Konstantin Malanchev

LINCC Frameworks Project Scientists · PhD

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SEPARATE CONFERENCES INTO CATEGORIES

Work Experience

Department of Physics, Carnegie Mellon University

Pittsburgh, PA, USA

Project Scientist

Augus 2023 – present

- Development of scientific software and pipelines for LSST community within LINCC Frameworks
- Anomaly detection and classification in astronomical catalogs and transient surveys: ZTF, DESIRT, LSST
- Cross-matching and analysis of large catalogs on scale with LSDB library
- Light curve processing and analysis with `light-curve` and `TAPE` libraries

Department of Astronomy, University of Illinois Urbana–Champaign

Urbana, IL, USA

Postdoctoral Research Associate

August 2020 – July 2023

- Anomaly detection and classification in astronomical catalogs and transient surveys: ZTF, YSE, LSST
- Light curve pre-processing for machine learning tasks: feature extraction and representation learning
- "Big data" applications to large photometric catalogs for fast cross-matching and analytics
- Data-driven simulations of variable star light curves for current (ZTF and YSE) and future surveys (LSST)
- Light-curve feature extraction for large survey era, my code is used by three ZTF/LSST brokers

SNAD anomaly detection team

International

Co-founder

2018 – present

- Developing and supporting of the SNAD ZTF viewer `http://ztf.snad.space`
- Data pre-processing for machine learning
- Development and analysis of anomaly detection algorithms

Sternberg Astronomical Institute MSU

Moscow, Russia

Researcher

2017 – 2023

- Accretion disk theory and applications for X-ray binaries, cataclismic variables and AGNs
- Before mid 2020: partial development and administration of institute web-site `http://sai.msu.ru` and Relativistic Astrophysics Department web-site `http://xray.sai.msu.ru`, administration and on-line video streaming for institute YouTube channel.
- Before mid 2020: lectures for scholar students and public outreach, excursions to observatory of Sternberg Astronomical Institute.

Faculty of Physics, Lomonosov Moscow State University

Moscow, Russia

Lecturer

September 2017 – 2020

- Developing and teaching of course "Scientific Python" for the first year master students.

Faculty of Physics, Higher School of Economics

Moscow, Russia

Associate Professor (since September 2017)

September 2016 – 2020

- Developing and teaching of course "Physics data processing and analysis" for the second year bachelor students (2018/2019, 2019/2020).
- Seminars for master's course "Astrophysics and Cosmology" (lecturers are academician A. Starobinsky and Prof. S. Popopv) (2017/2018, 2018/2019, 2019/2020).
- Seminars for bachelor's interfaculty minor "Astrophysics" (lecturer is Prof. S. Popov) (2016/2017, 2017/2018, 2018/2019).
- Python seminars for bachelor's course "Programming and computer methods of linguistics" (2017/2018, 2018/2019)

Caucasian observatory of Sternberg Astronomical Institute MSU

Mt. Shatdzhatmaz, Karachay-Cherkessia, Russia

Observer

April–May 2015, April–May 2016

- Scientific observations with 2.5-meter telescope: CCD photometry with wide optical filters, IR-photometry with ASTRONIRCAM.
- 2.5-meter telescope commissioning: calibration of optics with Shack-Hartmann sensor, software and hardware testing.

Moscow Planetarium

Moscow, Russia

Tour guide

Mid 2011 – early 2013

- Excursions to museums of Moscow planetarium.

Formal Education

Sternberg Astronomical Institute, Lomonosov Moscow State University — *Moscow, Russia*

Ph.D. in Astrophysics — *June 22, 2017*

- **Thesis:** Non-stationary processes in astrophysical accretion discs
- **Supervisor:** prof. Nikolai Shakura

Faculty of Physics, Lomonosov Moscow State University — *Moscow, Russia*

Specialist (master) degree in Astronomy — *January 31, 2013*

- **Thesis:** Non-stationary disc accretion in X-ray Novae
- **Supervisor:** prof. Nikolai Shakura

Additional Education

Yandex School of Data Analysis & Higher School of Economics — *Coursera*

Introduction to Machine Learning — *January–March 2016*

Stanford University — *Coursera*

Algorithms: Design and Analysis (Parts 1&2) — *October 2014 – May 2015*

Kislovodsk Mountain Astronomical Station of the Pulkovo observatory — *Mt. Shatdzhatmaz, Karachay-Cherkessia, Russia*

Student practice — *July 2010*

- Practical courses on solar astrophysics, participation in solar observations.

