Gulnaz Rakhmanova

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Education

09/2018 – 07/2020 **Master of Technical Physics (with honours)**
ITMO University, St. Petersburg, Russia
Major area of study: Nanophotonics and metamaterials
Thesis topic: Topological plasmon-polariton on a Dirac magnet helical state

09/2014 – 07/2018 **Bachelor of Technical Physics**
Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia
Major area of study: Physical Electronics
Thesis topic: Electron-beam modification of optical properties of phosphate glasses with high concentration of silver

Working experience

10/2022 – now **Visiting Researcher**
Physics Department, Bar Ilan University, Israel.
Major: transport and optical properties of 2D Van der Waals heterostructures

07/2019 – now **Researcher**
International Scientific Laboratory of photoprocesses in mesoscopic systems, Department of Physics and Engineering, ITMO University.
Major: magnetic and optical properties of 2D systems

2016 – 2018 **Researcher**
Scientific Laboratory of physics of radiation with matter interaction, Department of Physical Electronics, Peter the Great St. Petersburg Polytechnic University.
Major: electron-beam modification of phosphate glasses

Publications

- I. A. Ado, Gulnaz Rakhmanova, Dmitry A. Zezyulin, Ivan Iorsh, and M. Titov, Quartic asymmetric exchange for two-dimensional ferromagnets with trigonal prismatic symmetry, Phys. Rev. B - 2022, vol. 106, 144407

  doi: 10.1103/PhysRevB.106.144407

- G. Rakhmanova, A. Osipov, D. Ilyin, I. Shushakova, I. A. Ado, I. Iorsh, and M. Titov, Signatures of quartic asymmetric exchange in a class of two-dimensional magnets, Phys. Rev. B - 2022, vol. 105, no. 2, pp. L020401

  doi: 10.1103/PhysRevB.105.L020401

- Rakhmanova G.R., Iorsh I.V. Broadband enhancement of second-harmonic generation at the domain walls of magnetic topological insulators, Nanophotonics - 2020, Vol. 9, No. 15, pp. 4489–4495

  doi: 10.1515/nanoph-2020-0287

- Iorsh I.V., Rahmanova G., Titov M. Plasmon-polariton from a helical state in a Dirac magnet, ACS Photonics - 2019, Vol. 6, No. 10, pp. 2450-2454

  doi: 10.1021/acsphotonics.9b00683

- G R Rakhmanova et al, Helical phase in two-dimensional magnets due to four-spin interactions, J. Phys.: Conf. Ser. - 2021, vol. 2086 pp. 012165

  doi: 10.1088/1742-6596/2086/1/012165

- G R Rakhmanova et al, Non-collinear ground state and stable bimerons from four-spin chiral interactions in D3h magnet, J. Phys.: Conf. Ser. - 2021, Vol. 2015 012118

  doi: 10.1088/1742-6596/2015/1/012173

- Rakhmanova G., Iorsh I. Topological plasmon polariton on a Dirac magnet helical state: The second harmon generation enhancement, AIP Conference Proceedings - 2020, Vol. 2300, pp. 020101

  doi: 10.1063/5.0031857

- Kudlis A., Rakhmanova G., Iorsh I. Many-body phenomena in semiconductors and cluster expansion approach, AIP Conference Proceedings - 2020, Vol. 2300, pp. 020072

  doi: 10.1063/5.0032135

- Iorsh I.V., Rakhmanova G.R., Titov M. Topological plasmon-polariton on a Dirac magnet helical state, Journal of Physics: Conference Series - 2019, Vol. 1410, No. 1, pp. 012158

  doi: 10.1088/1742-6596/1410/1/012158

- Sidorov A.I., Yurina U.V., Rakhmanova G.R., et.al. Electron-beam modification of optical properties of phosphate glasses with high concentration of silver, Journal of Non-Crystalline Solids - 2018, Vol. 499, pp. 278-282

  doi: 10.1016/j.jnoncrysol.2018.07.053

Conferences

- International Conference "Saint-Petersburg OPEN 2022", St. Petersburg, 24-27 May 2022

  Talk: Electron-spectrum and transport phenomena in two-dimensional Dirac Semimetals

- All-Russian Conference "XI Congress of Young Scientists", St. Petersburg, 4-6 June 2022

  Talk: Magnetic and optical properties of two-dimensional van der Waals magnetic materials

- International Conference on Metamaterials and Nanophotonics "METANANO-2021", St. Petersburg, 13-17 September 2021

  Talk: Non-collinear ground state and stable bimerons from four-spin chiral interactions in D3h magnet

