



## Curriculum Vitae Nadezhda M. Bulgakova

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**Date of birth, material status:** 26.02.1956; married; two daughters; Russian citizen; permanent residence in Czech Republic

### Education:

MSc in Physics - Novosibirsk State University, Physics Department, Russia (1978)  
Ph.D. in Physics and Mathematics - Inst. of Thermophysics SB RAS, Novosibirsk, Russia (1985)  
PhD Thesis “Interaction of molecular gases with upper atmosphere during ejection”  
Dr.Sci. in Physics and Mathematics (habilitation) – Inst. of Thermophysics SB RAS, Novosibirsk, Russia (2002)  
Dr.Sci. Thesis “Mechanisms and dynamics of laser ablation with micro-, nano-, and femtosecond pulse durations”

### Appointments:

July 2020 – present Head of Department “Scientific Laser Applications”, HiLASE Centre, Institute of Physics CAS, Dolní Břežany, Czech Republic  
Jan. 2016 – June 2020 Research Program Leader, HiLASE Centre, Institute of Physics ASCR, Dolní Břežany, Czech Republic  
Jan. 2014 – Dec. 2015 Senior Researcher, Head of Theoretical Group of RP3, HiLASE Centre, Institute of Physics ASCR, Dolní Břežany, Czech Republic  
1984 – Dec. 2015 Chief Research Scientist (Research Professor since 2008), Leading Researcher, Head of Theory of Laser Ablation Group (since 1997), Senior Researcher, Researcher, Institute of Thermophysics SB RAS, Novosibirsk, Russia  
2011 - 2013 Visiting Professor (Marie Curie Fellowship of FP7 EC), Optoelectronic Research Centre, University of Southampton, UK  
1980 - 1984 PhD student, Institute of Thermophysics SB RAS, Novosibirsk, Russia  
1978 - 1980 Research Assistant, Laboratory of Rarefied Gases, Institute of Thermophysics SB RAS, Novosibirsk, Russia.

### Professional Visits and Activities:

- Expert and Vice-Chair of the European Commission (FP6, FP7, Horizon 2020, Horizon Europe), 2005 – present
- Member of subcommittee of CLEO, Section: S&I 1: Light-Matter Interactions and Materials Processing, San Jose, CA, USA, 2019, 2020, 2023 and 2024
- Member of Program Committee of 17th International Conference on Laser Ablation (COLA 2024), Hersonissos, Crete, Greece, September 29 – October 4, 2024
- Member of Program Committee of CLEO Europe 2023 and 2024, Munich, Germany, June 2023 and 2024
- Co-Chair of 16th International Conference on Laser Ablation (COLA 2021/2022), Kunibiki Messe in Matsue, Japan, April 24 – 29, 2022
- Member of Program Committee of the International Conference on High Power Laser Ablation (HPLA 2021 and HPLA 2024), Santa Fe, USA
- Organizing Committee Co-Chair of the Conference on Advanced Laser Technologies ALT-2019, Prague, Czech Republic, September 15-20, 2019
- Co-Organizer of International Conference on Ultrafast Optical Science, 2017, 2018, 2019, 2020, 2021, Moscow, Russia
- Member of the International Advisory Committee of the International Conference on Photo-Excited Processes and Applications (ICPEPA) in 2016 (Brasov, Romania) and 2018 (Vilnius, Lithuania)
- Member of the International Program Committee of International Conferences on Advanced Laser Technologies (ALT), 2018, 2021
- Co-Organizer of Progress in Electromagnetics Research Symposium – PIERS 2015, Focus Session SC3: Numerical Modeling of Ultrashort Laser Pulse Propagation in Transparent Materials: Micro/nanomodification, July 2015, Prague, Czech Republic

