

ILIA L. RASSKAZOV

theorist experienced in optics, photonics and light-matter interactions

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PROFESSIONAL HIGHLIGHTS

- 10+ years experience in Academia and Industry
- Developer of efficient numerical solutions for signal correction in infrared microspectroscopy
- Developer of one-of-a-kind MATLAB package for light scattering from multilayered spheres

PUBLICATIONS HIGHLIGHTS

- 1 paper is the most cited in the journal: **Reviews in Physics (2021)**
- 2 papers featured as Editor's choice: **Applied Spectroscopy (2019)** and **Applied Physics Reviews (2022)**
- 1 paper featured on the journal cover: **Journal of Physical Chemistry Letters (2021)**
- 2 invited papers: **Optical Materials Express (2017)** and **Photonics and Nanostructures - Fundamentals and Applications (2018)**

APPOINTMENTS

Research Scientist

KLA Corporation

Modeling of light-matter interaction in optical inspection imaging systems

Oct 2022 – present

Milpitas CA, USA

Scientist

The Institute of Optics, University of Rochester

Numerical modeling and optimization of light propagation in solar cells

Jul 2021 – Oct 2022

Rochester NY, USA

Postdoctoral Associate

The Institute of Optics, University of Rochester

Investigating light scattering by multilayered spheres with implications to fluorescence, upconversion, and biomedicine

Jul 2018 – Jul 2021

Rochester NY, USA

Postdoctoral Associate

Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign

Developing numerical solutions for inverse problems in infrared microspectroscopy

Jul 2016 – Jul 2018

Urbana-Champaign IL, USA

Visiting Scientist

Department of Bioengineering, University of Pennsylvania

Modeling plasmon propagation in chains of metallic nanoparticles

Dec 2012 – Feb 2013

Philadelphia PA, USA

EDUCATION

Ph.D. in Physics

Siberian Federal University

2011 – 2015

Krasnoyarsk, Russia

M.Sc. Engineering majoring in Physics

Siberian Federal University

2009 – 2011

Krasnoyarsk, Russia

B.Sc. Engineering majoring in Physics

Siberian Federal University

2005 – 2009

Krasnoyarsk, Russia

PROJECTS

Advanced Manufacturing of Photonic Smart Coatings for Utility-Scale PV Applications

NSF SBIR project #2014818

2020 – 2022

Rochester NY, USA

Standoff Illuminator for Measuring Absorbance and Reflectance Infrared Light Signatures

IARPA project #IARPA-BAA-15-07

2016 – 2017

Urbana-Champaign IL, USA

Computational Framework for Non-asymptotic Homogenization with Applications to Metamaterials

NSF project #1216970

2012 – 2013

Philadelphia PA, USA

INVITED TALKS

Collective lattice resonances: Plasmonics, all-dielectric photonics and beyond

Skolkovo Institute of Science and Technology

📅 Jul 28, 2020

📍 Moscow, Russia

Light scattering from multilayered spheres

ITMO University

📅 Jul 7, 2020

📍 Saint Petersburg, Russia

Electromagnetic light scattering from particles

KTH Royal Institute of Technology

📅 May 29, 2019

📍 Stockholm, Sweden

Plasmon-enhanced upconversion

KTH Royal Institute of Technology

📅 May 22, 2019

📍 Stockholm, Sweden

CONFERENCE TALKS

- APS March Meeting 2022, Chicago IL, **United States**, March 2022
- Frontiers in Optics, Washington DC, **United States**, November 2021
- METANANO 2021, Tbilisi, **Georgia**, September 2021
- The 19th Electromagnetic and Light Scattering Conference, **Online**, 2021
- METANANO 2019, St. Petersburg, **Russia**, July 2019
- Advanced Photonics Congress, Zurich, **Switzerland**, July 2018
- The 17th Electromagnetic and Light Scattering Conference (ELS-XVII), College Station TX, **United States**, March 2018
- The International Conference on Coherent and Nonlinear Optics/ International Conference on Lasers, Applications and Technologies, Minsk (ICONO/LAT 2016), **Belarus**, September 2016
- The 15th Electromagnetic and Light Scattering Conference (ELS-XV), Leipzig, **Germany**, June 2015
- Days on Diffraction 2015, St. Petersburg (DD 2015), **Russia**, May 2015
- Laser-light and Interactions with Particles (LIP 2014), Marseille, **France**, August 2014
- International Conference on Coherent and Nonlinear Optics (ICONO 2013), Moscow, **Russia**, June 2013

