europass

# Mikhail Makarov

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**Address:** Ulitsa Dmitriya Razumovskogo, building 2315Б, flat 106, 124365, Zelenograd, Russia (Home)

## ABOUT ME

I am a software engineer specializing in front-end application development. With a proven track record of creating visually stunning and user-friendly websites, coupled with a passion for clean and efficient coding, I am excited about the opportunity to contribute my skills and expertise to your team

## WORK EXPERIENCE

01/09/2022 – CURRENT Moscow, Russia
**SOFTWARE ENGINEER** JSC FLAT

- Created an administrative panel website for the Tretyakov Gallery
- Conducting bug fixing, security updates, migration to new API scheme, and routine maintaining of existing frontend applications
- Implementing new features such as custom photo uploader, complex forms and validation rules
- Working closely with the QA team and backend developer to set up CI/CD on Jenkins
- Creating custom stylesheets to match the corporate theme

**Business or Sector** Information and communication | **Department** Software development team | **Email** info@flat-soft.ru |

**Website** https://flat-soft.ru/

01/09/2016 – CURRENT Zelenograd, Russia
**SENIOR RESEARCHER** JSC MOLECULAR ELECTRONICS RESEARCH INSTITUTE

- Carring out theoretical and numerical simulations of different integrated optics devices using Comsol Multiphysics
- Working as a technical expert on neural network accelerators, photonic tensor processors and ADCs
- Writing scientific papers and presenting them on conferences
- Communicating with multi-diciplinary teams of scientists, engineers and managers

**Business or Sector** Professional, scientific and technical activities | **Department** Radiophotonics laboratory |

**Website** https://www.niime.ru/

## DIGITAL SKILLS

JavaScript | TypeScript | Vue.js | HTML | CSS | SASS | SCSS | Vite | webpack | npm | element-plus.js | git | State Management - Vuex, Pinia - Expert | Node.js, Express.js | Vue CLI | Jenkins | SPA and PWA | Vue router | Bootstrap | Google Firebase | Bubblewrap | Microsoft Office

## EDUCATION AND TRAINING

01/09/2014 – 01/08/2016 Russia
**MASTER OF SCIENE (APPLIED MATHEMATICS AND PHYSICS)** Moscow Institute of Physics and Technology (MIPT)

01/09/2010 – 01/08/2014 Dolgoprudny, Russia
**BACHELOR (APPLIED MATHEMATICS AND PHYSICS)** Moscow Institute of Physics and Technology (MIPT)

**Website** https://eng.mipt.ru/

## LANGUAGE SKILLS

Mother tongue(s): **RUSSIAN**

Other language(s):

| | UNDERSTANDING | | SPEAKING | | WRITING |
|---|---|---|---|---|---|
| | Listening | Reading | Spoken production | Spoken interaction | |
| **ENGLISH** | B2 | B2 | B2 | B2 | B2 |

*Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user*

## ADDITIONAL INFORMATION

### PUBLICATIONS

**Energy-Efficient Photonic Memory Cell with Spatially Separated Recording/Erasing and Readout Channels** – 2022

Phase change material Ge2Sb2Te5 (GST) is a promising candidate for non-volatile photonic devices due to its phase stability, different absorption coefficients in the amorphous and crystalline phase, and relatively fast response. Here, we proposed an energy-efficient design of a photonic non-volatile memory that stores its logical status as GST phase states. The device is based on the Silicon-On-Insulator (SOI) substrate and consists of the fourfold symmetric strip waveguide crossing incorporated with the square GST patch and a multimode interference (MMI) loop reflector. The distinctive feature of the proposed cell is two spatially separated recording/erasing and readout channels. One of the crossed waveguides is connected to the MMI loop reflector and used for recording/erasing. The other waveguide is used for readout. The numerical simulation of the light transmission through the device in question shows that the MMI loop reflector provides 45% and 80% higher absorption values in comparison with waveguide end reflector and straightforward transmission, respectively. This fact allows the more efficient utilization of the guided mode energy and makes the proposed photonic memory cell an attractive node element for photonic integrated circuits.

Physica status solidi (b) / Published by Wiley-VCH Verlag · Jun 1, 2022

**Numerical simulation of effective light transmission through a photonic memory cell** – 2021

This paper is devoted to numerical simulation of a non-volatile photonic memory cell based on phase-change material Ge2Sb2Te5. The parameters of light propagation are presented for both crystalline and amorphous Ge2Sb2Te5 phases. The cell structure is optimized for a single TE-mode regime that is suitable for short- and long-distance communication lines.ription...

Journal of Physics: Conference Series / Published under licence by IOP Publishing Ltd · Dec 1, 2021

**Peculiarities of the synthesis of GST films by magnetron sputtering for nonvolatile optical memory cells** – 2020

The structure and optical properties of thin films of the chalcogenide semiconductor Ge 2 Sb 2 Te 5 , deposited by magnetron sputtering, was studied. A significant change in the topology and optical properties of the films is demonstrated with varying deposition conditions. It is shown that an increase in the deposition time leads to an increase in the surface roughness. Doping with nitrogen during deposition leads to a smoothing of the film surface, and also provides a strong change in the band structure and optical properties.

Journal of Physics: Conference Series / Published under licence by IOP Publishing Ltd · Dec 1, 2020

**Performance of an optical non-volatile Ge 2 Sb 2 Te 5 -based storage element** – 2020

Considerable growth in data exchange leads to enhanced requirements for computing, storage, and transmitting devices. Promising solutions to this challenge can be found in the use of phase-change materials. This paper is devoted to evaluating the frequency response of a non-volatile storage element with optical recording and readout. The evaluation shows that it is possible to reduce the device's operating cycle time and improve its performance.

Journal of Physics: Conference Series / Published under licence by IOP Publishing Ltd · Dec 1, 2020

**Reflection spectra of a thin-film GeSbTe diffraction grating on a silicon nitride waveguide** – 2020

Recent advances in nanophotonics are due to the implication of new approaches to the photonic devices and components design, not only related to structural features, such as subwavelength periodic arrangements, but also new materials, e.g., phase-change materials like GeSbTe (GST) alloys. We consider recently proposed optical non-volatile GST memory cell with a GST diffraction grating instead of a continuous film placed on a silicon nitride waveguide. The grating allows diminishing the energy budget of an incident electromagnetic beam in case of an optically induced phase transition of GST due to excitation of the resonant guided mode in the grating. The excitation of this mode results in anomalous reflectance spectra of the waveguide-grating structure. Here, we present the reflection spectra of GST diffraction gratings on a silicon nitride waveguide calculated with the use of the matrix Riccati equation technique in the theory of multiple electromagnetic wave scattering in inhomogeneous media. We show how the reflection changes with variation of different parameters – grating period and height, incident wave polarization, and phase of the GST film.

IOP Conference Series: Materials Science and Engineering Jun 1, 2020

**Simulation of Mach–Zehnder modulator with ultra-responsive phase shifters** – 2020

This work is devoted to the simulation of the silicon Mach–Zehnder modulator operation with a phase shifter based on u-shaped p-n junction. The extinction ratio of 14.5 dB and the operation frequency of 20 GHz were achieved.

Conference: 2020 Photonics North (PN) / IEEE · May 1, 2020

## PROJECTS

2023

**Ring Resonator** The app provides a possibility to calculate the following parameters of a microring resonator:

- FSR
- Peak wavelength

**Link** https://play.google.com/store/apps/details?id=app.web.ringresonator_f99e6.twa&pli=1