

Alexey A. SHCHERBAKOV

Birth date: November 8, 1985
Nationality: Russia

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EDUCATION

Doctor of Philosophy / Candidate of Science

University Jean Monnet, Saint-Etienne, France June 2012
qualified in: Electronics, optronics and systems

under collaboration with

Moscow Institute of Physics and Technology, Dolgoprudnyi, Russia April 2012
qualified in: Radiophysics

THESIS: Light scattering calculation in dielectric layers containing micro- and nanoparticles of high refractive index.

Master of Science

Moscow Institute of Physics and Technology, Dolgoprudnyi, Russia July 2008

Chair of Problems of Theoretical Physics and Astrophysics
qualified in: Applied Physics and Mathematics (red diploma)

GPA 4.77/5

Bachelor of Science

Moscow Institute of Physics and Technology, Dolgoprudnyi, Russia July 2006

Chair of Radiophysics

qualified in: Applied Physics and Mathematics (red diploma)

GPA 4.96/5

PROFESSIONAL EXPERIENCE

ITMO University, Saint-Petersburg, Russia

Research Fellow December 2018 – Present

Research Fellow August 2012 – Present

- Scientific research in the field of nanooptics and nanophotonics;
- Supervision of student scientific work;
- Writing grant proposals and reports, project leading.

Moscow Institute of Physics and Technology, Dolgoprudnyi, Russia

Research Fellow July 2008 – July 2012

Senior Research Fellow August 2012 – Present

- Development of numerical methods for calculation of light diffraction and scattering;
- Supervision of student scientific work;
- Writing grant proposals and reports, project leading.

University Jean Monnet, Saint-Etienne, France

Invited Researcher April-May 2019, March 2018, April 2017; June 2016

Postdoc May – July 2015

Contract Researcher (under collaboration with OSRAM Opto Semiconductors) 2011

- Development of numerical methods and computer codes in the diffraction theory and their application in diffractive optics, solar heating and photovoltaics.
- Experimental measurements of optical properties of nanoparticle colloids and diffractive structures.

University of Bourgundy, Dijon, France

Invited Lecturer

January 2019

Moscow Institute of Physics and Technology, Dolgoprudnyi, Russia

Part time Assistant Professor

September 2012 – Present

- Seminars and labs in general physics (2012-2014);
- Deputy head of chair of Physics and Technology of Nanostructures (2013-2016);
- Lecture course “Computational Nanophotonics” (2017).

Evening School of Moscow Institute of Physics and Technology, Dolgoprudnyi, Russia

Advanced scholar Physics Teacher

March 2005 – June 2008

PROFESSIONAL SKILLS DEVELOPMENT

Scientific Leadership School by the Russian Science Foundation

Skolkovo Institute, Skolkovo, Russia

October 2017

Russian Quantum Center Spring School

Russian Quantum Center, Russia

March 2013

Advanced training certificate in high-performance computing: OpenMP, MPI, CUDA

High-Performance Computing Summer School of Moscow Institute of Physics and Technology, Dolgoprudnyi, Russia

August 2012

PROFESSIONAL ACTIVITY

- Project leader (four projects) and principal investigator in research grants provided by Russian Ministry of Education and Science, Russian Foundation for Basic Research, and Russian Science Foundation since 2007.
- OSA and IOP journals reviewer.
- Organizer of a special session “Advanced Theoretical and Numerical Tools for Nanooptics, Photonics and Plasmonics” at METANANO 2019 Conference.

HONORS AND AWARDS

- Russian Academy of Sciences Medal for Young Scientists 2013
- Russian President scholarship for young scientists and PhD students 2012-2014
- 3d rank diploma of the Regional stage of the Russian Physics Olympiad 2002
- Secondary education Gold Medal 2002

SCIENTIFIC INTERESTS

Electromagnetic wave emission, diffraction and scattering in composite media and strongly inhomogeneous structures. Resonant wave phenomena. Numerical methods and high-performance computing.

