Dmitry V. Chubukov

31 y.o., PhD

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Current Affiliation

ITMO University, *Postdoc*, Saint Petersburg, Russia
Petersburg Nuclear Physics Institute, *Research fellow* (Division of Innovations, Quantum Chemistry Laboratory), Gatchina, Russia

Previous Affiliation

2014-2023 St. Petersburg State University, *Research engineer* (Quantum Mechanics Division), Saint Petersburg, Russia
2021-2023 St. Petersburg Electrotechnical University "LETI", *Assistant*, Saint Petersburg, Russia

Education

2020 PhD, *Violation of fundamental symmetries in atoms and molecules: P, T-odd Faraday effect and P-odd optical activity*, St. Petersburg State University, Russia
2016 Master of Science, St. Petersburg State University, Russia
2014 Bachelor of Science, St. Petersburg State University, Russia

Research Interests

Tests of fundamental theories in atomic and molecular physics
Parity and time-reversal violation effects
Electronic structure calculations in heavy atoms and diatomic molecules
Quantum electrodynamics of highly charged ions

Teaching Experience

2017-2018 St. Petersburg State University, *PhD student*, practice course of Theoretical Mechanics

2021-2023 St. Petersburg Electrotechnical University "LETI", *Assistant,* Higher Mathematics Division, Courses taught: practice courses of Mathematical Analysis and Algebra and Geometry

2022-Present ITMO University, Postdoc, practice courses of Quantum Mechanics and General Physics (Mechanics)

Languages

Russian	**Native**
English	**Upper Intermediate**

Fundings Obtained

Coordinator

2018-2019 RFBR 18-32-00150, “My First Grant” competition of the initiative scientific projects, *Theoretical investigation of parity nonconservation effects in light diatomic homonuclear molecules*

2017–2020 Foundation for the Development of Theoretical Physics and Mathematics ”BASIS”, PhD student grant 17-15-577-1, *Theoretical investigation of effects violating P- and P,T-parities in the physics of atomic systems*

2017 Individual grant from German-Russian Interdisciplinary Science Center (G-RISC) for research in Germany P-2017b-4, *Effects of parity nonconservation in highly charged ions and homonuclear diatomic molecules*

2016 Individual grant from German-Russian Interdisciplinary Science Center (G-RISC) for research in Germany P-2016b-1, *Space parity and combined parity nonconserving effects in diatomic molecules*

2015–2016 “Dynasty” foundation grant for students

2015 Individual grant from German-Russian Interdisciplinary Science Center (G-RISC) for research in Germany P-2015b-3, *Precise calculations of weak electron-electron interaction effect in molecular oxygen*

Main Participant

2022-2024 RSF 22-12-00043, *Theoretical studies of the fundamental properties of nature: time, temperature, and the phenomenon of polarization in the physics of atomic systems*

2020-2021 RSF 17-12-01035 (prolongation), *Theoretical investigation of effects connected with the presence or with the absence of definite symmetries in the physics of atomic systems*

2017-2019 RSF 17-12-01035, *Theoretical investigation of effects connected with the presence or with the absence of definite symmetries in the physics of atomic systems*

Participant

2020-2021 RFBR 20-32-70177 Stability, *Development of methods for considering the effects of quantum electrodynamics in molecules*

2014-2016 RFBR 14-02-00188 A, *Theoretical studies of the fundamental symmetries and their violation in the low-energy physics in atoms, ions and the free electron beams*

Awards and Achievements

2021-2023 President of Russia scholarship for young scientists SP-1213.2021.2

2020 Prize for young researchers named after I.V. Kurchatov National Research Centre “Kurchatov Institute”

2020 G-RISC sur-place stipend F-2020s-2

2020 V. N. Gribov stipend in the field of theoretical physics

2019–2020 President of Russia scholarship

2019 Computer code 2019615874. “*Code for calculating of the weak electron-electron interaction in diatomic molecules*” Registration date 14.05.2019. Copyright holder NRC Kurchatov Institute - PNPI. Author: Chubukov D. V

2018 DAAD stipend

2018–2019 Government of Russia scholarship

2017–2018 Government of Russia scholarship

2017 G-RISC sur-place stipend P-2017a-5

Conference Talks

2022 Modern problems of chemical physics and theoretical chemistry, Bolshiye Koty, Russia *(oral talk)*

2021 International Symposium on Molecular Spectroscopy *(oral talk, virtual, online)*

2019 All-Russian Scientific Forum for Young Scientists with International Participation "Open Science 2019", Gatchina, Leningrad District, Russia *(poster)*

2019 53th Winter School (Petersburg Nuclear Physics Institute), Roschino, Leningrad Oblast, Russia *(oral talk)*

2018 The International Workshop "Searching for New Physics with Cold and Controlled Molecules", Mainz, Germany *(oral talk)*

2018 52th Winter School (Petersburg Nuclear Physics Institute), Roschino, Leningrad Oblast, Russia *(oral talk)*

2018 The International Conference on Precision Physics of Simple Atomic Systems PSAS`18, Vienna, Austria *(oral talk + poster)*

2017 12th International Conference on Relativistic Effects in Heavy-Element Chemistry and Physics REHE — 2017, Marburg, Germany *(poster)*

2017 All-Russian Scientific Forum for Young Scientists with International Participation "Open Science 2017", Gatchina, Leningrad District, Russia *(poster)*

2017 51th Winter School (Petersburg Nuclear Physics Institute), Roschino, Leningrad Oblast, Russia *(poster)*

