

## Publications

---

### *Article*

#### **Artificial intelligence guided search for van der Waals materials with high optical anisotropy**

Liudmila A. Bereznikova, Ivan A. Kruglov, Georgy A. Ermolaev, Ivan Trofimov, Congwei Xie,

Arslan Mazitov, Gleb Tselikov, Anton Minnekhanov, Alexey P. Tsapenko, Maxim Povolotsky,

Davit A. Ghazaryan, Aleksey V. Arsenin, Valentyn S. Volkov, Kostya S. Novoselov

Materials Horizons 2025 1953 - 1961

---

### *Article*

#### **Optical Properties of Biaxial van der Waals Crystals for Photonic Applications**

A. Slavich, G. Ermolaev, I. Zavidovskiy, D. Grudinin, M. Tatmyshevskiy, A. Toksumakov, A. Syuy,

A. Vyshnevyy, D. Yakubovsky, S. Novikov, D. Ghazaryan, A. Arsenin, V. Volkov

Bulletin of the Russian Academy of Sciences: Physics 2025 S433 - S438

---

### *Article*

#### **In-Plane Directional MoS<sub>2</sub> Emitter Employing Dielectric Nanowire Cavity**

Alexey Kuznetsov, Maria Aleksandrovna Anikina, Adilet Nurlanbekovich Toksumakov,

Artem Nikolaevich Abramov, Vyacheslav Vsevolodovich Dremov, Eseniya Zavyalova,

Valeriy Mikhailovich Kondratev, Vladimir Victorovich Federov, Ivan Sergeevich Mukhin, Vasily Kravtsov,

Kostya Sergeevich Novoselov, Aleksey Vladimirovich Arsenin, Valentyn Sergeevich Volkov,

Davit Armenovich Ghazaryan, Alexey Dmitrievich Bolshakov

Small Structures 2025 2400476

---

### *Article*

#### **Germanium disulfide as an alternative high refractive index and transparent material for UV-visible nanophotonics**

Aleksandr S. Slavich, Georgy A. Ermolaev, Ilya A. Zavidovskiy, Dmitriy V. Grudinin,

Konstantin V. Kravtsov, Mikhail K. Tatmyshevskiy, Mikhail S. Mironov, Adilet N. Toksumakov,

Gleb I. Tselikov, Iliya M. Fradkin, Kirill V. Voronin, Maksim R. Povolotskiy, Olga G. Matveeva,

Alexander V. Syuy, Dmitry I. Yakubovsky, Dmitry M. Tsymbarenko, Ivan Kruglov, Davit A. Ghazaryan,

Sergey M. Novikov, Andrey A. Vyshnevyy, Aleksey V. Arsenin, Valentyn S. Volkov, Kostya S. Novoselov

Light: Science and Applications 2025 213

---

### *Article*

#### **Exploring van der Waals materials with high anisotropy: geometrical and optical approaches**

Aleksandr S Slavich, Georgy A Ermolaev, Mikhail K Tatmyshevskiy, Adilet N Toksumakov,

Olga G Matveeva, Dmitriy V Grudinin, Kirill V Voronin, Arslan Mazitov, Konstantin V Kravtsov,

Alexander V Syuy, Dmitry M Tsymbarenko, Mikhail S Mironov, Sergey M Novikov, Ivan Kruglov,

Davit A Ghazaryan, Andrey A Vyshnevyy, Aleksey V Arsenin, Valentyn S Volkov, Kostya S Novoselov

Light: Science and Applications 2024 68

---

Article

**Wandering principal optical axes in van der Waals triclinic materials**

Georgy A Ermolaev, Kirill V Voronin, Adilet N Toksumakov, Dmitriy V Grudin, Ilia M Fradkin, Arslan Mazitov, Aleksandr S Slavich, Mikhail K Tatmyshevskiy, Dmitry I Yakubovsky, Valentin R Solovey, Roman V Kirtaev, Sergey M Novikov, Elena S Zhukova, Ivan Kruglov, Andrey A Vyshnevyy, Denis G Baranov, Davit A Ghazaryan, Aleksey V Arsenin, Luis Martin-Moreno, Valentyn S Volkov, Kostya S Novoselov  
Nature Communications 2024 1552