Special Astrophysics Observatory (SAO RAS) — *Nizhny Arkhyz, Karachay-Cherkessia, Russia*

Student practice — *July 2008*

- Theoretical and practical courses on astrophysics, spectral analysis, instrumentation and observational methods.

Scientific Interests

- Machine learning and statistics methods in astrophysics: anomaly detection, big data storage, pre-processing
- Disk accretion theory: vicsous evolution, instabilities
- Software development in astrophysics: physical simulation, GPU usage, GUI

Grants

The New Photometric Model of M-Dwarf Flares for LSST — *LSST Corporation Enabling Science Program*

Co-investigator — *2021*

- **Principal investigator:** Gautham Narayan

Machine-learning-driven search of new astrophysical objects in Zwicky Transient Facility survey — *Russian Foundation for Basic Research (RFBR) grant #20-02-00779*

Co-investigator — *2020 – 2022*

- **Principal investigator:** Matwey Kornilov

Study of the new types of viscous instabilities in laminar accretion disks — *Russian Foundation for Basic Research (RFBR) grant #18-32-00553*

Principal investigator — *2018 – 2020*

Develop and upgrade special course “Scientific Python” at Faculty of Physics MSU — *Foundation for the Advancement of Theoretical Physics and Mathematics “BASIS”*

Principal investigator — *2018*

The physics of accretion in X-ray binary pulsars – relativistic effects, pulse profiles, and emission properties — *RFBR grant #18-502-12025*

Co-investigator — *2018 – 2020*

- **Principal investigator:** Nikolai Shakura

Astrophysics of black holes, neutron stars and white dwarfs — *Russian Science Foundation grant #14-12-00146*

Co-investigator — *2014 – 2018*

- **Principal investigator:** Nikolai Shakura

The physics of accretion in X-ray binary pulsars – the emitting region and magnetospheric boundary — *RFBR grant #14-02-91345*

Co-investigator — *2014 – 2015*

- **Principal investigator:** Nikolai Shakura

Accretion disks: subcritical and supercritical regimes — *RFBR grant #14-02-91172*

Co-investigator — *2014 – 2015*

- **Principal investigator:** Nikolai Shakura

Study of observational appearances of the final stages of stellar evolution — *RFBR grant #12-02-00186*

Co-investigator — *2012 – 2014*

- **Principal investigator:** Nikolai Shakura

Awards and memberships

Since 2020	**Young Supernova Experiment Collaboration**, Member	*International*
Since 2020	**LSST Dark Energy Science Collaboration**, Member	*International*
Since 2020	**LSST Transient and Variable Star Collaboration**, Member	*International*
2020	**Winner (with Maria Pruzhinskaya & Matwey Kornilov)**, Scientific research contest for young scientists, aspirants and students of Lomonosov Moscow State University.	*Moscow, Russia*
Since 2018	**Co-founder**, SNAD team.	*International*
Since 2018	**Young member**, International Astronomical Union.	*Earth*
2015	**Member of Finalist Team**, Yandex.Root contest for Unix engineers, system administrators, and all fans of open source and Linux.	*Internet*
2013	**Winner**, D. Ya. Martynov Award for the best master thesis on astronomy, Faculty of Physics MSU.	*Moscow, Russia*
2007	**Second degree award**, XIV Russian Olympiad on Astronomy for the last year school students.	*Saransk, Russia*

Languages

English: fluent, including professional vocabulary.
Russian: native.

Computer and Programming Skills

Python:	scientific stack (numpy, astropy, etc), machine learning (scikit-learn, pytorch, etc), web frameworks (Django, Flask, aiohttp, etc).
C/C++:	C++11, Boost, GSL, OpenMP, Qt, OpenGL.
Other languages:	Rust, Bash scripting, Perl, Julia, basic web development with HTML/CSS/JS, Make, CMake.
Technologies:	Docker, git, Linux administration, macOS, LaTeX, PostgreSQL, ClickHouse, AWS (EC2, S3, Route 53, CloudFront).
Contributer of:	ClickHouse (C++), Docker Machine (Go), python-flickr-api