- Co-Organizer of European Congress and Exhibition on Advanced Materials and Processes, EUROMAT 2015, Symposium C3.1: Light-Induced Micro-Nano Surface Modification, September 20-24, 2015, Warsaw, Poland
- Co-Director of the 12<sup>th</sup> IUVSTA School on Lasers in Materials Science – SLIMS, July 2014, Venice, Italy
- Lecturer of the Biannual IUVSTA School on Lasers in Materials Science – SLIMS, 2008-2018, Venice, Italy
- Co-Organizer of Symposium J "Laser Interaction with Advanced Materials: Fundamentals and Applications" in the frames of the E-MRS 2014 Spring Meeting, May 26-30, 2014, Lille, France
- Regular visits as a guest scientist to Max-Born-Institute, Berlin, Germany, 2001 – 2010
- Member of the Organizing Committee of ICONO/LAT 2010, Kazan, Russia, August 2010
- Invited Professor in Universite Jean Monnet, Saint Etienne, France, 2007 – 2008
- Guest scientist in Gothenburg University, Atomic Physics Group, Gothenburg, Sweden, 2000, 2007
- Guest scientist in Université de la Méditerranée, Marseille, France, 2002, 2006
- Member of the Program Committee of the Conference “Laser Applications in Microelectronic and Optoelectronic Manufacturing IX” in the frames of Photonic West, San-Jose, CA, January 2006
- Member of the Organizing Committee of the 10th International Conference “Desorption 2004”, Saint-Petersburg, Russia, September 2004
- Organizer of the EUROMECH Colloquium 363 “Mechanics of Laser Ablation”, Novosibirsk, Russia, June 1997
- Member of the Optical Society of America
- Member of Erwin Schrödinger Society
- Member of European Society Photonics21
- Reviewer for scientific journals: Nature Materials, Nature Communications, Nature: Light&Applications, Physical Review (Letters, A, B, and E), Scientific Reports, Journal of Applied Physics, Applied Physics Letters, Optics Express, Journal of Physics D, New Journal of Physics, several Elsevier journals (Outstanding Reviewer 2015 Award), and others.

#### **Research Interests:**

Dynamics of plasma plumes during pulsed laser ablation of solids; processes in solid targets absorbing laser radiation; photonics, nanotechnology, critical phenomena at pulsed laser ablation; cluster formation in free gaseous jets and laser-ablation plumes; gas discharges; plasma-chemical reactions; fluid dynamics.

#### **Awards and Fellowships:**

- Order LABORE ET SCIENTIA by European Scientific and Industrial Consortium "ESIC" for outstanding scientific achievements (2017)
- Honorary Worker of Science and Education of the Russian Federation (2017)
- Medal of Vernadsky of the Russian Academy of Natural History for exceptional contributions to science (2017)
- Elected Corresponding Member of the Russian Academy of Natural History (2017)
- Honorary Professor of the Russian Academy of Natural History (2017)
- Elsevier Outstanding Reviewer Award (2015)
- Elected Member of the Russian National Committee on Theoretical and Applied Mechanics of the Russian Academy of Sciences (2015)
- Diplomatic Mission ID issued by the European Scientific-Industrial Chamber (2013-2025)
- Diploma Di Merito of the European Scientific-Industrial Chamber for exceptional scientific achievements (2012)
- Golden Medal of the European Scientific-Industrial Chamber for exceptional scientific achievements (2012)
- Marie Curie Fellowship of the European Commission for Experienced Researchers (2011-2013)
- Medal for Contribution to Science in Siberia (2009)
- Fellowship of the Swedish Royal Society (2007)
- Fellowship of the Ministry of Education of France (2002)

#### **Invited, Plenary, Keynote talks and Tutorial Lectures:**

1. “State of art of experiments versus theory in the interaction of high-intensity laser radiation with matter: novel aspects and new possibilities”, 2<sup>nd</sup> International Conference on Laser, Plasma and Radiation - Science and Technology (ICLPR-ST), June 16-21, 2024, Danube Delta, Romania (**Plenary**)
2. “Laser-Assisted Synthesis and Manipulation of 2D Materials”, 4th International Workshop on Frontiers in Lasers and Applications (FLA-4), July 7-11, 2024, Ishigaki, Okinawa, Japan (**Keynote**)
3. “Modeling of laser-matter interaction: Linking theory and experiment”, 8<sup>th</sup> International School “Lasers in Material Science”, July 14-20, 2024, Venice, Italy (**Tutorial lecture**)