Publications in peer-reviewed journals

1. I. M. Akhmetzhanov, A. V. Tishchenko, and A. A. Shcherbakov. Modeling of the light scattering by nanoparticles of complex shape using the Generalized Source Method. *Opt. Spectrosc.* 105. 950. (2008).
2. A. A. Shcherbakov, and A. V. Tishchenko. Fast numerical method for modeling one-dimensional diffraction gratings. *Quantum Electron.* 40, 6, 538-544 (2010).
3. S. A. Mayorov, and A. A. Shcherbakov. Distribution of the Coulomb microfield inside an ion cluster. *Plas. Phys. Rep.*, 36, 13, 1103 (2010).
4. A. A. Shcherbakov, and A. V. Tishchenko, Rigorous S-matrix based modeling of OLED's. *Optics InfoBase Conference Papers, SOLED 2010, SOTuC3* (2010).
5. A. A. Shcherbakov, and A. V. Tishchenko, D. S. Setz, B. C. Krummacher. Rigorous S-matrix approach to the modeling of the optical properties of OLEDs. *Organic Electronics.* 12, 654-659 (2011).
6. A. A. Shcherbakov, and A. V. Tishchenko, Light scattering calculations in planar non-homogeneous dielectric media by means of the light diffraction calculation on gratings. *AAPP*, 89, Suppl. No. 1, C1V89S1P085 (2011).
7. A. A. Shcherbakov, and A. V. Tishchenko. New fast and memory-sparing method for rigorous electromagnetic analysis of 2D periodic dielectric structures. *J. Quantitative Spectrosc. Radiat. Transf.* 113. 158-171 (2012).
8. A. A. Shcherbakov, and A. V. Tishchenko, Light scattering in plane dielectric layers: Modeling in the 2d reciprocal space. *JQSRT.* 113. 2424-2430 (2012).
9. A. A. Shcherbakov, and Ya. V. Lesnichiy. Morphology and optical properties of thin films of single-layer carbon nanotubes deposited by the air-brushing method. *Bulletin of MIPT.* 4(3). 109-113 (2012) (in Russian).
10. A. A. Shcherbakov, A. Yu. Vasil'ev, and A. V. Tishchenko. The Generalized Source Method in 3D reciprocal space. *Bulletin of MIPT.* 4(3). 187-191 (2012) (in Russian).
11. A. A. Shcherbakov, and A. V. Tishchenko. Modal composition of planar structures of organic light-emitting diodes. *Russian J. Radioelectronics*, #6, 1-14 (2012) (in Russian).
12. A. A. Shcherbakov, and A. V. Tishchenko. Efficient curvilinear coordinate method for grating diffraction simulation. *Opt. Express.* 21. 25236-25247 (2013).
13. A. A. Shcherbakov, and A. V. Tishchenko. 3D periodic dielectric composite homogenization based on the Generalized Source Method. *J. Opt.* 17. 065101 (2015).
14. A. A. Shcherbakov, and A. V. Tishchenko. Generalized source method in curvilinear coordinates for 2D grating diffraction simulation. *J. Quantitative Spectrosc. Radiat. Transf.* 187. 76-96 (2017).
15. A. A. Shcherbakov, O. Shavdina, A. V. Tishchenko, C. Veillas, I. Verrier, O. Dellea, and Y. Jourlin, Optical diffraction by ordered 2D arrays of silica microspheres. *J. Quantitative Spectrosc. Radiat. Transf.* 189. 37-42 (2017).
16. A. A. Ushkov, and A. A. Shcherbakov, Concurrency of anisotropy and spatial dispersion in low refractive index dielectric composites. *Opt. Express*, 25. 243-249 (2017).
17. A. V. Tishchenko, and A. A. Shcherbakov, General analytical solution for the electromagnetic grating diffraction problem. *Opt. Express*, 25, 13435-13447 (2017).
18. A. A. Ushkov, and A. A. Shcherbakov, Temporal dispersion of Dyakonov modes induced by spatial dispersion in dielectric composites, *AIP Conf. Proc.*, 1874(1):040055 (2017).
19. E. Ushakova, et. al. From colloidal CdSe quantum dots to microscale optically anisotropic supercrystals through bottom-up self-assembly, *J. Mater. Chem. C* 6, 12904-12911 (2018)
20. A. A. Shcherbakov, Y. V. Stebunov, D. F. Baidin, T. Kämpfe, and Y. Jourlin, Direct S-matrix calculation for diffractive structures and metasurfaces, *Phys. Rev. E* 97, 063301 (2018)

21. A. A. Shcherbakov, Calculation of the electromagnetic scattering by non-spherical particles based on the volume integral equation in the spherical wave function basis, *J. Quant. Spectrosc. Radiat. Transf.* 231, 102-114 (2019)
22. A. A. Shcherbakov, Curvilinear coordinate Generalized Source Method for gratings with sharp edges, *J. Opt. Soc. Am. A* 36, 1402-1409 (2019)