Software

SNAD viewer	SNAD viewer gives an access to dozen terabyte Clickhouse database containing billions light curves of Zwicky Transient Facility data releases (ZTF DRs). It provides light curve plots, cross-matching with a dozen catalogs and embedded FITS viewer to analyse ZTF DR data in a better way. The viewer is based on multiple micro-services providing cross-matching, feature extraction and other facilities.
light-curve	Libraries for performant light-curve feature extraction. I used Rust package to extract up to hundred features from dozens million light curves of Zwicky Transient Facility in just few hours using a single machine. The Python binding is used by three ZTF brokers: Antares, Fink and Ampel.
Freddi	Accretion disk evolution modelling code written in C++ with Boost::Python bindings. The code is used to model X-ray and optical light curves of black hole and neutron star binaries.
Coniferest	Python package for active anomaly detection pipeline. (Co-authored with the SNAD team.)
FIPS 3	GPU-accelerated FITS image viewer which brings a modern user experience by responsive interface. (Co-authored with Matwey Kornilov.)

Organization of conferences and seminars

International Conference in Memory of L. P. Grishchuk — *Moscow, Russia*

Member of local organizing committee — *November 2016*

Colloquium "Earth in early solar planetary system" — *Moscow, Russia*

Member of local organizing committee — *2016*

Scientific seminar of Relativistic astrophysics department SAI MSU — *Moscow, Russia*

Secretary — *2011 – 2020*

Publications

Reviewed papers for

- Astrophysical Journal
- Astronomy and Astrophysics
- Universe
- Astronomy Reports

Accepted and submitted papers

1. de Soto, K.M., et al. (incl Malanchev K.) *"Superphot+: Realtime Fitting and Classification of Supernova Light Curves"*, accepted as a talk to GECCO 2024, arXiv:2403.07975.
2. Russeil, E., Olivetti de França, F., Malanchev, K., et al. *"Multi-View Symbolic Regression"*, submitted, arXiv:2402.04298.
3. Sokolovsky, K,V., Aydi, E., Malanchev, K., et al. *"TESS photometry of the nova eruption in V606 Vul: asymmetric photosphere and multiple ejections?"*, submitted, arXiv:2311.04903.
4. Lipunova, G.V., Tavleev, A.S., Malanchev, K.L. *"Fast giant flares in discs around supermassive black holes"*, submitted, arXiv:2404.08441.
5. Voloshina, A.S., Lavrukhina, A.D., Pruzhinskaya, M.V., Malanchev, K.L., et. al *"M-dwarf flares in the Zwicky Transient Facility data and what we can learn from them"*, submitted, arXiv:2404.07812.
6. Aleo, P.D., et al. (incl Malanchev K.) *"Anomaly Detection and Approximate Similarity Searches of Transients in Real-time Data Streams"*, submitted, arXiv:2404.01235.

Refereed papers

1. Russeil, E., Malanchev, K., et al. *"Rainbow: a colorful approach on multi-passband light curve estimation"*, Astronomy & Astrophysics, Volume 683, id.A251, 2024.
2. Avakyan, A.L., Lipunova, G.V., Malanchev, K.L. *"The effect of thermal winds on the outbursts evolution of LMXB systems"*, Monthly Notices of the Royal Astronomical Society, Volume 527, Issue 2, pp.3709-3727, 2024.
3. Hambleton, K.M., et al. (incl Malanchev K.) *"Rubin Observatory LSST Transients and Variable Stars Roadmap"*, Publications of the Astronomical Society of the Pacific, Volume 135, Issue 1052, id.105002, 102 pp., 2023.
4. Tavleev, A.S., Lipunova, G.V., Malanchev, K. *"Analysis of accretion disc structure and stability using open code for vertical structure"*, Monthly Notices of the Royal Astronomical Society, Volume 524, Issue 3, pp.3647-3661, 2023.
5. Deminanenko, M., Malanchev, K., et al., *"Toward an understanding of the properties of neural network approaches for supernovae light curve approximation"*, Astronomy & Astrophysics, Volume 677, id.A16, 19 pp., 2023.
6. Axelrod, T., et al. (incl. Malanchev, K.) *"All-sky Faint DA White Dwarf Spectrophotometric Standards for Astrophysical Observatories: The Complete Sample"*, The Astrophysical Journal, Volume 951, Issue 1, id.78, 23 pp., 2023.
7. Counter, D. A., et al. (incl Malanchev, K.) *"YSE-PZ: A Transient Survey Management Platform that Empowers the Human-in-the-loop"*, Publications of the Astronomical Society of the Pacific, Volume 135, Issue 1048, id.064501, 19 pp., 2023.
8. Aleo, P., Malanchev K. et al. *"The Young Supernova Experiment Data Release 1 (YSE DR1): Light Curves and Photometric Classification of 1975 Supernovae"*, The Astrophysical Journal Supplement Series, Volume 266, Issue 1, id.9, 46 pp., 2023.
9. Pruzhinskaya, M., et al. (incl. Malanchev, K.) *"Supernova search with active learning in ZTF DR3"*, Astronomy & Astrophysics, Volume 672, id.A111, 22 pp., 2023.
10. Malanchev K., et al. *"The SNAD Viewer: Everything You Want to Know about Your Favorite ZTF Object"*, Publications of the Astronomical Society of the Pacific, Volume 135, Issue 1044, id.024503, 18 pp., 2023.
11. Calamida, A., et al. (incl. Malanchev, K.) *"Perfecting our set of spectrophotometric standard DA white dwarfs"*, The Astrophysical Journal, Volume 940, Issue 1, id.19, 2022.