4. “Volumetric glass modification with Gaussian and doughnut-shaped pulses: From localized laser energy absorption to absorption delocalization”, International SPIE Symposium on High Power Laser Ablation VIII (HPLA-2024), February 26 - March 1, 2024, Santa Fe, New Mexico, USA
5. “Laser processing of bandgap materials in dual wavelength irradiation regimes: mechanisms and opportunities for efficient energy coupling”, 12th International Conference on Photo-Excited Processes and Applications (ICPEPA- 12), September 18-22, 2023, Suzhou, China
6. “Ultrafast laser interaction with silicon: Critical assessment of excited processes through comparison of simulations with experiment”, LiM Conference 2023: Lasers in Manufacturing, June 26 - 29, 2023, Munich, Germany.
7. “Selective ultrashort laser annealing of amorphous Ge/Si multilayer stacks”, the 5th Erwin Schrödinger Symposium 2023, March 13-15, Mauterndorf, Austria
8. “Dual Wavelength Laser Processing of Bandgap Materials: Challenges and Opportunities for Efficient Energy Coupling”, the International Summit on Lasers, Optics, and Photonics, April 24-26, 2023, Valencia, Spain (**Keynote**)
9. “Non-thermal regimes of laser annealing of semiconductor nanostructures: crystallization without melting”, 3rd International Workshop on Frontiers in Lasers and Applications (FLA-2), December 5 – 9, 2022, Nassau, The Bahamas (**Keynote**)
10. “Can spatially and temporally shaped laser pulses be advantageous for laser propulsion?” 2<sup>nd</sup> International Forum on Physics and Astronomy, November 14-16, 2022, Valencia, Spain
11. “Physical and computational aspects of continuum modeling of laser-matter interaction in short and ultrashort pulse regimes”, 7<sup>th</sup> International School “Lasers in Material Science”, July 3-9, 2022, Venice, Italy (**Tutorial lecture**)
12. “Ultrafast laser interaction with silicon: Critical assessment of excited processes via comparison of modeling with experiment”, 2022 Spring Meeting of the European Materials Research Society (E-MRS), Virtual Conference, May 30 to June 3, 2022.
13. “Modeling of ultrafast laser interaction with silicon: Critical assessment of excited processes through comparison of simulations with experiment”, 9th European Conference on Applications of Femtosecond Lasers in Materials Science, FemtoMat-2022, March 14-16, 2022, Mauterndorf, Austria
14. “Effects of spatiotemporal coupling in ultrashort laser pulses upon volumetric modification of transparent dielectrics”, 26th International Conference on Advanced Laser Technologies (ALT-2021), September 9-14, 2021, Moscow, Russia
15. “Ultrafast processes at laser material processing: Toward more knowledge and better control”, VIII International School and Conference on Photonics (PHOTONICA 2021), August 23 - 27, 2021, Belgrade, Serbia (**Plenary**)
16. Laser annealing of semiconductor layered structures: Mechanisms and opportunities, 4th International Conference on Optics, Photonics and Lasers (OPAL' 2021), 13-15 October 2021, Corfu, Holiday Palace, Greece
17. “Enhanced Laser Energy Coupling to Different Materials: Toward Understanding and Realization of New Irradiation Regimes”, 2nd International Workshop on Frontiers in Lasers and Applications (FLA-2) (online event), July 2021 (**Keynote**)
18. “On the perspectives of dual wavelength laser processing of bandgap materials”, International Conference on Ultrafast Optical Science (UltrafastLight-2019), September 28-October 02, 2020, Moscow, Russia
19. “Critical assessment of ultrafast laser-induced processes in transparent dielectrics: New results and challenges”, International Conference on Ultrafast Optical Science (UltrafastLight-2019), September 30-October 04, 2019, Moscow, Russia
20. “Optical response of metals to ultrashort laser pulses: A puzzle for standard optical models”, 27th International Conference on Advanced Laser Technologies (ALT'19), September 15-20, 2019, Prague, Czech Republic
21. “Femtosecond laser-induced dynamics of the processes in transparent solids”, APPOLO Summer School on Ultra-short Pulse Lasers Applications in Material Processing, July 7-12, 2019, Vilnius, Lithuania (**Tutorial lecture**)
22. “How spatiotemporal coupling in ultrashort laser beams can induce 3D writing anisotropy: insight from inside”, International Symposium “Fundamentals of Laser-Assisted Micro- and Nanotechnologies” (FLAMN-19), June 30 – July 4, 2019, Saint-Petersburg, Russia
23. “Laser-matter interaction in novel regimes of material processing: Toward more knowledge and better control”, 8th European Conference on Applications of Femtosecond Lasers in Materials Science, FemtoMat-2019, March 18-22, 2019, Mauterndorf, Austria
24. “Laser-matter interaction in the regimes of material processing: Toward more knowledge and better control”, European Conference on Laser-Interaction with Matter ECLIM-2018, October 22-26, 2018, Rethymno, Crete, Greece
25. “Progress in understanding of plasmas in solids upon ultrashort laser action on transparent materials”, XI International Conference on Surfaces, Materials, and Vacuum, September 24-28, 2018, Playa del Carmen, Quintana Roo, Mexico (**Plenary**)