---

Article

**Broadband optical properties of Ti<sub>3</sub>C<sub>2</sub> MXene revisited**

Aleksey V. Arsenin, Valentyn S. Volkov, Daria A. Panova, Gleb I. Tselikov, Georgy A. Ermolaev, Alexander V. Syuy, Dmitrii S. Zimbovskii, Olesya O. Kapitanova, Dmitry I. Yakubovsky, Arslan B. Mazitov, Ivan A. Kruglov, Andrey A. Vyshnevyy  
Optics Letters 2024 25-28

---

Article

**Crystallinity as a factor of SERS stability of silver nanoparticles formed by Ar<sup>+</sup> irradiation**

Aleksey V. Arsenin, Valentyn S. Volkov, Natalia V. Doroshina, Oleg A. Streletskiy, Ilya A. Zavidovskiy, Mikhail K. Tatmyshevskiy, Gleb I. Tselikov, Olesya O. Kapitanova, Alexander V. Syuy, Roman Romanov, Prabhask Mishra, Vjaceslavs Bobrovs, Andrey M. Markeev, Dmitry I. Yakubovsky, Irina A. Veselova, Sergey M. Novikov  
Heliyon 2024 e27538

---

Article

**Chiral Photonic Super-Crystals Based on Helical van der Waals Homostructures**

Kirill V. Voronin, Adilet N. Toksumakov, Georgy A. Ermolaev, Aleksandr S. Slavich, Mikhail K. Tatmyshevskiy, Sergey M. Novikov, Andrey A. Vyshnevyy, Aleksey V. Arsenin, Kostya S. Novoselov, Davit A. Ghazaryan, Valentyn S. Volkov, Denis G. Baranov  
Laser and Photonics Reviews 2024 2301113

---

Article

**Programmable Carbon Nanotube Networks: Controlling Optical Properties Through Orientation and Interaction**

Kirill V. Voronin, Georgy A. Ermolaev, Maria G. Burdanova, Aleksandr S. Slavich, Adilet N. Toksumakov, Dmitry I. Yakubovsky, Maksim I. Paukov, Ying Xie, Liu Qian, Daria S. Kopylova, Dmitry V. Krasnikov, Davit A. Ghazaryan, Denis G. Baranov, Alexander I. Chernov, Albert G. Nasibulin, Jin Zhang, Aleksey V. Arsenin, Valentyn Volkov  
Advanced Science 2024 2404694

---

Article

**Polarization control of lasing from few-layer MoTe<sub>2</sub> coupled with the optical metasurface supporting quasi-trapped modes**

A. V. Prokhorov, A. N. Toksumakov, A. V. Shesterikov, F. M. Maksimov, M. K. Tatmyshevskiy, M. Yu. Gubin, R. V. Kirtaev, E. I. Titova, D. I. Yakubovsky, E. S. Zhukova, V. V. Burdin, S. M. Novikov, A. I. Chernov, D. A. Ghazaryan, A. V. Arsenin, V. S. Volkov  
Applied Physics Letters 2024 041702

---

Article

**Anisotropic Optical Properties of Monolayer Aligned Single-Walled Carbon Nanotubes**

Aleksey V. Arsenin, Valentyn S. Volkov, Georgy A. Ermolaev, Ying Xie, Liu Qian, Mikhail K. Tatmyshevskiy, Aleksandr S. Slavich, Jin Zhang, Alexander I. Chernov  
Physica Status Solidi - Rapid Research Letters 2024 2300199

---

Article

**Exploring stable hot carrier multiplication in filled carbon nanotubes**

Aleksey V. Arsenin, Maksim I. Paukov, Shuang Sun, Anna A. Vorfolomeeva, Alexander V. Syuy, Roman I. Romanov, Mikhail S. Mironov, Andrey A. Vyshnevyy, Gennadiy A. Komandin, Lyubov G. Bulusheva, Alexander V. Okotrub, Valentyn Volkov, Yan Zhang, Maria G. Burdanova  
Carbon 2024 119580

---

Article

**Laser-synthesized TiN-based nanoparticles as novel efficient electrostatic nanosorbent for environmental water cleaning**

Aleksey V Arsenin, Valentyn S Volkov, Alexander V Syuy, Ilya V Martynov, Ilya A Zavidovskiy, Dmitry V Dyubo, Qingjiang Sun, Xi Yang, Gleb V Tikhonowski, Daniil I Tselikov, Maxim S Savinov, Islam V Sozaev, Anton A Popov, Sergey M Klimentov, Gleb I Tselikov, Sergey M Novikov, Xiangwei Zhao, Andrei V Kabashin  
Physica Scripta 2024 115914

