Proc. SPIE* **10228**, 102280E (2017) (5 citations).
16. *M. V. Shugaev, C. Wu, O. Ambruster, A. Naghilou, N. Brouwer, D.S. Ivanov, **T. J.-Y. Derrien**, N. M. Bulgakova, W. Kautek, B. Rethfeld, L.V. Zhigilei, Fundamentals of ultrafast laser-material interaction, *MRS Bull.* **41**, 960-968 (2016), featured article. (176 citations, IF 5.3).
17. ***T. J.-Y. Derrien**, J. Krüger, J. Bonse, Properties of Surface Plasmon Polaritons on lossy materials: Lifetimes, periods and excitation conditions, *J. Opt.* **18**, 115007 (2016) (53 citations, IF 2.2).
18. *Y. Levy, **T. J.-Y. Derrien**, N. M. Bulgakova, E. L. Gurevich, T. Mocek, Relaxation dynamics of femtosecond-laser-induced temperature modulation on the surfaces of metals and semiconductors, *Appl. Surf. Sci.* **374**, 157-164 (2016). (69 citations, IF 6.2).
19. *N. M. Bulgakova, V. P. Zhukov, A. R. Collins, D. Rostohar, **T. J.-Y. Derrien**, T. Mocek, How to optimize ultrashort pulse laser interaction with glass surfaces in cutting regimes? *Appl. Surf. Sci.* **336**, 364-374 (2015) (31 citations, IF 6.2).
20. ***T. J.-Y. Derrien**, R. Koter, J. Krüger, S. Höhm, A. Rosenfeld, J. Bonse, Plasmonic formation mechanism of periodic 100-nm-structures upon femtosecond laser irradiation of silicon in water, *J. Appl. Phys.* **116**, 074902 (2014), featured article (108 citations, IF 2.8).
21. ***T. J.-Y. Derrien**, J. Krüger, T.E. Itina, S. Höhm, A. Rosenfeld, J. Bonse, Rippled area formed by surface plasmon polaritons upon femtosecond laser double-pulse irradiation of silicon: the role of carrier generation and relaxation processes, *Appl. Phys. A* **117**, 77 (2014) (70 citations, IF 2.5).
22. ***T. J.-Y. Derrien**, J. Krüger, T.E. Itina, S. Höhm, A. Rosenfeld, J. Bonse, Rippled area formed by surface plasmon polaritons upon femtosecond laser double-pulse irradiation of silicon, *Opt. Express* **21**, 29643 (2013) (86 citations, IF 3.8).
23. *T. J.-Y. Derrien, T. E. Itina, R. Torres, T. Sarnet, M. Sentis, Possible surface plasmon polariton excitation under femtosecond laser irradiation of silicon, *J. Appl. Phys.* **114**, 083104 (2013) (133 citations, IF 2.8).
24. *X. Sedao, **T. J.-Y. Derrien**, G.R.B.E. Romer, B. Pathiraj, A.J Huis in‘t Veld, Large area laser surface micro/nanopatterning by contact microsphere lens arrays, *Appl. Phys. A* **111**, 701-709 (2013) (10 citations, IF 2.5).
25. ***T. J.-Y. Derrien**, R. Torres, T. Sarnet, M. Sentis, T.E. Itina, Formation of femtosecond laser induced surface structures on silicon: insights from numerical modeling and single pulse experiments, *Appl. Surf. Sci.* **258**, 9487-9490 (2012) (43 citations, IF 6.2).
26. *X. Sedao, **T. J.-Y. Derrien**, Gert-Willem RBE Romer, Belavendram Pathiraj, A.J Huis in‘t Veld, Laser surface micro-/nano-structuring by a simple transportable micro-sphere lens array, *J. Appl. Phys.* **112**, 103111 (2012) (13 citations, IF 3.2).
27. *A.V. Kabashin, T. Sarnet, D. Grojo, Ph. Delaporte, L. Charmasson, P. Blandin, R. Torres, **T. J-Y. Derrien**, M. Sentis, Laser-ablative nanostructuring of Surfaces, *Int. J. Nanotechnol.* **9**, 230-245 (2011) (8 citations, IF 0.5).
28. ***T. J.-Y. Derrien**, T. Sarnet, M. Sentis, T. E. Itina, Application of a two-temperature model for the investigation of the periodic structure formation on Si surface in femtosecond laser interaction, *J. Optoelectron. Adv. Mater.* **12**, 610-615 (2010) (27 citations, IF 0.4).