12. Aleo, P. D., Malanchev, K. L., at al. *"SNAD transient miner: Finding missed transient events in ZTF DR4 using k-D trees"*, New Astronomy, vol. 96, id. 101846, 2022.

13. Lipunova, G., Malanchev, K., et al. *"Physical modeling of viscous disc evolution around magnetized neutron star. Aql X-1 2013 outburst decay"*, Monthly Notices of the Royal Astronomical Society, vol.510, p.1837, 2022.

14. Chatterjee, D., Narayan, G., Aleo, P., Malanchev, K., Muthukrishna, D. *El-CID: a filter for gravitational-wave electromagnetic counterpart identification*, Monthly Notices of the Royal Astronomical Society, vol.509, p.914, 2021.

15. Avakyan, A., Lipunova, G., Malanchev, K., Shakura N. *"Change in the orbital period of a binary system due to an outburst in a windy accretion disc"*, Astronomy Letters, vol. 47, p. 377, 2021.

16. Malanchev, K., et al., *"Anomaly detection in the Zwicky Transient Facility DR3"*, Monthly Notices of the Royal Astronomical Society, vol.502, p.5147, 2021.

17. Ishida, E., Kornilov, M., Malanchev, K., et al., *"Active Anomaly Detection for time-domain discoveries"*, Astronomy & Astrophysics, vol.650, id.A195, 2021.

18. Jones, D., et al. (incl. Malanchev, K.), *"The Young Supernova Experiment: Survey Goals, Overview, and Operations"*, The Astrophysical Journal, vol.908, id.143, 2021.

19. Antipin, S., el al. (incl. Malanchev, K.), *"New SU UMa-type star ZTF18abdlzhd in the Zwicky Transient Facility data"*, Contributions of the Astronomical Observatory Skalnate Pleso, vol.51, p.132, 2021.

20. Dobryakov, S., Malanchev, K., Derkach, D., Hushchyn, M., *"Photometric Data-driven Classification of Type Ia Supernovae in the Open Supernova Catalog"*, Astronomy & Computing, vol.35, article id. 100451, 2021.

21. Pruzhinskaya, M., Malanchev, K., et al., *"Anomaly Detection in the Open Supernova Catalog"*, Monthly Notices of the Royal Astronomical Society, vol.489, p.3591et al.hev, K., *"Fips: An OpenGL based FITS viewer"*, Astronomy and Computing, vol.26, p.61, 2019

22. Lipunova, G., & Malanchev, K., *"Determination of the turbulent parameter in accretion discs: effects of self-irradiation in 4U 1543—47 during the 2002 outburst"*, Monthly Notices of the Royal Astronomical Society, vol.468, p.4735, 2017.

23. Lukin, V., Malanchev, K. et al., *"3D modelling of accretion disc in eclipsing binary system V1239 Her"*, Monthly Notices of the Royal Astronomical Society, vol.467, p.2934, 2017.

24. Oknyansky, V. et al. (incl. Malanchev, K. L.), *"The curtain remains open: NGC 2617 continues in a high state"*, Monthly Notices of the Royal Astronomical Society, vol.467, p.1496, 2017.