- International Conference "Saint-Petersburg OPEN 2021", St. Petersburg, 25-28 May 2021

  Poster: Helical phase in two-dimensional magnets due to four-spin interactions

- International Conference on Metamaterials and Nanophotonics "METANANO-2020", St. Petersburg, 14-19 September 2020

  Talk: Topological plasmon polariton on a Dirac magnet helical state: The second harmonic generation enhancement

- 20 International Conference on Physics of Light-Matter Coupling in Nanostructures (PLMCN20), Moscow/Suzdal, 2-7 July 2019

  Poster: Plasmon-polariton from a helical state in Dirac magnet

- International Conference "Saint-Petersburg OPEN 2019", St. Petersburg, 22-25 April 2019

  Poster: Topological plasmon-polariton on a Dirac magnet helical state

- XLVIII International Tulinov Conference on the Physics of the Interaction of Charged Particles with Crystals, Moscow, 29-31 May 2018

  Poster: Modification of Surface Layers of Silver-Containing Phosphate Glasses by Electron Irradiation

Scientific Schools

- SUMMER SCHOOL ON PHOTONICS OF 2D MATERIALS, St. Petersburg, 19-23 July 2021

  Poster: Non-collinear ground state from four-spin chiral interactions in D3h magnet

  3 ECTS

- School "Optical scattering matrix for photonic crystal slab", St. Petersburg, 6-16 November 2018

  3 ECTS

Scholarships and Awards

2021 Individual grant "PhD Student" from the Foundation for the Advancement of Theoretical Physics and Mathematics "BASIS"

2021 Grant for research work, The School of Physics and Engineering, ITMO University (intra-university)

2019 Scholarship of the Government of the Russian Federation for research activity

2019 Scholarship for research activity from ITMO University

Teaching

2022 Teaching Assistant, "General physics: mechanics and electrostatics", course for Bachelor students, ITMO University, spring semester. Lecturer: Y. Muzychenko.
Duties: seminars, homeworks, labs, tests

2021 Teaching Assistant, "General physics: optics", course for Bachelor students, ITMO University, autumn semester. Lecturer: R. Polozkov.
Duties: seminars, homeworks, labs, tests

2021 Teaching Assistant, "General physics: mechanics and electrostatics", course for Bachelor students, ITMO University, spring semester. Lecturer: A. Zinchik.
Duties: seminars, homeworks, labs, tests

2019-2021 Teaching Assistant, "Quantum mechanics", course for 1st year Master students, ITMO University, autumn semester. Lecturer: Dr. I. Iorsh.
Duties: seminars, homeworks

2019 -2020 Teaching Assistant, "Electrodynamics of Metamaterials", course for 1st year Master students, ITMO University, spring semester. Lecturer: Dr. M. Gorlach.
Duties: homeworks

Science Lectures and Seminars

- Open lecture for students "Tight-Binding Approximation", ITMO University, St. Petersburg, 14 May 2021 and 2022.
- Summer practice for schoolchildren 15-25 June 2021
- "Topological plasmon polariton on a Dirac magnet helical state: The second harmonic generation enhancement", Theoretical Seminar, The School of Physics and Engineering, ITMO University St. Petersburg, 29 April 2020.

- "Nonlinear optical effects and magnetic properties of low-dimensional topologically nontrivial systems", , Theoretical Seminar, The School of Physics and Engineering, ITMO University, St. Petersburg, 3 February 2021.

Skills

Computer skills	Python, Wolfram Mathematica, Matlab, Latex, OriginPro, Microsoft Office, CST, Adobe Illustrator
Languages	Russian (Mother tongue), English (Advanced 6.5 IELTS)
additional education	Certificate of professional development "Scientific Communication" 2 ECTS Certificate of professional development "Teacher's Oratory" 0.5 ECTS Certificate of professional development "Soft Skills for teachers" 0.5 ECTS Certificate of professional development "Fundamentals of Pedagogical Activity" 1 ECTS

My Profiles

- WoS ResearcherID AAP-2457-2021
- Scopus AuthorID 57215997053
- ORCID 0000-0001-8750-4065
- Google Scholar https://scholar.google.com/citations?user=-eWTCF4AAAAJ&hl=ru
- ResearchGate https://www.researchgate.net/profile/Gulnaz-Rakhmanova

Extra-cirrucular activities

- I was professionally involved in skiing for 12 years. Also I like jogging, playing volleyball and doing yoga
- I am interested in teaching, psychology, travelling and reading books
- I have been in the USA under "Work And Travel" program for 3 month