2015 WE-Heraeus-Seminar: Astrophysics, Clocks and Fundamental Constants, Bad-Honnef, Germany *(poster)*

2014 Workshop on Precision Physics and Fundamental Physical Constants FPC-2014, Dubna, Russia *(poster)*

h-index=6 (Scopus, WoS), h-index=8 (Google Scholar)

List of publications

2014 D. V. Chubukov and L. N. Labzowsky, *Ω-doubling and a limit for the enhancement of the electron EDM effect in diatomic molecules*, Physics Letters A 378, 2857 (2014)

2015 A.A. Bondarevskaya, D.V. Chubukov, O.Yu. Andreev, E.A. Mistonova, L.N. Labzowsky, G. Plunien, D. Liesen, and F. Bosch, *On the electric dipole moment of the electron and the P,T-odd electron-nucleus interaction in highly charged ions,* Journal of Physics B 48, 144007 (2015)

2016 D.V. Chubukov and L.N. Labzowsky, *P, T-odd electron-nucleus interaction in atomic systems as an exchange by Higgs bosons*, Physical Review A 93, 062503 (2016)

2017 D. V. Chubukov, L. V. Skripnikov, O. Yu. Andreev, L. N. Labzowsky and G.Plunien, *Effects of parity nonconservation in molecule of oxygen*, J. Phys. B:At. Mol. Opt. Phys. 50, 105101 (2017)

2017 D. V. Chubukov, L. N. Labzowsky, *P,T-odd Faraday effect in intracavity absorption spectroscopy*, Phys. Rev. A 96, 052105 (2017)

2018 A.A. Bondarevskaya, D.V. Chubukov, E.A. Mistonova, K.N. Lyashchenko, O.Yu. Andreev, A. Surzhykov, L.N. Labzowsky, G. Plunien, D. Liesen, F. Bosch, and Th. Stöhlker, *Considerations towards the possibility of the observation of parity nonconservation in highly charged ions in storage rings,* Physica Scripta 93, 025401 (2018)

2018 D. V. Chubukov, L. V. Skripnikov, L. N. Labzowsky, *P,T-odd Faraday rotation in heavy neutral atoms*, Phys. Rev. A 97, 062512 (2018)

2019 D. V. Chubukov, L. V. Skripnikov, L. N. Labzowsky, G. Plunien, *Nuclear spin-independent effects of parity nonconservation in molecule of hydrogen*, J. Phys.B 52, 025003 (2019)

2019 D. V. Chubukov, L. V. Skripnikov, L. N. Labzowsky, V. N. Kutuzov,S. D.Chekhovskoi, *Evaluation of the P,T-odd Faraday effect in Xe and Hg atoms*, Phys. Rev. A 99, 052515 (2019)

2019 D. V. Chubukov, L. V. Skripnikov, V. N. Kutuzov, S. D. Chekhovskoi,L.N. Labzowsky, *Optical Rotation Approach to Search for the Electric Dipole Moment of the Electron*, Atoms 7, 56 (2019)

2019 D.V. Chubukov, L.V. Skripnikov, L.N. Labzowsky, *On the Search for the Electric Dipole Moment of the Electron:P,T-Odd Faraday Effect on a PbF Molecular Beam*, JETP Letters 110, 382 (2019)

2020 D. V. Chubukov, L. V. Skripnikov, L. N. Labzowsky, G. Plunien, *Nuclear Spin-Dependent Effects of Parity Nonconservation in Ortho-H_2*, Symmetry 12, 141 (2020)

2021 S. Chekhovskoi, D.V. Chubukov, L.V. Skripnikov, A.N. Petrov, L.N. Labzowsky, *Photon-spin-dependent contribution to the P,T-odd Faraday rotation effect for atoms*, Journal of Physics B: Atomic, Molecular and Optical Physics 54, 055001 (2021)

2021 D.V. Chubukov, L.V. Skripnikov, A.N. Petrov, V.N. Kutuzov, and L. N. Labzowsky, *P, T- odd Faraday rotation in intracavity absorption spectroscopy with a molecular beam as a possible way to improve the sensitivity of the search for time-reflection-noninvariant effects in nature,* Phys. Rev. A 103, 042802 (2021)

2021 L.V. Skripnikov, D.V. Chubukov, V.M. Shakhova, *The role of QED effects in transition energies of heavy-atom alkaline earth monofluoride molecules: A theoretical study of Ba+, BaF, RaF, and E120F*, J. Chem. Phys. 155, 144103 (2021)

2021 V.N. Kutuzov, D.V. Chubukov, L.V. Skripnikov, A.N. Petrov, L.N. Labzowsky, *P,T-odd Faraday rotation in intracavity absorption spectroscopy with particle beam as a possible way to improve the sensitivity of the search for the time reflection noninvariant effects in nature*, Annals of Physics 434, 168591 (2021)

2022 T. Zalialiutdinov, D. Solovyev, D. Chubukov, S. Chekhovskoi, and L. Labzowsky, *Alternative interpretation of relativistic time-reversal and the time arrow*, Physical Review Research, Vol. 4, Iss. 2, L022052 (2022)

2022 S.D. Chekhovskoi, D.V. Chubukov, L.V. Skripnikov, A.N. Petrov, and L.N. Labzowsky. *Atomic-level-mixing contribution to the P, T-odd Faraday effect as an enhancement factor in the search for P, T-odd interactions in nature,* Physical Review A 106, 052803 (2022)

International Collaboration

Priv.-Doz. Dr. Günter Plunien
Research staying in Technische Universität Dresden (Germany)

- **2015** - one-month staying
- **2016** - one-month staying
- **2017** - one-month staying
- **2018** - two and a half-months staying
- **2019** - one-month staying