25. Malanchev, K., Postnov, K., & Shakura, N., *"Convection in axially symmetric accretion discs with microscopic transport coefficients"*, Monthly Notices of the Royal Astronomical Society, vol.464, p.410, 2017.

26. Malanchev, K., & Shakura, N., *"Vertical convection in turbulent accretion disks and light curves of the X-ray nova A0620-00 1975 outburst"*, Astronomy Letters, vol.41, p.797, 2015.

Book

Chapter in the book *"Accretion Flows in Astrophysics"*, editor Nikolay Shakura, Springer, 2018:

- Lipunova, G. V., Malanchev, K. L, & Shakura, N. I., *"The Standard Model of Disc Accretion"*.

Two chapters in the Russian edition of the book, 2016:

- Lipunova, G. V., & Malanchev, K. L, chapter *"Standard model of disc accretion"*.
- Malanchev, K. L., Postnov, K. A., & Shakura, N. I., chapter *"A viscous-convective instability in laminar Keplerian thin discs"*

Non-refereed papers

1. Lavrukhina, A., Malanchev, K., Kornilov, M.V. *"Automatic Detection of Plateau Phases in Light Curves of Variable Stars"*, Research Notes of the AAS, Volume 7, Issue 9, id.199, 2023.

2. Volnova, A., et al. (incl Malanchev, K.) *"The Most Interesting Anomalies Discovered in ZTF DR17 from the SNAD-VI Workshop"*, Research Notes of the AAS, Volume 7, Issue 7, id.155, 2023.

3. Agarwal, M., et al. (incl Malanchev, K.) *"Applications of Deep Learning to physics workflows"*, arXiv:2306.08106.

4. Pruzhinskaya, et al. (incl Malanchev, K.) *"Could SNAD160 be a Pair-instability Supernova?"*, Research Notes of the AAS, vol.6, iss.6, id.122, 2022.

5. Aleo, P., Ishida., E., Matwey, K., Korolev, V., Malanchev, K., et al., *"The Most Interesting Anomalies Discovered in ZTF DR3 from the SNAD-III Workshop"*, Research Notes of the AAS, vol.4, iss.7, id.112, 2020.

Proceedings

1. Malanchev, K., et al., *Realization of Different Techniques for Anomaly Detection in Astronomical Databases*, Communications in Computer and Information Science, pp. 97-107, 2020

2. Pruzhinskaya, M.; Malanchev, K. L.; et al. *"Machine Learning Analysis of Supernova Light Curves"*, Proceedings of Science, vol. 342, p. 1, 2020

3. Kornilov M.V., Pruzhinskaya M.V., Malanchev K.L., et al., *"Machine learning techniques for analysis of photometric data from the Open Supernova catalog"*, Proceedings of the International Conference "The multi-messenger astronomy: gamma-ray bursts, search for electromagnetic counterparts to neutrino events and gravitational waves", p. 110, 2019

4. Tavleev A., Malanchev K., Lipunova G., *"Vertical structure of accretion discs in LMXB"*, Proceedings of the International Conference "The multi-messenger astronomy: gamma-ray bursts, search for electromagnetic counterparts to neutrino events and gravitational waves", p. 229, 2019
5. Avakyan A.L., Malanchev K.L., Lipunova G.V., *"Influence of accretion disk wind on the evolution of LMX outburst"*, Proceedings of the International Conference "The multi-messenger astronomy: gamma-ray bursts, search for electromagnetic counterparts to neutrino events and gravitational waves", p. 25, 2019
6. Oknyansky, V. L., Malanchev, K. L., Gaskell, C. M., *"Changing-look Narrow-Line Seyfert 1s?"*, Proceedings of Science, 2018, vol.328, id.12
7. Oknyansky, V. L. et al. (incl. Malanchev, K. L.), *"Multi-wavelength monitoring of the changing-look AGN NGC 2617 during state changes", Odessa Astronomical Publications, v.30, p.117, 2017.*
8. Lamzin S. et al. (incl. Malanchev, K. L.), *"Anomalous eclipses of the young star RW Aur A"*, "Stars: From Collapse to Collapse", ASP Conf. Ser. v.510, p.356, 2017.
9. Oknyansky, V. L. et al. (incl. Malanchev, K. L.), *"Monitoring of the Changing-Look AGN NGC 2617"*, "Actual problems of extragalactic astronomy", p.8, 2017.
10. Malanchev, K., Postnov, K., & Shakura, N., *"A viscous-convective instability in laminar Keplerian thin discs"*, "Radiation mechanisms of astrophysical objects: classics today", p.331, 2016.
11. Malanchev, K. L, & Lipunova, G. V., *"Model of viscous evolution of accretion disc in wide X-ray binary 4U 1543—47 during its 2002 outburst"*, "Fundamental and applied cosmic studies", p.44, 2016.
12. Malanchev, K., *"Vertical convection in turbulent accretion disk and light curves of X-ray Nova A0620-00"*, "International Conference on Particle Physics and Astrophysics", Journal of Physics Conference Series, vol.675, p.032020, 2016.
13. Malanchev, K. L., et al. *"Modeling of Light Curves of X-ray Novae"*, "Fifty years of Cosmic Era: Real and Virtual Studies of the Sky. Conference of Young Scientists of CIS Countries", p.114, 2012.

