

Mushegh Spartak Rafayelyan

Research Institute of Physics

Ֆոտոնիկայի և արհեստական բանականության լաբորատորիա
Head of laboratory

☎ 23-21

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Education

Institution	University of Bordeaux
Faculty	Laboratoire Ondes et Matière d'Aquitaine
Date	2013 - 2017
Degree name	PhD student

Institution	Yerevan State University
Faculty	Faculty of physics
Date	2012 - 2015
Degree name	PhD student

Institution	Yerevan State University
Faculty	Faculty of physics
Date	2010 - 2012
Degree name	Masters

Institution	Yerevan State University
Faculty	Faculty of physics
Date	2006 - 2010
Degree name	Bachelor

Scientific Rank/degree

Institution	Laboratoire Ondes et Matière d'Aquitaine, University of Bordeaux
Date	2017
Degree name	Postgraduate
Scientific Supervisor	Etienne Brasselet
Research Topic	Singular Beam Shaping From Spin-Orbit Flat Optics

Institution	Yerevan State University
Date	2015
Degree name	Candidate
Specialty	Physico-mathematical sciences
Scientific Supervisor	Ashot Gevorgyan
Research Topic	Optical properties of metamaterial-based cholesteric liquid crystals

Language skills

Հայերեն English Français Русский

Work experience

Institution	Yerevan State University
Period of time	2025 till now
Rank/degree	Head of laboratory

Publications

Article

Rewritable Binary Recording of the Photon Spin State in Chiral Liquid Crystals

Nicolas Bruni, Charles Loussert, Mushegh Rafayelyan, Tetiana Orlova, Delphine Coursault,

Etienne Brasselet

Physical Review Letters 2025 223804

Article

Light-induced isotropic pen for generation of topological solitons and hopfion-toron transition in frustrated chiral nematic films

Sergey A. Shvetsov, Darina D. Darmoroz, Alexey Vasil'ev, Tetiana Orlova, Igor S. Lobanov,

Mushegh Rafayelyan

Chaos, Solitons and Fractals 2025 116905

Article

On-Demand Photopatterned Twisted Nematics for Generation of Polychromatic Vector Fields

Edvard Grigoryan, Hayk H. Harutyunyan, Hrayr Hakobyan, Sergey A. Shvetsov, Tetiana Orlova,

Mushegh Rafayelyan, Vahram L. Grigoryan

Crystals 2025 877

Article

Single-Path Spatial Polarization Modulation for Vector Transmission Matrix Measurement and Polarization Control in Scattering Media

Edvard Grigoryan, Aram Sargsyan, Tatevik Sarukhanyan, Mushegh Rafayelyan

Photonics 2025 1145

Article

Nanostructured Material Design via a Retrieval-Augmented Generation (RAG) Approach: Bridging Laboratory Practice and Scientific Literature

Nikita A. Krotkov, Dmitrii A. Sbytov, Anna A. Chakhoyan, Polina I. Kornienko, Anna A. Starikova,

Maxim G. Stepanov, Anastasiia O. Piven, Timur A. Aliev, Tetiana Orlova, Mushegh S. Rafayelyan,

Ekaterina V. Skorb

Journal of Chemical Information and Modeling 2025 11064-11078

Article

Low-Loss Multimode Waveguide Bends with Direct Laser Writing in Polymer

Tigran Baghdasaryan, Neshteh Kourian, Mushegh Rafayelyan, Tatevik Sarukhanyan

Micromachines 2025 1361

Article

Light-controllable liquid crystal platform for microparticle oscillations and transport

Sergey Shvetsov, Tetiana Orlova, Aleksandr Hayrapetyan, Alexey Vasil'ev, Mushegh Rafayelyan

Soft Matter 2024 6920-6928

Article

Tunable spin-glass optical simulator based on multiple light scattering

Gianni Jacucci, Louis Delloye, Davide Pierangeli, Mushegh Rafayelyan, Claudio Conti, Sylvain Gigan

