Updated September, 2021

Prof. DMITRY S. PONOMAREV

Deputy Director, Chief Researcher

Institute of ultra-high frequency semiconductor electronics of Russian academy of sciences
Laboratory of high-power microwave and mm-wave applications
Russia, 117105 Moscow, Nagorny proezd 7, build. 5 (IUHFSE RAS)
Tel. +7(499) 123-44-64
Fax +7(499) 123-44-64
Cell ph. +7(926) 855-27-31
E-mail: ponomarev_dmitr@mail.ru
ResearchGate page - https://www.researchgate.net/profile/Dmitry_Ponomarev6

Education

Ph.D. is Physics and Math., Moscow State Institute of Radio Engineering, Electronics and Automation 2012

M.D. in Physics and Math., Moscow Engineering Physics Institute 2009

Professional appointments

Institute of ultra-high frequency semiconductor electronics of Russian academy of sciences (IUHFSE RAS)

Deputy Director	2014–p.t.
Professor	2018–p.t.
Chief researcher	2016–p.t.
Senior researcher	2013–2014
Junior researcher	2012–2013

Moscow Institute of Physics and Technology (MIPT), Center for Photonics and 2D Materials

Chief researcher	2018–2020

Prokhorov General Physics Institute of the Russian Academy of Sciences (GPI RAS), Laboratory of Broadband Dielectric Spectroscopy

Chief researcher	2018–p.t.

National Research Nuclear University Moscow Engineering Physics Institute

Assistant Professor	2012
Engineer	2009–2012

Research interests

- THz devices and applications
- Low-dimensional systems of A3B5 compounds
- Microwave and mm-wave semiconductor device physics

Honors/Awards/Participation

• Laureate of the Annual Prize for the physicists of the Government of Moscow for his contribution to the development of photonics and optoelectronics THz devices	2020
• Gold medal Winner of the Russian academy of Sciences for his contribution to the development of THz quantum-cascade lasers	2019
• Winner of the President of Russia scholarship for young scientists MK-5450.2018.2	2014
• Winner of Skolkovo Summer school for young leaders in science (at OpUS)	2018
• Scholarship Diploma of the Mokerov foundation for the support of science and education	2011
• Diplomas for the best issue on the Kurchatov's school for young scientists	2009, 2011
• Full member of scientific consortium "Prospective materials and electron component base for telecommunication systems"	2015
• Certificated expert of the Russian academy of Sciences	2016
• Certificated expert of the Russian Science Foundation	2019
• Full member of scientific council at 2D materials and Photonics Center, MIPT	2019
• Full member of scientific council at IUHFSE RAS	2014
• Full member of scientific council at Mokerov's foundation for the support of science and education	2018

Language proficiency

Russian: native
English: advanced
Italian: basic

Principal Investigator of the Projects

1. Russian Science Foundation (RSF), grant 18-79-10195 "*Photoconductive antennas based on novel physical principles for the development of instruments for medical diagnosis of malignancies: manufacturing technology, theoretical and experimental studies*", duration 2018-2021; prolongation 2021-2023,

2. Ministry of Science and Higher Education of the Russian Federation, project AAAA-A19-119071890026-2 "*InGaAs/InAlAs strain-induced superlattices for THz photomixers*", duration 2019-2021,

3. Federal Agency for Scientific Organizations, project AAAA-A18-118030590049-2 "*Exploratory research aimed at the development of THz emitters and detectors (high-electron mobility transistor and a photoconductive antenna on a chip)*", duration 2018 year,

4. Federal Agency for Scientific Organizations, project AAAA-A17-117070550013-2 "*Development of the physical principles of manufacturing technology of low-temperature grown GaAs and/or InGaAs photoconductive substrates for THz emitters (frequency range 0.5 THz-5.0 THz)*", duration 2017 year,

5. Russian foundation for basic research (RFBR), grant 20-32-70129 "*Photoconductive semiconductor-based optical-to-terahertz converters with increased efficiency featuring plasmonic and sub-diffraction caustics*", duration 2019-2020.