Astronomer's telegram

1. Oknyansky V. L. et al. (incl. Malanchev K. L.), *"New outburst of NGC 2617"*, #9050, May 14, 2016.

Participation in Conferences and Seminars

1. Invited talk *"Tutorial on Active anomaly detection for light curve catalogs"*, ESO AI Forum, 2024, Internet.
2. Invited talk *"Exploring the Variable Sky: Anomaly Detection with SNAD Pipelines"*, Seminar of Laboratoire de Physique Clermont Auvergne, 2024, Clermont-Ferrand, France.
3. Invited talk *"Mysterious Lights: Anomaly Detection in Astronomy"*, AISSAI Anomaly Detection Workshop, 2024, Clermont-Ferrand, France.
4. Invited tutorial *"Active Anomaly Detection"*, AISSAI Anomaly Detection Workshop, 2024, Clermont-Ferrand, France.
5. Talk *"Pineforest: An Adaptive Machine Learning Tool for Anomaly Detection in Light Curves"*, 243rd Meeting of the American Astronomical Society, New Orleans LA, USA.
6. Talk *"Detection of anomalies in ZTF with SNAD"*, Vera C. Rubin Observatory Project and Community Workshop 2023, Tucson AZ, USA.
7. Poster *"LINCC Frameworks - Time series Analysis Processing Engine (TAPE) for time-domain survey analysis"*, 243rd Meeting of the American Astronomical Society, New Orleans LA, USA.
8. Invited talk *"light-curve – Rust/Python toolkit for time-series analysis"*, Virtual Astronomy Software Talks, 2023, Internet.
9. Invited talk *"Time-domain data science for large photometric surveys"*, Astronomy seminar, University of Pittsburgh, Department of Physics and Astronomy, 2023, Pittsburgh PA, USA.
10. Invited talk *"Multi-messenger astronomy infrastructure for optical follow-ups"*, workshop Accelerating Physics with ML@MIT 2023, Cambridge MA, USA.
11. Talk *"ELAsTiCC alerts classification: combining photometric and contextual data"*, the 241st meeting of the American Astroomy Society 2023, session "Surveys and Large Programs: Time Domain Astronomy", Siettle WA, USA.
12. Invided talk *"Machine learning in ANTARES"*, the 241st meeting of the American Astroomy Society 2023, special session "Time-Domain Astronomy at NSF's NOIRLab", Siettle WA, USA.
13. Talk *"Finding missed ZTF transients with SNAD"*, Boom! A Workshop on Explosive Transients with LSST 2022, Urbana IL, USA.
14. Talk *"SNAD: anomaly detection for large scale time-domain astronomy"*, Bayesian Deep Learning for Cosmology and Time Domain Astrophysics #2, 2022, Paris, France.
15. Talk *"Search of anomalous objects in Zwicky Transient Facility"*, Russian Astronomical Conference 2021, Internet.
16. Talk *"New high-performant light-curve feature-extraction library"*, Vera C. Rubin Observatory Project and Community Workshop 2021, Internet.
17. Talk on the behalf of Transients & Variable Stars Colaboration of LSST *"Timeseries features from the perspective of Transients and Variable Stars"*, Vera C. Rubin Observatory Project and Community Workshop 2021, Internet.
18. Talk *"Discovery of anomalies in ZTF DR3"*, Progress of Russian Astrophysics 2020, Internet.