---

Article

**Leveraging Femtosecond Laser Ablation for Tunable Near-Infrared Optical Properties in MoS<sub>2</sub>-Gold Nanocomposites**

Aleksey V. Arsenin, Alexey D. Bolshakov, Ilya A. Zavidovskiy, Ilya V. Martynov, Daniil I. Tselikov, Alexander V. Syuy, Anton A. Popov, Sergey M. Novikov, Andrei V. Kabashin, Gleb I. Tselikov, Valentyn S. Volkov  
Nanomaterials 2024 1961

---

Article

**Unveiling the broadband optical properties of Bi<sub>2</sub>Te<sub>3</sub>: Ultrahigh refractive index and promising applications**

Aleksey V. Arsenin, Valentyn S. Volkov, Georgy A. Ermolaev, et al.  
Applied Physics Letters 2024 241101

---

Article

**SERS analysis of single cells and subcellular components: A review**

A. Arsenin, V. Volkov, M. Barshutina  
Heliyon 2024 e37396

---

Article

**Graphene on SiO<sub>2</sub>/Si and Al<sub>2</sub>O<sub>3</sub> under thermal annealing and electric current: Competition of dopant desorption and conformation to substrate**

E.A. Kolesov, M.S. Tivanov, O.V. Korolik, I.A. Svito, A.S. Antonovich, Yu. Klishin, D.A. Ghazaryan, A.V. Arsenin, V.S. Volkov, O.O. Kapitanova, G.N. Panin  
Diamond and Related Materials 2023 110362

---

Article

## **Dry Assembly of van der Waals Heterostructures Using Exfoliated and CVD-Grown 2D Materials**

Adilet N. Toksumakov, M. N. Sidorova, A. S. Slavich, M. K. Tatmyshevskiy, I. A. Zavidovskiy,  
G. A. Ermolaev, V. S. Volkov, D. A. Ghazaryan, A. V. Arsenin

Bulletin of the Russian Academy of Sciences: Physics 2023 S453-S457

---

*Article*

## **Hexagonal boron nitride nanophotonics: a record-breaking material for the ultraviolet and visible spectral ranges**

D. V. Grudinina, G. A. Ermolaev, D. G. Baranov, A. N. Toksumakov, K. V. Voronin, A. S. Slavich,  
A. A. Vyshnevyy, A. B. Mazitov, I. A. Kruglov, D. A. Ghazaryan, A. V. Arsenin, K. S. Novoselov, V. S. Volkov  
Materials Horizons 2023 2427-2435

---

*Article*

## **Anomalous optical response of graphene on hexagonal boron nitride substrates**

Adilet N Toksumakov, Georgy A Ermolaev, Mikhail K Tatmyshevskiy, Yuri A Klishin, Aleksandr S Slavich,  
Ilya V Begichev, Dusan Stosic, Dmitry I Yakubovsky, Dmitry G Kvashnin, Andrey A Vyshnevyy,  
Aleksey V Arsenin, Valentyn S Volkov, Davit A. Ghazaryan

Communications Physics 2023 13

---

*Article*

## **Tunable THz flat zone plate based on stretchable single-walled carbon nanotube thin film**

Gleb M Katyba, Nikita I Raginov, Eldar M Khabushev, Vladislav A Zhelnov, Andrei Gorodetsky,  
Davit A Ghazaryan, Mikhail S Mironov, Dmitriy V Krasnikov, Yuri G Gladush, James Lloyd-Hughes,  
Albert G Nasibulin, Aleksey V Arsenin, Valentyn S Volkov, Kirill I Zaytsev, Maria G Burdanova

Optica 2023 53-61

---

*Article*

## **Optical Nanoimaging of Surface Plasmon Polaritons Supported by Ultrathin Metal Films**

Aleksey V. Arsenin, Valentyn S. Volkov, Dmitriy I. Yakubovsky, Dmitriy V. Grudinina, Georgy A. Ermolaev,  
Kirill Voronin, Dmitry A. Svintsov, Andrey A. Vyshnevyy, Mikhail S. Mironov