6. RFBR grant 18-07-01145 "*Terahertz detector based on GaAs structure with Sn nanothreads with quasi-one-dimensional electron transport*", duration 2018-2019.
7. RFBR grant 16-07-00187 "*Investigation of terahertz generation and detection in low-temperature grown metamorphic structures with high density of scattering centers*", duration 2016-2017.
8. RFBR grant 14-07-31108 "*Investigation of electron transport in AlGaAs/InGaAs/(Al)GaAs heterostructures with the composite spacer containing nano-sized AlAs barriers*", duration 2015-2016.
9. Research Institute of Electrical Communication (RIEC), Tohoku University, RIEC Nation-wide Cooperative Research Project H30/A04 "*Japan-Russia International collaborative research on gated GaAs structures with an array of self-assembled Sn-nanothreads and their terahertz applications*", duration 2018-2019. The host team PI is Prof. Taiichi Otsuji, http://www.otsuji.riec.tohoku.ac.jp/english/index_en.php
10. RIEC Nation-wide Cooperative Research Project H31/A31 "*Japan-Russia International collaborative research on high sensitive and tunable room-temperature plasmonic photoconductive antenna-detector*", duration 2019-2020.
11. RIEC Nation-wide Cooperative Research Project R02/A12 "*Japan-Russia International collaborative research on a large-area photoconductive terahertz detector for high-speed imaging*", duration 2020-2022.

Selected peer-reviewed publications

1. R. Henri, K. Nallappan, **D.S. Ponomarev**, H. Guerboukha, D.V. Lavrukhin, A.E. Yachmenev, R.A. Khabibullin, M. Skorobogatiy, *Fabrication and Characterization of an 8x8 Terahertz Photoconductive Antenna Array for Spatially Resolved Time Domain Spectroscopy and Imaging Applications*, IEEE Access, 9, 117691-117702 (2021); DOI: 10.1109/ACCESS.2021.3106227,
2. I. V. Minin, O. V. Minin, I. A. Glinskiy, R. A. Khabibullin, R. Malureanu, A. Lavrinenko, D. I. Yakubovsky, V. S. Volkov, and **D. S. Ponomarev**, *Experimental verification of a plasmonic hook in a dielectric Janus particle,* Appl. Phys. Lett. 118, 131107 (2021); DOI: 10.1063/5.0043923,
3. D. V. Lavrukhin, A. E. Yachmenev, Y. G. Goncharov, K. I. Zaytsev, R.A. Khabibullin, A. M. Buryakov, E. D. Mishina, and **D. S. Ponomarev**, *Strain-Induced InGaAs-Based Photoconductive Terahertz Antenna Detector*, IEEE Trans. THz. Sci. Technolog., 11(4), 417 – 424 (2021), DOI: 10.1109/TTHZ.2021.3079977,
4. I. E. Ilyakov, B. V. Shishkin, V. L. Malevich, **D. S. Ponomarev**, R. R. Galiev, A. Yu. Pavlov, A. E. Yachmenev, S. P. Kovalev, M. Chen, R. A. Akhmedzhanov, and R. A. Khabibullin, *Efficient optical-to-terahertz conversion in large-area InGaAs photo-Dember emitters with increased indium content*, Optics Letters, 46 (14), 3360-3363 (2021), DOI: 10.1364/OL.428599,
5. V. A. Zhelnov, K. I. Zaytsev, A. S. Kucheryavenko, G. M. Katyba, I. N. Dolganova, V. N. Kurlov, **D. S. Ponomarev**, M. Skorobogatiy and N. V. Chernomyrdin, *Object-dependent spatial resolution of the reflection-mode terahertz solid immersion microscopy*, Optics Express, 29(3), 3553-3566 (2021), DOI: 10.1364/OE.415049
6. A. A. Gavdush, N. V. Chernomyrdin, D. V. Lavrukhin, Yang Cao, G. A. Komandin, I. E. Spektor, A. N. Perov, I. N. Dolganova, G. M. Katyba, V. N. Kurlov, **D. S. Ponomarev**, M. Skorobogatiy, I. V. Reshetov, and K. I. Zaytsev, Proof of concept for continuously-tunable terahertz bandpass filter based on a gradient metal-hole array, Optics Express, 28(18), 26228–26238 (2020), DOI: 10.1364/OE.401608