19. Talk *"Anomaly detection in ZTF DR3"*, Vera C. Rubin Observatory Project and Community Workshop 2020, Internet.
20. Talk *"Use of machine learning for anomaly detection in large astronomical databases"*, DAMDID/RCDL 2019, Kazan Federal University, Kazan, Russia.
21. Invited talk *"Black Hole Accretion Disks"*, Seminar of Laboratoire de Physique Clermont Auvergne, 2019, Clermont-Ferrand, France.
22. Poster *"Fips: novel GPU-based FITS image viewer"*, High Energy Astrophysics, 2019, Space Research Institute, Moscow, Russia.
23. Talk *"Study of viscous-convection instabilities of thin laminar accretion flows"*, IV International Conference on Particle Physics and Astrophysics, 2018, National Research Nuclear University MEPhI, Moscow, Russia.
24. Talk *"Search of new types of instabilities in accretion disks"*, Russian Astronomical Conference 2018, Lomonosov Moscow State University, Moscow, Russia.
25. Talk *"3D hydrodynamical modelling of accretion in close binary systems with white dwarf"*, Lomonosov conference, 2017, Lomonosov Moscow State University, Moscow, Russia.
26. Talk *"On convective stability of accretion discs with microscopic transport coefficients"*, Fundamental and applied cosmic studies, Space Research Institute RAS, 2017, Moscow, Russia.
27. Poster *"Freddi — new tool for X-ray nova modelling"*, High Energy Astrophysics, Space Research Institute RAS, 2016, Moscow, Russia.
28. Talk *"Model of viscous evolution of accretion disc in wide X-ray binary 4U 1543—47 during its 2002 outburst"*, Fundamental and applied cosmic studies, Space Research Institute RAS, 2016, Moscow, Russia.
29. Poster *"Viscous evolution of accretion disc around black hole in 4U 1543—47 in 2002"*, High Energy Astrophysics, Space Research Institute RAS, 2015, Moscow, Russia.
30. Talk *"Vertical convection in turbulent accretion disk and light curves of X-ray Nova A0620-00"*, The International Conference on Particle Physics and Astrophysics, MEPhI, 2015, Moscow, Russia.
31. Talk *"Numerical Simulation of X-Ray Nova Light Curves"*, IUTAM Symposium on Growing solids, 2015, Moscow Russia.
32. Poster *"Non-stationary disk accretion in X-ray Novae"*, Black Hole Accretion and AGN Feedback, 2015, Shanghai observatory, Shanghai, China.
33. Talk *"Numerical modelling of non-stationary accretion in X-ray novae"*, Conference of Russian Astronomical Society, 2015, Sternberg Astronomical Institute MSU, Moscow, Russia.
34. Talk *"Study of the secondary peak of light curves of X-ray novae"*, Fundamental and applied cosmic studies, Space Research Institute RAS, 2015, Moscow, Russia.
35. Participation and poster *"Non-stationary disk accretion in X-ray Novae"* in International Cargese school on cosmic accelerators, 2013, Cargèse, France.
36. Participation in School of Modern Astrophysics, 2013, Pushino, Russia.
37. Participation in High Energy Astrophysics, 2013, Heidelberg, Germany.
38. Participation and talk *"Non-stationary disk accretion in X-ray Novae"* in Kaurovka Winter School, 2012, Sverdlovskaya oblast, Russia.
39. Talk *"Non-stationary disk accretion in Soft X-ray transients"*, Accretion flow instabilities: 30 years of the thermal-viscous disc instability model, Nicolaus Copernicus Astronomical Center, Warsaw, Poland.
40. Talk *"Non-stationary disk accretion in X-ray Novae"*, 2012 Observation evidences of stellar evolution, Special astrophysics observatory, Karachay-Cherkessia, Russia.
41. Poster *"Modelling of light curves of X-ray novae"*, High Energy Astrophysics, Space Research Institute RAS, 2011, Moscow, Russia.
42. Talk *"Modelling of light curves of X-ray novae"*, Fifty years of Cosmic Era: Real and Virtual Studies of the Sky, 2011, Armenian Academy of Sciences, Yerevan, Armenia.