

Kristina Frizyuk

Curriculum Vitae

Faculty of Physics, ITMO University
Saint-Petersburg, Russia
✉ frizyuk@gmail.com
✉ k.frizyuk@metalab.ifmo.ru
☎ +79112997727
ORCID 0000-0002-0506-464X
SC 57195776935



Education

- 2016–present **PhD, Optics**, ITMO University, Saint-Petersburg, Russia, Thesis title: “Nonlinear generation from dielectric nanoparticles and nanostructures”.
Multipolar decomposition, Mie resonances, Symmetry analysis, Second-harmonic generation
- 2016–2018 **Master, Physics**, Saint-Petersburg Academic University, Russia, (GPA: 4.9/5.0), Thesis title: “Second harmonic generation by a nanoparticle based on material with volumetric nonlinearity”.
- 2012–2016 **Bachelor, Solid-state physics**, Peter the Great Saint-Petersburg Polytechnic University, Russia, (Graduated with distinctions, GPA: 5.0/5.0), Thesis title: “Raman scattering in silicon nanoparticles with magnetic and electric resonances”.

Publications

Selected Journal Articles

- 2022 Mariia Tsimokha, Vladimir Igoshin, Anastasia Nikitina, Ivan Toftul, **Kristina Frizyuk**, and Mihail Petrov. Acoustic resonators: Symmetry classification and multipolar content of the eigenmodes. *Phys. Rev. B*, volume 105, page 165311. American Physical Society, 2022, (**IF: 3.908, Q1**).
- 2021 **Kristina Frizyuk**, Elizaveta Melik-Gaykazyan, Jae-Hyuck Choi, Mihail I. Petrov, Hong-Gyu Park, and Yuri Kivshar. Nonlinear Circular Dichroism in Mie-Resonant Nanoparticle Dimers. *Nano Lett.*, volume 21, pages 4381–4387. American Chemical Society, 2021, (**IF: 11.189, Q1**).
- 2020 Sergey Gladyshev, **Kristina Frizyuk**, and Andrey Bogdanov. Symmetry analysis and multipole classification of eigenmodes in electromagnetic resonators for engineering their optical properties. *Phys. Rev. B*, volume 102, page 075103. American Physical Society, 2020, (**IF: 3.908, Q1**).
- 2019 **Kristina Frizyuk**, Irina Volkovskaya, Daria Smirnova, Alexander Poddubny, and Mihail Petrov. Second-harmonic generation in Mie-resonant dielectric nanoparticles made of noncentrosymmetric materials. *Phys. Rev. B*, volume 99, page 075425. American Physical Society, 2019, (**IF: 3.908, Q1**).
- 2019 **Kristina Frizyuk**. Second-harmonic generation in dielectric nanoparticles with different symmetries. *J. Opt. Soc. Am. B*, volume 36, pages F32–F37. Optica Publishing Group, 2019, (**IF: 2.106, Q2**).
- 2019 Zarina Sadrieva, **Kristina Frizyuk**, Mihail Petrov, Yuri Kivshar, and Andrey Bogdanov. Multipolar origin of bound states in the continuum. *Phys. Rev. B*, volume 100, page 115303. American Physical Society, 2019, (**IF: 3.908, Q1**).
- 2018 **Kristina Frizyuk**, Mehedi Hasan, Alex Krasnok, Andrea Alú, and Mihail Petrov. Enhancement of Raman scattering in dielectric nanostructures with electric and magnetic Mie resonances. *Phys. Rev. B*, volume 97, page 085414. American Physical Society, 2018, (**IF: 3.908, Q1**).

Selected Conference Proceedings

- 2021 Mariya Poleva, Kseniya V. Baryshnikova, **Kristina Frizyuk**, and Andrei B. Evlyukhin. Nontrivial optical response of silicon triangular prisms. *J. Phys. Conf. Ser.*, volume 2015, page 012111. IOP Publishing, 2021.
- 2021 Vladimir Igoshin, Anastasia Nikitina, Mariia Tsimokha, Ivan Toftul, Mihail Petrov, and **Kristina Frizyuk**. High-Q states in acoustic apple-shaped resonators. *J. Phys. Conf. Ser.*, volume 2015, page 012040. IOP Publishing, 2021.
- 2020 **Kristina Frizyuk** and Mihail Petrov. Second harmonic generation driven by magnetic dipole moment in dielectric nanoparticles of different shapes. *J. Phys. Conf. Ser.*, volume 1461, page 012042. IOP Publishing, 2020.
- 2020 Olesia Pashina, **Kristina Frizyuk**, George Zograf, and Mihail Petrov. Thermally induced reshaping of second harmonic radiation patterns from resonant semiconductor nanostructures. *AIP Conf. Proc.*, volume 2300, page 020033. American Institute of Physics, 2020.
- 2018 **Kristina Frizyuk** and Mihail Petrov. Selection Rules In Second Harmonic Generation Process Supported By Mie Resonances – METAMATERIALS 2018. In *2018 12th International Congress on Artificial Materials for Novel Wave Phenomena (Metamaterials)*, pages 137–139. IEEE, 2018.