7. D. Ushakov, A. Afonenko, R. Khabibullin, **D. Ponomarev**, V. Aleshkin, S. Morozov, and A. Dubinov, HgCdTe-based quantum cascade lasers operating in the GaAs phonon Reststrahlen band predicted by the balance equation method, Optics Express, 28(17), 25371-25382 (2020), DOI: 10.1364/OE.398552,
8. A.E. Yachmenev, S.S. Pushkarev, R. R. Reznik, R.A. Khabibullin, **D.S. Ponomarev**, *Arsenides-and related III-V materials-based multilayered structures for terahertz applications: various designs and growth technology*, Progress in Crystal Growth and Characterization of Materials, 66, 100485 (2020), DOI: 10.1016/j.pcrysgrow.2020.100485,
9. I.V. Minin, O.V. Minin, I.A. Glinskiy, R.A. Khabibullin, R. Malureanu, A.V. Lavrinenko, D.I. Yakubovsky, A.V. Arsenin, V.S. Volkov, **D.S. Ponomarev**, *Plasmonic nanojet: an experimental demonstration*, Optics Letters, 45(12), 3244-3247 (2020), DOI: 10.1364/OL.391861,
10. **D S Ponomarev**, D V Lavrukhin, A E Yachmenev, R A Khabibullin, I E Semenikhin, V V Vyurkov, K. Marem'yanin, V.I. Gavrilenko, M Ryzhii, M. Shur, T Otsuji and V Ryzhii, *Sub-terahertz FET detector with self-assembled Sn-nanothreads*, J. Phys. D: Appl. Phys. 53 075102 (2020), DOI: 10.1088/1361-6463/ab588f,
11. Kirill I Zaytsev, Irina N. Dolganova, Nikita V Chernomyrdin, Gleb M. Katyba, Arseniy Gavdush, Olga P. Cherkasova, Gennady Komandin, Marina A. Shchedrina, Anatoly N. Khodan, **Dmitry S. Ponomarev**, Igor V. Reshetov, Valerij Karasik, Maksim Skorobogatiy, Vladimir N Kurlov and Valery V Tuchin, *The progress and perspectives of terahertz technology for diagnosis of neoplasms: A review*, J. Optics, 22 013001 (2020), DOI: 10.1088/2040-8986/ab4dc3,
12. A.E. Yachmenev, D.V. Lavrukhin, I.A. Glinskiy, N.V. Zenchenko, Yu.G. Goncharov, I.E. Spektor, R.A. Khabibullin, T. Otsuji, and **D.S. Ponomarev**, *Metallic and dielectric metasurfaces in photoconductive terahertz devices: a review*, Optical Engineering, 59(6), 061608 (2019), DOI: 10.1117/1.OE.59.6.061608,
13. Lavrukhin, D.V., Yachmenev, A.E., Pavlov, A.Y., Khabibullin, R.A., Goncharov, Y.G., Spektor, I.E., Komandin, G.A., Yurchenko, S.O., Chernomyrdin, N.V., Zaytsev, K.I., **Ponomarev, D.S.** *Shaping the spectrum of terahertz photoconductive antenna by frequency-dependent impedance modulation*, Semiconductor Science and Technology, 34 (3), 034005 (2019), DOI: 10.1088/1361-6641/aaff31,
14. **Ponomarev, D.S.,** Gorodetsky, A., Yachmenev, A.E., Pushkarev, S.S., Khabibullin, R.A., Grekhov, M.M., Zaytsev, K.I., Khusyainov, D.I., Buryakov, A.M., Mishina, E.D. *Enhanced terahertz emission from strain-induced InGaAs/InAlAs superlattices*, Journal of Applied Physics, 125 (15), 151605 (2019), DOI: 10.1063/1.5079697,
15. D.V. Lavrukhin, A.E. Yachmenev, I.A. Glinskiy, R.A. Khabibullin, Y.G. Goncharov, M. Ryzhii, T. Otsuji, I.E. Spector, M. Shur, M. Skorobogatiy, K.I. Zaytsev, **D.S. Ponomarev**, *Terahertz photoconductive emitter with dielectric-embedded high-aspect-ratio plasmonic grating for operation with low-power optical pumps*, AIP Advances 9, 015112 5p. (2019), DOI: 10.1063/1.5081119,
16. Victor Ryzhii, **Dmitry S. Ponomarev**, Maxim Ryzhii, Vladimir Mitin, Michael S. Shur, and Taiichi Otsuji, *Negative and positive terahertz and infrared photoconductivity in uncooled graphene*, Optical Materials Express, 9(2), p. 585-597 (2019), DOI: 10.1364/OME.9.000585,
17. V. Ryzhii, M. Ryzhii, **D.S Ponomarev**, V.G. Leiman, V. Mitin, M.S. Shur, T. Otsuji, *Negative photoconductivity and hot-carrier bolometric detection of terahertz radiation in graphene-phosphorene hybrid structures*, Journal of Applied Physics, 125 (15), 151608 (2019), DOI: 10.1063/1.5054142,
18. R.A. Khabibullin, N.V. Shchavruk, **D.S. Ponomarev**, D.V. Ushakov, A.A. Afonenko, K.V. Maremyanin, O.Yu. Volkov, V.V. Pavlovskiy, A.A. Dubinov, *The operation of THz quantum*