26. “Plasma effects in short- and ultrashort-pulse laser processing of materials and in film deposition, XI International Conference on Surfaces, Materials, and Vacuum, September 24-28, 2018, Playa del Carmen, Quintana Roo, Mexico (**Tutorial lecture**)
27. “Effects of spatiotemporal coupling in ultrashort laser pulses upon volumetric modification of transparent dielectrics”, 26th International Conference on Advanced Laser Technologies (ALT-2018), September 9-14, 2018, Tarragona, Spain
28. “Topical problems of thermophysics in laser material science”, 34th Siberian Thermophysical Seminar, August 27-30, 2018, Novosibirsk, Russia (**Plenary**)
29. “Physical and computational aspects of continuum modeling of laser-matter interaction in short and ultrashort pulse regimes”, 6<sup>th</sup> International School “Lasers in Material Science”, July 8-14, 2018, Venice, Italy (**Tutorial lecture**)
30. “Sequential processes of volumetric restructuring of transparent materials by ultrashort laser pulses: Critical assessment through modeling and challenges”, 19<sup>th</sup> International Symposium on Laser Precision Microfabrication LPM-2018, June 25-28, 2018, Edinburgh, Scotland, UK
31. “Impacts of spatio-temporal coupling in ultrashort laser pulses on laser energy absorption by transparent dielectrics in bulk modification regimes”, CLEO, May 12-17, 2018, San Jose, CA, USA
32. “Implications of thermal and mechanical coupling for laser nano- and micromachining of semiconductors and insulators”, International Symposium on High Power Laser Ablation (HPLA-2018), March 26-29, 2018, Santa Fe, New Mexico, USA
33. “Correlation between optical response and thermodynamic properties of free electron gas in metals upon ultrafast laser irradiation: comparing modeling results with experiment”, International Conference on Ultrafast Optical Science, October 03-05, 2017, Moscow, Russia
34. “Role of laser-induced thermal stresses in material modification: Comparative analysis for lasers of different pulse duration”, 25th International Conference on Advanced Laser Technologies (ALT-2017), September 10-15, 2017, Busan, South Korea
35. “Femtosecond laser induced dynamics of the processes in transparent solids: Insights from Maxwell’s-based model”, Advanced Electromagnetics Symposium AES 2017, July 26-28, Incheon – Seoul, South Korea
36. “Spatio-temporal modeling of femtosecond laser effects in transparent dielectrics based on solving Maxwell’s equations”, VI International Symposium “Topical Problems of Biophotonics”, 28 July – 3 August, 2017, St.-Petersburg – Nizhny Novgorod, Russia
37. “Some thoughts on present and future opportunities in the field of using lasers in material science”, 13th Erwin Schrödinger Colloquium, June 9, 2017, Vienna, Austria