AWARDS

Scholarship of the President of the Russian Federation to young scientists and graduate students

📅 2016 – 2017

📍 Russia

Scholarship of the President of the Russian Federation for study abroad

📅 2012 – 2013

📍 Russia

Scholarship of the President of the Russian Federation to students

📅 2010 – 2011

📍 Russia

SYNERGISTIC



Science Mentors Program

supporting junior scholars



Scientific Expert

French National Research Agency (ANR), Generic Call 2019



Developer

STRATIFY: Open-access MATLAB software for versatile modeling of light scattering from multilayered spheres



Topic Editor

Photonics, Frontiers in Physics



Reviewer

160+ reviews for major publishers: American Chemical Society (ACS), American Institute of Physics (AIP), Elsevier, Frontiers, Institute of Physics (IOP), MDPI, Nature Publishing Group (NPG), OPTICA (former OSA), Royal Society of Chemistry (RSC), SAGE Publishing, Springer, Wiley



Professional Societies

OPTICA

FULL LIST OF PUBLICATIONS

Journal Articles

- ⁴¹V. I. Zakomirnyi, A. Moroz, R. Bhargava, and I. L. Rasskazov, Fluorescence enhancement via lossless all-dielectric spherical mesocavities, *submitted* (2023).
- ⁴⁰A. Utyushev, R. Gaponenko, S. Sun, A. Shcherbakov, A. Moroz, and I. L. Rasskazov, Generation of nearly pure and highly directional magnetic light in fluorescence of rare earth ions, *submitted* (2023).
- ³⁹I. L. Rasskazov, A. Moroz, C. J. Murphy, T. D. Krauss, and P. S. Carney, Metal-dielectric-enhanced upconversion: Going “meso”, *submitted* (2023).
- ³⁸L. Wang, I. L. Rasskazov, and P. S. Carney, Clausius-Mossotti relation revisited: Media with electric and magnetic response, *submitted* (2023).
- ³⁷R. Gaponenko, M. S. Sidorenko, D. Zhirihin, I. L. Rasskazov, A. Moroz, K. Ladutenko, P. Belov, and A. Shcherbakov, Experimental demonstration of superdirective spherical dielectric antenna, *Journal of Applied Physics* **134**, 014901 (2023).
- ³⁶Y. Ji, W. Xu, I. L. Rasskazov, H. Liu, J. Hu, M. Liu, D. Zhou, X. Bai, H. Ågren, and H. Song, Perovskite photonic crystal photoelectric devices, *Applied Physics Reviews [Featured Article]* **9**, 041319 (2022).
- ³⁵I. L. Rasskazov, N. Sonwalkar, and P. S. Carney, Light scattering by plasmonic disks and holes arrays: Different or the same?, *Journal of Physics D: Applied Physics* **55**, 455104 (2022).
- ³⁴I. L. Rasskazov and A. Moroz, Is there a proper figure of merit for a plasmonic structure involved in metal-enhanced fluorescence?, *Plasmonics* **17**, 1091–1094 (2022).
- ³³A. S. Kostyukov, I. L. Rasskazov, V. S. Gerasimov, S. P. Polyutov, S. V. Karpov, and A. E. Ershov, Multipolar lattice resonances in plasmonic finite-size metasurfaces, *Photonics* **8**, 109 (2021).
- ³²L. Wang, I. L. Rasskazov, and P. S. Carney, Clustering diffused-particle method for scattering from large ensembles of electromagnetically polarizable particles, *Physical Review B* **104**, 115418 (2021).
- ³¹R. Gaponenko, A. Moroz, I. L. Rasskazov, K. Ladutenko, A. Shcherbakov, and P. Belov, Harnessing superdirectivity in dielectric spherical multilayer antennas, *Physical Review B* **104**, 195406 (2021).