cascade laser in the region of negative differential resistance, Opto-Electronics Review, 27 329–333 (2019), DOI: 10.1016/j.opelre.2019.11.002,

19. N. V. Chernomyrdin, A. S. Kucheryavenko, G. S. Kolontaeva, G. M. Katyba, I. N. Dolganova, P. A. Karalkin, **D. S. Ponomarev**, V. N. Kurlov, I. V. Reshetov, M. Skorobogatiy, V. V. Tuchin, and K. I. Zaytsev, Reflection-mode continuous-wave 0.15λ-resolution terahertz solid immersion microscopy of soft biological tissues, Applied Physics Letters, 113, 111102 (2018), DOI: 10.1063/1.5045480,
20. I.V. Minin, O.V. Minin, **D.S. Ponomarev**, I.A. Glinskiy. Photonic Hook Plasmons: A New Curved Surface Wave. Annalen der Physik. 530(12), 1800359 5p. (2018), DOI: 10.1002/andp.201800359,
21. V. Ryzhii, M. Ryzhii, D. Svintsov, V. Leiman, P. P. Maltsev, **D. S. Ponomarev**, V. Mitin, M. S. Shur, and T. Otsuji, *Real-space-transfer mechanism of negative differential conductivity in gated graphene-phosphorene hybrid structures: Phenomenological heating model*, Journal of Applied Physics 124(11), 114501 (2018), DOI: 10.1063/1.5046135,
22. V Ryzhii, T Otsuji, M Ryzhii, **D S Ponomarev**, V E Karasik, V G Leiman, V Mitin and M S Shur, *Electrical modulation of terahertz radiation using graphene-phosphorene heterostructures*, Semiconductor science and technology, 33 124010 (2018), DOI: 10.1088/1361-6641/aae9b2,
23. **D.S. Ponomarev**, D.V. Lavrukhin, A.E. Yachmenev, R.A. Khabibullin, I. Semenikhin, V. Vyurkov, M. Ryzhii, T. Otsuji, V. Ryzhii. *Lateral terahertz hot-electron bolometer based on an array of Sn nanothreads in GaAs*, Journal of Physics D: Applied Physics, 51, 135101 (2018), DOI: 10.1088/1361-6463/aab11d,
24. R.A. Khabibullin, A.E Yachmenev, D.V. Lavrukhin, **D.S Ponomarev**, A.S. Bugayev, P.P. Maltsev. *Pseudomorphic HEMT with Sn nanowires on a vicinal GaAs substrate*, Semiconductor Science and Technology, 30, 085009 (2015), DOI: 10.1088/0268-1242/30/8/085009,
25. V A Kulbachinskii, N A Yuzeeva, G B Galiev, E A Klimov, I S Vasil'evskii, R A Khabibullin, **D S Ponomarev**, *Electron effective masses in an InGaAs quantum well with InAs and GaAs inserts*, Semiconductor Science and Technology, 27(3), 035021 (2012), DOI: 10.1088/0268-1242/27/3/035021

Remarks

Total number of publications	125
Patents on invention (Intellectual Property Rights of Russian Federation)	8
Teaching courses	2
Plenary, invited and oral talks on international meetings	55