38. “Strength of laser-energy coupling to transparent dielectrics from ultrashort pulses with spatiotemporal features: Understanding and prediction through numerical modeling”, 7<sup>th</sup> European Conference on Applications of Femtosecond Lasers in Material Science, March 20 - 23, 2017, Mauterndorf, Austria
39. “Non-linear effects upon propagation of focused ultrashort laser beams in transparent inorganic solids”, III International Symposium “Advances in Nonlinear Photonic”, September 29 - 30, 2016, Minsk, Belorussia
40. “Ultrafast laser light absorption in dielectrics: Focusing into the bulk versus surface irradiation”, 10th International Conference on Photoexcited Processes and Applications, August 29 - September 2, 2016, Brasov, Romania
41. “Models of pulsed laser ablation based on continuum methods: How to compare modeling results with experiment?”, 13<sup>th</sup> IUUVISTA School “Lasers in Material Science”, July 10-18, 2016, Venice, Italy, (**Tutorial lecture**)
42. “Cold ablation regimes under ultrafast laser irradiation of dielectric materials”, International Conference on High Power Laser Ablation (HPLA 2016), April 3-7, 2016, Santa Fe, USA
43. “Ultrashort-pulse laser processing of transparent materials: insight from numerical and semi-analytical models”, Photonics West 2016, Conference 9735 “Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XXI”, February 13–19, 2016, San Francisco, CA, USA
44. “Numerical modelling of laser interaction with transparent materials: From description to prediction”, 13th International Conference on Laser Ablation – COLA 2015, August 31 – September 4, 2015, Cairns, Australia
45. “Models of ultrashort laser modification of bulk transparent materials: Synergy of excitation/relaxation kinetics, thermodynamics and mechanics”, International Conference on Advanced Laser Technologies (ALT-2015), Sep. 7-11, 2015, Faro, Portugal
46. “Short and Ultrashort Pulse Laser Processing of Materials: From Fundamentals to Industrial Applications”, ELI Beamlines and HiLASE Summer School 2015 (ELISS 2015), August 23, 2015, Prague, Czech Republic
47. “Pulsed laser modification of transparent dielectrics: Dynamics of energy absorption and post-excitation evolution”, Progress in Electromagnetics Research Symposium – PIERS 2015, July 6-9, 2015, Prague, Czech Republic
48. “Interaction of femtosecond doughnut-shaped laser pulses with glasses”, Progress in Electromagnetics Research Symposium – PIERS 2015, July 6-9, 2015, Prague, Czech Republic
49. “Powerful light for life”, Annual Meeting of German Society of Applied Optics (DgaO), 26-29 May, 2015, Brno, Czech Republic