Talks

- 2021 METANANO. Two talks: High-Q states in acoustic apple-shaped resonators., Nonlinear circular dichroism in Mie-resonant nanoparticle dimers. *13-17 September 2021 Saint Petersburg, Russia (Online)*, 2021.
- 2020 SNAIA. Selection rules for second-harmonic generation in dielectric nanoparticles. *8-11 December 2020, École Nationale Supérieure de Chimie de Paris 11, rue Pierre et Marie Curie, France (Online)*, 2020.
- 2020 METANANO. Thermally induced reshaping of second harmonic radiation patterns from resonant semiconductor nanostructures. *2020 14-18 September 2020. Saint Petersburg, Russia (Online)*, 2020.
- 2020 The annual International Winter School on Semiconductor Physics. Non-radiating states in periodic structures in terms of multipole decomposition. *February 27 – March 2, 2020, Russia, 2020*.
- 2019 METANANO. Second harmonic generation driven by magnetic dipole moment in dielectric nanoparticles of different shapes. *15-19 July 2019. Saint-Petersburg, Russia, 2019*.
- 2019 13th International Congress on Artificial Materials for Novel Wave Phenomena (Metamaterials). Second harmonic generation driven by magnetic dipole moment in dielectric nanoparticles of different shapes. *16 - 21 September 2019, Rome, Italy, 2019*.
- 2018 METANANO. Second harmonic generation in nanoparticles with Mie resonances. *17-21 September 2018. Sochi, Russia, 2018*.
- 2018 12th International Congress on Artificial Materials for Novel Wave Phenomena (Metamaterials). Selection Rules In Second Harmonic Generation Process Supported By Mie Resonances. *27 August - 1 September 2018, Espoo, Finland, 2018*.
- 2016 Days on Diffraction. *27 June – 1 July 2016, St. Petersburg, Russia, 2016*.
- 2016 The annual International Winter School on Semiconductor Physics. Raman scattering from silicon nanoparticles with magnetic and electric resonances. *February 26 – March 1, 2016, Zelenogorsk, Russia, 2016*.
- 2015 XXXI EUPROMETA Summer School on Nanophotonics and Metamaterials. *21 - 24 June 2016 ITMO University, St. Petersburg, Russia, 2015*.
- 2015 The 17th Russian Youth Conference on Physics of Semiconductors, Opto Nanostructures, and Nanoelectronics. Investigation of Raman scattering from silicon nanostructures. *November 23 – 27, 2015, St. Petersburg, Russia, 2015*.

Awards

- 2021 **Scholarship** of the President of the Russian Federation in priority areas
- 2020 **Best Poster (I)**, The annual International Winter School on Semiconductor Physics
- 2019 **Grant** “PhD-Student” from BASIS foundation
- 2016 **Best Talk (II)**, The annual International Winter School on Semiconductor Physics
- 2016 **Grant** “UMNIC” from FASIE

Academic Achievements & Recognitions

- 2022 **ITMO News**, Researchers Propose New Multipolar Lattices for Improved Metasurfaces
- 2022 **Low-dimensional seminar** in Ioffe Institute, Nonlinear circular dichroism in nanoparticle dimers
- 2021 **ITMO News**, ITMO Scientists Discover Nonlinear Circular Dichroism in Mie-Resonant Nanoparticle Dimers
- 2020 **Lecturer** on Metanano Summer school, Practice on Exact multipolar decompositions with applications in nanophotonics

Computer skills

- Modelling COMSOL Multiphysics, Matlab
- Illustrations Adobe Illustrator, Cinema 4D, InkScape

Position of Responsibility

- 2021-present **Organizer of Scientific Seminars**, *ITMO, Faculty of Physics.*
- 2020-present **Creation and filling content for internal Wiki**, *ITMO, Faculty of Physics.*
- 2021-present **Maintaining a telegram channel with news and information for 200 students**, *ITMO, Faculty of Physics.*
- 2021-present **Member of bachelor’s program advisory**, *ITMO, Faculty of Physics.*

Teaching Activities

- 2021-present **Practices on Group Theory**, *Faculty of Physics, ITMO University.*
- 2020-present **Scientific advisor for 3 undergraduate students**, Faculty of Physics, ITMO University.
 - 2020 **Manual of general physics, Optics**, Faculty of Physics, ITMO University.
 - 2020 **Educational video (English subtitles)**, “*Second Harmonic. Nonlinear susceptibility. Phase synchronism*”, Faculty of Physics, ITMO University.
 - 2020 **Educational video (English subtitles)**, “*Mie Theory, Part 3. Kerker effect*”, Faculty of Physics, ITMO University.
 - 2020 **Educational video (English subtitles)**, “*Diffraction. How to find orders quickly? Ewald’s sphere. Relation to Bloch’s theorem and the Fourier transform*”, Faculty of Physics, ITMO University.
 - 2020 **Educational videos**, “*Applications of group and representation theory in physics*”, *mini-course*, Faculty of Physics, ITMO University.
- 2017 **Quantum optics course, teaching assistant**, Academic University.
- 2014 **Physics tutor for schoolchildren**, *Saint Petersburg Lyceum “Physical-Technical High School”.*
- 2013 **Coach for schoolchildren for the tournament in physics**, Saint Petersburg Presidential Physics and Mathematics Lyceum №239.
- 2012 **Physics tutor for schoolchildren**, Saint Petersburg Physics and Mathematics Lyceum №30.

Hobbies

Sports **Bouldering**, Motocross, MTB.

Other **Art & Design**, Deutsch (A2).

Referees

Dr. Mihail Petrov

Assistant Professor

Faculty of Physics

ITMO University

✉ trisha.petrov@gmail.com

Dr. Yuri Kivshar

Professor, Department of

Fundamental & Theoretical Physics

Australian National University

✉ yuri.kivshar@anu.edu.au

Dr. Alexander Poddubny

Senior Sci. researcher, Sector of Theory

of Quantum Coherent Phenomena in Solids

Ioffe Institute

✉ poddubny@coherent.ioffe.ru