- ³⁰V. S. Gerasimov, A. E. Ershov, R. G. Bikbaev, I. L. Rasskazov, I. L. Isaev, P. N. Semina, A. S. Kostyukov, V. I. Zakomirnyi, S. P. Polyutov, and S. V. Karpov, Plasmonic lattice Kerker effect in ultraviolet-visible spectral range, *Physical Review B* **103**, 035402 (2021).
- ²⁹A. S. Kostyukov, A. E. Ershov, R. G. Bikbaev, V. S. Gerasimov, I. L. Rasskazov, S. V. Karpov, and S. P. Polyutov, Substrate-mediated lattice Kerker effect in Al metasurfaces, *Journal of the Optical Society of America B [Feature Issue on “Light-Matter Interaction in Complex Photonic Systems”]* **38**, C78–C83 (2021).
- ²⁸A. D. Utyushev, V. I. Zakomirnyi, and I. L. Rasskazov, Collective lattice resonances: Plasmonics and beyond, *Reviews in Physics* **6**, 100051 (2021).
- ²⁷I. L. Rasskazov, A. Moroz, and P. S. Carney, Extraordinary fluorescence enhancement in metal-dielectric core-shell nanoparticles, *Journal of Physical Chemistry Letters [Cover Article]* **12**, 6425–6430 (2021).
- ²⁶I. L. Rasskazov, V. I. Zakomirnyi, A. D. Utyushev, P. S. Carney, and A. Moroz, Remarkable predictive power of the modified long wavelength approximation, *Journal of Physical Chemistry C* **125**, 1963–1971 (2021).
- ²⁵A. D. Utyushev, I. L. Isaev, V. S. Gerasimov, A. E. Ershov, V. I. Zakomirnyi, I. L. Rasskazov, S. P. Polyutov, H. Ågren, and S. V. Karpov, Engineering novel tunable optical high-Q nanoparticle array filters for a wide range of wavelengths, *Optics Express* **28**, 1426–1438 (2020).
- ²⁴I. L. Rasskazov, P. S. Carney, and A. Moroz, STRATIFY: a comprehensive and versatile MATLAB code for a multilayered sphere, *OSA Continuum* **3**, 2290–2309 (2020).
- ²³A. D. Utyushev, V. I. Zakomirnyi, A. E. Ershov, V. S. Gerasimov, S. V. Karpov, and I. L. Rasskazov, Collective lattice resonances in all-dielectric nanostructures under oblique incidence, *Photonics* **7**, 24 (2020).
- ²²V. I. Zakomirnyi, I. L. Rasskazov, L. K. Sørensen, P. S. Carney, Z. Rinkevicius, and H. Ågren, Plasmonic nano-shells: atomistic discrete interaction versus classic electrodynamics models, *Physical Chemistry Chemical Physics [2020 Hot Article]* **22**, 13467–13473 (2020).
- ²¹S. Sun, I. L. Rasskazov, P. S. Carney, T. Zhang, and A. Moroz, Critical role of shell in enhanced fluorescence of metal-dielectric core-shell nanoparticles, *Journal of Physical Chemistry C* **124**, 13365–13373 (2020).
- ²⁰I. L. Rasskazov, P. S. Carney, and A. Moroz, Intriguing branching of the maximum position of the absorption cross section in Mie theory explained, *Optics Letters* **45**, 4056–4059 (2020).
- ¹⁹I. L. Rasskazov, A. Moroz, and P. S. Carney, Electromagnetic energy in multilayered spherical particles, *Journal of the Optical Society of America A* **36**, 1591–1601 (2019).
- ¹⁸V. I. Zakomirnyi, S. V. Karpov, H. Ågren, and I. L. Rasskazov, Collective lattice resonances in disordered and quasi-random all-dielectric metasurfaces, *Journal of the Optical Society of America B [Feature Issue on “Collective Effects and Coupling Phenomena in Resonant Optical Metasurfaces”]* **36**, E21–E29 (2019).