Nano Letters 2023 9461-9467

---

*Article*

## **Physisorption-Mediated Charge Transfer in TiS<sub>2</sub> Nanodiscs: A Room Temperature Sensor for Highly Sensitive and Reversible Carbon Dioxide Detection**

Aleksey V. Arsenin, Valentyn S. Volkov, Samrah Manzoor, Mohammad Talib, Sergey M. Novikov,

Prabhash Mishra

ACS Sensors 2023 3435-3447

---

*Article*

## **van der Waals Materials for Overcoming Fundamental Limitations in Photonic Integrated Circuitry**

Aleksey V. Arsenin, Valentyn S. Volkov, Andrey A. Vyshnevyy, Georgy A. Ermolaev, Dmitriy V. Grudinina,  
Kirill V. Voronin, Ivan Kharichkin, Arslan Mazitov, Ivan A. Kruglov, Dmitry I. Yakubovsky, Prabhash Mishra,  
Roman V. Kirtaev, Kostya S. Novoselov, Luis Martin-Moreno

Nano Letters 2023 8057-8064

---

Article

**Elastic Gallium Phosphide Nanowire Optical Waveguides—Versatile Subwavelength Platform for Integrated Photonics**

Alexey Kuznetsov, Eduard Moiseev, Artem N. Abramov, Nikita Fominykh, Vladislav A. Sharov, Valeriy M. Kondratev, Ivan I. Shishkin, Konstantin P. Kotlyar, Demid A. Kirilenko, Vladimir V. Fedorov, Svetlana A. Kadinskaya, Alexandr A. Vorobyev, Ivan S. Mukhin, Aleksey V. Arsenin, Valentyn S. Volkov, Vasily Kravtsov, Alexey D. Bolshakov

Small 2023 2301660

---

Article

**Self-assembled photonic structure: a Ga optical antenna on GaP nanowires**

Alexey Kuznetsov, Prithu Roy, Dmitry V. Grudin, Valeriy M. Kondratev, Svetlana A. Kadinskaya, Alexandr A. Vorobyev, Konstantin P. Kotlyar, Evgeniy V. Ubyivovk, Vladimir V. Fedorov, George E. Cirlin, Ivan S. Mukhin, Aleksey V. Arsenin, Valentyn S. Volkov, Alexey D. Bolshakov

Nanoscale 2023 2332 - 2339

---

Article

**Photoluminescence anisotropy in hybrid nanostructures based on gallium phosphide nanowire and 2D transition metal dichalcogenides**

MA Anikina, A Kuznetsov, AN Toksumakov, VV Dremov, DA Ghazaryan, VV Fedorov, AV Arsenin, VS Volkov, AD Bolshakov

St. Petersburg State Polytechnical University Journal: Physics and Mathematics 2023 3.2

---

Article

**Temperature-dependent Raman spectroscopy and thermal conductivity of TiS<sub>2</sub> hexagonal nanodiscs**

Mohammad Talib, Samrah Manzoor, Davit A. Ghazaryan, Aleksey V. Arsenin, Valentyn S. Volkov, Prabhash Mishra

Materials Science in Semiconductor Processing 2022 107084

---

Article

**High-refractive index and mechanically cleavable non-van der Waals InGaS<sub>3</sub>**

Adilet N. Toksumakov, Georgy A. Ermolaev, Aleksandr S. Slavich, Natalia V. Doroshina,, Ekaterina V. Sukhanova, Dmitry I. Yakubovsky, Alexander V. Syuy, Sergey M. Novikov,, Roman I. Romanov, Andrey M. Markeev, Aleksandr S. Oreshonkov, Dmitry M. Tsymbarenko, Zakhar I. Popov, Dmitry G. Kvashnin, Andrey A . Vyshnevyy, Aleksey V. Arsenin, Davit A. Ghazaryan, Valentyn S. Volkov

npj 2D Materials and Applications 2022 85

---

Article

**Broadband optical and terahertz properties of 1D van der Waals heteronanotubes**

Maria G. Burdanova, Yongjia Zheng, Maksim I. Paukov, Georgy A. Ermolaev, Gennady A. Komandin, Davit Ghazaryan, Sergey Novikov, Rong Xiang, Shohei Chiashi, Shigeo Maruyama, James Lloyd-Hughes, Alexey V. Arsenin, Valentin Volkov

IEEE Photonics Journal 2022 182243

---