50. "Modeling of modification of dielectric materials with ultrashort laser pulses: New advantages and challenges", 6<sup>th</sup> European Conference on Applications of Femtosecond Lasers in Material Science, March 16-17, 2015, Mauterndorf, Austria
51. "Problems of thermophysics and hydrogasdynamics under interaction of powerful laser radiation with matter", 13<sup>th</sup> International School-Conference on Topical Problems of thermophysics and physical hydrogasdynamics, November 20-24, 2014, Novosibirsk, Russia
52. "Models of pulsed laser ablation based on continuum methods", 12<sup>th</sup> IUUVISTA School "Lasers in Material Science", July 13-20, 2014, Venice, Italy (**Tutorial lecture**)
53. "Pulsed laser modification of transparent dielectrics: What can be foreseen and predicted in numerical experiments?", International Conference on High Power Laser Ablation (HPLA 2014), April 21-25, 2014, Santa Fe, USA
54. "Towards better understanding of ultrashort laser modification of transparent solids", 20<sup>th</sup> International Conference on Advanced Laser Technologies (ALT-2013), Sep. 16-20, 2013, Budva, Montenegro
55. "Ultrashort-pulse laser modification of transparent materials: Insight from inside", 5<sup>th</sup> European Conference on Applications of Femtosecond Lasers in Material Science, March 18-20, 2013, Mauterndorf, Austria
56. "Theoretical treatments of ultrashort pulse laser processing of transparent materials: Towards explanations the extraordinary phenomena", International Workshop on "Laser Micro and Nanostructuring: Fundamentals and Applications", December 10 – 13, 2012, Ecole Polytechnique, Palaiseau, France
57. "Ultrashort laser modification of transparent materials: Synergy of excitation/relaxation kinetics, thermodynamics, and mechanics", International Conference and Expo on Materials Science & Engineering, October 21-28, 2012, Chicago, USA
58. "Theoretical treatment of ultrashort pulse laser processing of transparent materials: What is energetically and mechanically meaningful?", 8<sup>th</sup> International Conference on Photo-Excited Processes and Applications – ICPEPA-8, August 12-17, 2012, Rochester, NY, USA
59. "Continuum models of ultrashort laser ablation", 3<sup>rd</sup> International School "Lasers in Material Science", July 8-15, 2012, Venice, Italy (**Tutorial lecture**)
60. "Laser-induced modifications of transparent crystals and glasses: photo-excitation, thermodynamics, mechanical response", 3<sup>rd</sup> Int. School and Conference on Photonics, Photonica 2011, August 29 – September 2, 2011, Belgrade, Serbia
61. "Ultrafast laser modification in glasses: basic and novel aspects and applications", 19<sup>th</sup> International Conference on Advanced Laser Technologies (ALT-2011), September 3-8, 2011, Sofia, Bulgaria
62. "Continuum models of ultrashort laser ablation: Overview, advantages, limitations", 2<sup>nd</sup> International School "Laser-Surface Interactions for New Material Production: Tailoring Structure and Properties", July 11-18, 2010, Venice, Italy (Tutorial lecture)
63. "Ultrashort laser induced processes in photonic crystals and glasses: photo-excitation, thermodynamic conditions, mechanical response", XXIX All-Siberian Workshop on Thermophysics, November 2009, Novosibirsk, Russia
64. "Pulsed laser ablation of compound semiconductors: Mechanism and dynamics", IX International Conference "Atomic and Molecular Pulsed Lasers", September 14-18, 2009, Tomsk, Russia
65. "Continuum models of ultrashort laser ablation", 1<sup>st</sup> International School "Laser-Surface Interactions for New Material Production: Tailoring Structure and Properties", July 13-20, 2008, Venice, Italy (**Tutorial lecture**)
66. "Charge and plasma effects under ultrashort pulsed laser ablation", 7<sup>th</sup> International Conference "High-Power Laser Ablation", April 20-24, 2008, Taos, NM, USA
67. "Modeling of electron dynamics in laser-irradiated solids: Progress achieved through a continuum approach and future prospects", International Conference on Coherent and Nonlinear Optics and International Conference on Lasers, Applications, and Technologies (ICONO/LAT 2007), May 28 – June 1, 2007, Minsk, Belarus
68. "Electron dynamics in laser-irradiated solids: What can be learned with the continuum approach", International Workshop "Modeling of the Processes under Ultrashort Laser Irradiation of Solids", 26 – 28 March 2007, Carry le Rouet, France
69. "Theoretical models and qualitative interpretations of fs material processing", 4<sup>th</sup> International Congress on Laser Advanced material Processing (LAMP 2006), May 16-19, 2006, Kyoto, Japan
70. "Surface charging under pulsed laser ablation of solids and its consequences: studies with a continuum approach", Photonic West 2005, Symposium "Lasers and Applications in Science and Engineering", Conference 5714 "Commercial and Biomedical Applications of Ultrafast Lasers VI", 22-27 January 2005, San Jose, California, USA
71. "A general continuum approach to the problem of Coulomb explosion under pulsed laser ablation of solids", 10<sup>th</sup> International Conference "Desorption 2004", August 29 – September 2, 2004, Saint-Petersburg, Russia
72. "A general continuum approach to describe fast electronic transport in pulsed laser irradiated materials: the problem of Coulomb explosion", International Conference on High Power Laser Ablation 2004, April 25-30, Taos, NM, USA