Physical Review A 2022 033502

Article

Optical cloaking of macroscopic objects by geometric-phase vortex processing

Mushegh Rafayelyan, Henrik Melkonyan, Arman Tigranyan, Etienne Brasselet

Journal of Optics 2022 094005

Article

Light localization in 1D chirped photonic crystals

A. H. Gevorgyan, N. A. Vanyushkin, M. S. Rafayelyan

European Physical Journal Plus 2022 719/1-8

Article

Asymptotic Stability in Reservoir Computing

Mushegh Rafayelyan, Jonathan Dong, Erik Börve, Michael Unser

IEEE Xplore 2022 01-08

Article

Особенности поглощения света в чирпированных одномерных фотонных кристаллах

А.А. Геворгян, Н.А. Ванюшкин, И.М. Ефимов, С.С. Голик, С.А. Мхитарян, М.З. Арутюнян,

М.С. Рафаелян

Оптика и спектроскопия (Optics and Spectroscopy) 2022 1583-1589

Article

Magnetically Induced Transparency in Media with Helical Dichroic Structure

Mushegh S. Rafayelyan, Gvidon K. Matinyan, Hermine Gharagulyan, Tatevik M. Sarukhanyan,

Meruzhan Z. Hautyunyan, Ilya M. Efimov, Nikolay A. Vanyushkin, Sergey S. Golik, Ashot H. Gevorgyan

MATERIALS 2021 2172

Article

Scalable spin-glass optical simulator

Mushegh Rafayelyan, Davide Pierangeli, Claudio Conti, Sylvain Gigan

PHYSICAL REVIEW APPLIED 2021 034087

Article

Multimode Robust Lasing in a Dye-Doped Polymer Layer Embedded in a Wedge-Shaped Cholesteric

Tatevik M. Sarukhanyan, Hermine Gharagulyan, Mushegh S. Rafayelyan, Sergey S. Golik,
Ashot H. Gevorgyan, Roman B. Alaverdyan
Molecules 2021 6089

Article

Large-Scale Optical Reservoir Computing for Spatiotemporal Chaotic Systems Prediction

Mushegh Rafayelyan, Jonathan Dong, Yongqi Tan, Florent Krzakala, Sylvain Gigan

Physical Review X 2020 041037

Article

Reservoir Computing meets Recurrent Kernels and Structured Transforms

Mushegh Rafayelyan, Jonathan Dong, Ruben Ohana, Florent Krzakala

Advances in Neural Information Processing Systems 2020 16785-16796

Article

Optical Reservoir Computing Using Multiple Light Scattering for Chaotic Systems Prediction

Jonathan Dong, Mushegh Rafayelyan, Florent Krzakala, Sylvain Gigan

IEEE JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS 2020 1-12

Article

Spin-to-orbital angular momentum mapping of polychromatic light

Mushegh Rafayelyan, Etienne Brasselet

Physical Review Letters 2018 213903

Article

Laguerre-Gaussian quasi-modal q-plates from nanostructured glasses

Mushegh Rafayelyan, Titas Gertus, Etienne Brasselet

Applied Physics Letters 2017 261108

Article

Laguerre-Gaussian modal q-plates

Mushegh Rafayelyan, Etienne Brasselet

Optics Letters 2017 1966-1969

Article

Ultrabroadband gradient-pitch Bragg-Berry mirrors

Mushegh Rafayelyan, Gonzague Agez, Etienne Brasselet

Physical Review A 2017 043862

Article

Spin-orbit optomechanics of optically levitated chiral Bragg microspheres

Georgiy Tkachenko, Mushegh Rafayelyan, Etienne Brasselet

Physical Review A 2017 053839

Article

Reflective spin-orbit geometric phase from chiral anisotropic optical media

Georgiy Tkachenko, Mushegh Rafayelyan, Etienne Brasselet

Physical Review Letters 2016 253902

Article

Bragg-Berry mirrors: reflective broadband q-plates

Mushegh Rafayelyan, Etienne Brasselet

Optics Letters 2016 3972-3975

Conference

Nonlinear spatiotemporal dynamics of liquid crystals under the illumination of an inhomogeneous light field

A. Mirzoyan, M. Rafayelyan, V. Grigoryan

Conference

Bragg-Berry cavities: orbital angular momentum manipulation of broadband light beams

Sergey Shvetsov, Vahram Grigoryan, Valeri Abrahamyan, Nune Hakobyan, Hakob Margaryan,

Mushegh Rafayelyan

Conference

The role of the geometric phase in cholesteric with a defect layer toward multimodal robust lasing

T.M. Sarukhanyan, M.S. Rafayelyan, H. Gharagulyan, R.B. Alaverdyan, S.S. Golik, A.H. Gevorgyan