- ¹⁷I. L. Rasskazov, R. Singh, P. S. Carney, and R. Bhargava, Extended multiplicative signal correction for infrared microspectroscopy of heterogeneous samples with cylindrical domains, *Applied Spectroscopy [Editor's Choice]* **73**, 859–869 (2019).
- ¹⁶V. S. Gerasimov, A. E. Ershov, R. G. Bikbaev, I. L. Rasskazov, I. V. Timofeev, S. P. Polyutov, and S. V. Karpov, Engineering mode hybridization in regular arrays of plasmonic nanoparticles embedded in 1D photonic crystal, *Journal of Quantitative Spectroscopy and Radiative Transfer* **224**, 303–308 (2019).
- ¹⁵A. S. Kostyukov, A. E. Ershov, V. S. Gerasimov, S. A. Filimonov, I. L. Rasskazov, and S. V. Karpov, Super-efficient laser hyperthermia of malignant cells with core-shell nanoparticles based on alternative plasmonic materials, *Journal of Quantitative Spectroscopy and Radiative Transfer* **236**, 106599 (2019).
- ¹⁴V. I. Zakomirnyi, A. E. Ershov, V. S. Gerasimov, S. V. Karpov, H. Ågren, and I. L. Rasskazov, Collective lattice resonances in arrays of dielectric nanoparticles: a matter of size, *Optics Letters* **44**, 5743–5746 (2019).
- ¹³V. Zakomirnyi, I. Rasskazov, V. Gerasimov, A. Ershov, S. Polyutov, S. Karpov, and H. Ågren, Titanium nitride nanoparticles as an alternative platform for plasmonic waveguides in the visible and telecommunication wavelength ranges, *Photonics and Nanostructures - Fundamentals and Applications [Invited Article]* **30**, 50–56 (2018).
- ¹²I. L. Rasskazov, L. Wang, C. J. Murphy, R. Bhargava, and P. S. Carney, Plasmon-enhanced upconversion: engineering enhancement and quenching at nano and macro scales, *Optical Materials Express* **8**, 3787–3804 (2018).
- ¹¹A. E. Ershov, V. S. Gerasimov, A. P. Gavriluk, S. V. Karpov, V. I. Zakomirnyi, I. L. Rasskazov, and S. P. Polyutov, Thermal limiting effects in optical plasmonic waveguides, *Journal of Quantitative Spectroscopy and Radiative Transfer* **191**, 1–6 (2017).
- ¹⁰V. S. Gerasimov, A. E. Ershov, S. V. Karpov, A. P. Gavriluk, V. I. Zakomirnyi, I. L. Rasskazov, H. Ågren, and S. P. Polyutov, Thermal effects in systems of colloidal plasmonic nanoparticles in high-intensity pulsed laser fields [Invited], *Optical Materials Express [Invited Article]* **7**, 555–568 (2017).
- ⁹V. I. Zakomirnyi, I. L. Rasskazov, V. S. Gerasimov, A. E. Ershov, S. P. Polyutov, and S. V. Karpov, Refractory titanium nitride two-dimensional structures with extremely narrow surface lattice resonances at telecommunication wavelengths, *Applied Physics Letters* **111**, 123107 (2017).
- ⁸V. I. Zakomirnyi, I. L. Rasskazov, S. V. Karpov, and S. P. Polyutov, New ideally absorbing Au plasmonic nanostructures for biomedical applications, *Journal of Quantitative Spectroscopy and Radiative Transfer* **187**, 54–61 (2017).
- ⁷I. L. Rasskazov, N. Spegazzini, P. S. Carney, and R. Bhargava, Dielectric sphere clusters as a model to understand infrared spectroscopic imaging data recorded from complex samples, *Analytical Chemistry* **89**, 10813–10818 (2017).
- ⁶I. L. Rasskazov, S. V. Karpov, G. Y. Panasyuk, and V. A. Markel, Overcoming the adverse effects of substrate on the waveguiding properties of plasmonic nanoparticle chains, *Journal of Applied Physics* **119**, 043101 (2016).
- ⁵I. L. Rasskazov, S. V. Karpov, and V. A. Markel, Waveguiding properties of short linear chains of nonspherical metal nanoparticles, *Journal of the Optical Society of America B* **31**, 2981–2989 (2014).
- ⁴I. L. Rasskazov, S. V. Karpov, and V. A. Markel, Surface plasmon polaritons in curved chains of metal nanoparticles, *Physical Review B* **90**, 075405 (2014).
- ³I. L. Rasskazov, S. V. Karpov, and V. A. Markel, Nondecaying surface plasmon polaritons in linear chains of silver nanospheroids, *Optics Letters* **38**, 4743–4746 (2013).
- ²S. V. Karpov and I. L. Rasskazov, Simulation of conditions for fabrication of optical nanowaveguides in the form of chains of spherical metal nanoparticles by electrostatic functionalization of the process substrate, *Colloid Journal* **75**, 279–288 (2013).
- ¹I. L. Rasskazov, V. A. Markel, and S. V. Karpov, Transmission and spectral properties of short optical plasmon waveguides, *Optics and Spectroscopy* **115**, 666–674 (2013).