## List of selected publications by Nadezhda M. Bulgakova

(Over 250 publications in English and Russian in areas of laser micro- and nanotechnologies, laser–matter interaction, plasma and gas dynamics, nanotube growth, Earth atmosphere physics.  $h = 36$  according to Web of Science and  $h = 37$  according to Scopus)

### Books and Book Chapters

1. 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: J. Bonse and R. Stoian (Eds.), *Ultrafast Laser Nanostructuring: The Pursuit of Extreme Scales*, Springer Series in Optical Sciences, Vol. 239 (Springer-Nature, 2023), pp. 3-64. <https://link.springer.com/book/9783031147517>
2. M.V. Shugaev, M. He, Y. Levy, A. Mazzi, A. Miotello, **N.M. Bulgakova**, L.V. Zhigilei, Laser-Induced Thermal Processes: Heat Transfer, Generation of Stresses, Melting and Solidification, Vaporization, and Phase Explosion, In: *Handbook of Laser Micro- and Nano-Engineering*, K. Sugioka (ed.), Springer, Cham. (2021), [https://doi.org/10.1007/978-3-319-69537-2\\_11-1](https://doi.org/10.1007/978-3-319-69537-2_11-1).
3. M.V. Shugaev, M. He, S.A. Lizunov, Y. Levy, T. J.-Y. Derrien, V.P. Zhukov, **N.M. Bulgakova**, L.V. Zhigilei, Insights into Laser-Materials Interaction Through Modeling on Atomic and Macroscopic Scales, In: *Advances in the Application of Lasers in Materials Science*, Springer Series in Materials Science, Ed. P.M. Ossi, Vol. 274, Chapter 5 (Springer, 2018). – P. 107-148.
4. **N.M. Bulgakova**, V.P. Zhukov, Continuum models of ultrashort laser – matter interaction in application to wide-bandgap dielectrics, In: *Lasers in Materials Science*, Springer Series in Material Science, Eds. P.M. Ossi et al., Vol. 191, Chapter 5 (Springer, 2014). – P. 101-124.
5. **N.M. Bulgakova**, Fundamentals of Ultrafast Laser Processing, In: *Ultrafast Laser Processing: From Micro- to Nanoscale*, Chapter 3, Eds. Koji Sugioka and Ya Cheng (Pan Stanford Publishing, 2013). – P. 99–182.
6. **N.M. Bulgakova**, R. Stoian, A. Rosenfeld, I.V. Hertel, Continuum Models of Ultrashort Pulsed Laser Ablation. In: *Laser-Surface Interactions for New Materials Production*, Springer Series in Materials Science, Vol. 130, Chapter 4, Eds. A. Miotello, P.M. Ossi (Springer, 2010), pp. 81-97.
7. A.V. Bulgakov, **N.M. Bulgakova**, I.M. Burakov, et al. Nanosized material synthesis by action of high-power energy fluxes on matter. (Novosibirsk: IT SB RAS, 2009). – 458 p. (in Russian).
8. **N.M. Bulgakova**, R. Stoian, A. Rosenfeld, I.V. Hertel, E.E.B. Campbell, Fast electronic transport and Coulomb explosion in materials irradiated with ultrashort laser pulses, In: *Laser Ablation and its Application*, Springer Series in Optical Sciences, Vol. 129, Chapter 2, Ed. C. Phipps (Springer, 2007), pp. 17-36.

### Journal articles

1. V.P. Zhukov, **N.M. Bulgakova**, Volumetric modification of transparent materials with two-color laser irradiation: Insight from numerical modeling, *Materials* **17**(8), 1763 (2024).
2. S. Tahir, N. Shkodich, B. Eggert, J. Lill, O. Gatsa, M. Flimelová, E. Adabifiroozjaei, **N.M. Bulgakova**, L. Molina-Luna, H. Wende, M. Farle, A.V. Bulgakov, C. Doñate-Buendia, B. Gökce, Synthesis of high entropy alloy nanoparticles by pulsed laser ablation in liquids: Influence of target preparation on stoichiometry and productivity, *ChemNanoMat* **10**, e202400064 (2024).
3. M. Zugerstein, V.P. Zhukov, T.J.-Y. Derrien, O. Fedotova, **N.M. Bulgakova**, Double-pulse-laser volumetric modification of fused silica: the effect of pulse delay on light propagation and energy deposition, *Opt. Express* **32**(7), 12882-12891 (2024).
4. A.V. Bulgakov, J. Sládek, J. Hrabovský, I. Mirza, W. Marine, **N.M. Bulgakova**, Dual-wavelength femtosecond laser-induced low-fluence single-shot damage and ablation of silicon, *Proc. SPIE*, **12939**, 129390F (2024).
5. M. Zugerstein, V.P. Zhukov, Y.P. Meshcheryakov, **N.M. Bulgakova**, Volumetric glass modification with Gaussian and doughnut-shaped pulses: From localized laser energy absorption to absorption delocalization, *Proc. SPIE* **12939**, 1293903 (2024).
6. A.V. Bulgakov, J. Sládek, J. Hrabovský, I. Mirza, W. Marine, **N.M. Bulgakova**, Dual-wavelength femtosecond laser-induced single-shot damage and ablation of silicon, *Appl. Surf. Sci.* **643**, 158626 (2024).
7. I. Mirza, A.V. Bulgakov, H. Sopha, S.V. Starinskiy, H. Turčičová, O. Novák, J. Mužík, M. Smrž, V.A. Volodin, T. Mocek, J.M. Macak, **N.M. Bulgakova**, Non-thermal regimes of laser annealing of semiconductor nanostructures: crystallization without melting, *Front. Nanotechnol.* **5**, 1271832 (2023).
8. Y. Cheng, A.V. Bulgakov, **N.M. Bulgakova**, J. Beránek, M. Zugerstein, I.A. Milekhin, A.A. Popov, V.A. Volodin, Ultrafast infrared laser crystallization of amorphous Ge films on glass substrates, *Micromachines* **14**, 2048 (2023).
9. J. Hrabovsky, M. Zelensky, J. Sladek, M. Zugerstein, J. Fischer, K. Schwarzova-Peckova, A. Taylor, M. Veis, S. Mandal, O.A. Williams, **N.M. Bulgakova**, Laser-patterned boron-doped diamond electrodes with precise control of sp<sup>2</sup>/sp<sup>3</sup> carbon lateral distribution, *Appl. Surf. Sci.* **639**, 158268 (2023).

10. X. Yao, C. Schneider, **N.M. Bulgakova**, A.V. Bulgakov, T. Lippert, Double layer acceleration of ions with differently charged states in a laser induced plasma, *Appl. Phys. A* **129**, 590 (2023).
11. M. Zukerstein, V.P. Zhukov, Y.P. Meshcheryakov, **N.M. Bulgakova**, From localized laser energy absorption to absorption delocalization at volumetric glass modification with Gaussian and doughnut-shaped pulses, *Photonics* **10**, 882 (2023).
12. X. Yao, C. Schneider, **N.M. Bulgakova**, A.V. Bulgakov, T. Lippert, Ion expansion dynamics of laser induced multi-elemental plasmas, *J. Phys. D: Appl. Phys.* **56**, 345202 (2023).
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#### *Patents*

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