

# Anastasia Tsvetkova

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- Personal data**      *Place and Date of Birth:* Saint Petersburg, Russia, 23 October 1985
- Nationality:* Russian
- Research interests** Gamma-ray bursts, Strong gravitational lensing, Soft gamma repeaters, Solar flares, development of gamma-ray spectrometers.
- Employment history**      **High-Energy Astrophysics Group, Department of Physics, University of Cagliari, Italy**
- Postdoctoral Fellow (05/2022 – present)
- High-Energy Astrophysics Group, Max Planck Institute for Extraterrestrial Physics, Garching bei München, Germany**
- Galileo Postdoctoral Fellow (10/2020–12/2021)
- Laboratory for Experimental Astrophysics (Konus-Wind team), Ioffe Institute of Russian Academy of Sciences, St. Petersburg, Russia**
- Researcher (01/2019–09/2020, 01/2022–04/2022)  
                         Junior Researcher (09/2010–12/2018)  
                         Research Assistant (07/2008–08/2010)
- Visiting scientist**      **High-Energy Astrophysics Group, Max Planck Institute for Extraterrestrial Physics, Garching bei München, Germany (01/2020)**
- Education**              **Ioffe Institute of Russian Academy of Sciences**  
                         PhD in Physics and Mathematics (09/2014–06/2018)  
                         Major: Astrophysics and Astronomy  
                         Thesis: Konus-Wind observations of gamma-ray bursts with known redshifts  
                         Supervisor: Leading Research Scientist Dr. D. D. Frederiks
- Peter the Great St. Petersburg Polytechnic University**  
                         MSc in Astrophysics (09/2006–12/2008)  
                         Thesis: Gravitational lensing of gamma-ray bursts  
                         Supervisor: Leading Research Scientist Dr. V. D. Pal'shin
- Peter the Great St. Petersburg Polytechnic University**  
                         BSc in Astrophysics (09/2002–06/2006)  
                         Thesis: Ionization losses of protons and alpha-particles in the Earth's atmosphere  
                         Supervisor: Prof. V. M. Ostriakov
- Research experience**      Studying the observed Gamma-ray burst (GRB) properties with the *Konus-Wind* (KW)  $\gamma$ -ray spectrometer.
- Examining the cosmological properties of GRBs with known redshifts.

Joint spectral analysis of the data acquired in different  $\gamma$ -ray experiments (KW, *Swift*-BAT, *Fermi*-GBM).

Modeling the GRB light curves.

**Professional duty** Writing pipeline for the *Konus-Wind* data processing.

Carrying out spectral analysis for publishing the GCN circulars based on the KW data.

Performing spectral analysis of the KW/joint data by request.

Maintenance of a website on Solar flares [http://www.ioffe.ru/LEA/SF\\_AR/](http://www.ioffe.ru/LEA/SF_AR/) and a webpage containing a list of the KW Solar flare triggers identified by GOES <http://www.ioffe.ru/LEA/Solar/>

**Mentoring experience** Thesis: Temporal properties of *Konus-Wind* gamma-ray bursts  
Student: Valeria Ivanova, Peter the Great St. Petersburg Polytechnic University (Spring 2022)

**Computer and programming skills** *Astronomy*: Xspec, PyXspec, Astropy, 3ML.  
*General*: Python (including Numpy, Matplotlib, Seaborn, Pandas, Scikit-learn, TensorFlow, Keras), Origin Pro, Gnuplot, Perl, L<sup>A</sup>T<sub>E</sub>X, GNU Octave, MySQL, C, Fortran, HTML.

**Instruments** *Konus-Wind*, *Swift*-BAT, *Fermi*-GBM.

**Languages** **English**: Full professional proficiency, including professional vocabulary,

**Spanish**: Full professional proficiency, DELE C1,

**Russian**: Native,

**German**: Elementary proficiency,

**Italian**: Elementary proficiency.

**Auxiliary certifications** Machine Learning (Coursera course from Stanford University)

Neural Networks and Deep Learning (Coursera course from DeepLearning.AI)

Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization (Coursera course from DeepLearning.AI)

Structuring Machine Learning Projects (Coursera course from DeepLearning.AI)

Convolutional Neural Networks (Coursera course from DeepLearning.AI)

Sequence Models (Coursera course from DeepLearning.AI)

## Papers

### Papers in preparation

1. **Tsvetkova, A.**, Greiner, J., Frederiks, D., et al., *Relative Cross-comparison of Konus-Wind, Fermi/GBM, and Swift/BAT instruments using simultaneously detected Gamma-Ray Bursts*
2. Xu., D, Xiong, S., . . . , **Tsvetkova, A.** et al., *GRB 211227A*
3. Svinkin, D., Frederiks, D., . . . , **Tsvetkova, A.** et al., *Ultra-long GRBs detected by Konus-Wind*

### Submitted papers

1. **Tsvetkova, A.**, Karpov, S., Svinkin, D. et al., *Key space and ground facilities in GRB science*, submitted to MDPI Universe
2. Chattopadhyay, T., . . . , **Tsvetkova, A.** et al., *X-ray polarization catalog for a 5-year sample of Gamma-Ray Bursts using AstroSat CZT-Imager*, submitted to ApJ
3. Mei, A., Oganessian, G., **Tsvetkova, A.** et al., *Constraints on the physics of the prompt emission from a distant and energetic gamma-ray burst GRB 220101A*, submitted to ApJL
4. Ho, A. Y. Q., Perley, D. A., Yao, Y. , . . . , **Tsvetkova, A.** et al., *Cosmological Fast Optical Transients with the Zwicky Transient Facility: A Search for Dirty Fireballs*, submitted to ApJ
5. Rossi, A., Frederiks, D. D., Kann, D. A., . . . , **Tsvetkova, A.** et al., *A blast from the infant Universe: the very high-z GRB 210905A*, submitted to A&A

### Accepted papers

1. Greiner, J., Hugentobler U., Burgess J.M., . . . , **Tsvetkova A.**, *A proposed network of Gamma-ray Burst detectors on the Global Navigation Satellite System Galileo G2*, accepted to A&A

### Papers in refereed journals

1. Svinkin, D., Hurley, K., Ridnaia, A., . . . , **Tsvetkova, A.**, et al., *The Second Catalog of Interplanetary Network Localizations of Konus Short Gamma-Ray Bursts*, ApJS 259 34 (2022), DOI: <https://doi.org/10.3847/1538-4365/ac4607>
2. Ahumada, T, Singer, L. P., Anand, S., . . . , **Tsvetkova, A.** et al., *Discovery and confirmation of the shortest gamma-ray burst from a collapsar*, Nat. Astron, 1 (2021), DOI: <https://doi.org/10.1038/s41550-021-01428-7>
3. **Tsvetkova, A.**, Frederiks, D., Svinkin, D., et al., *The Konus-Wind catalog of gamma-ray bursts with known redshifts. II. Waiting mode bursts simultaneously detected by Swift/BAT*, ApJ, 908, 83 (2021), DOI: <https://doi.org/10.3847/1538-4357/abd569>
4. Svinkin, D., Frederiks, D., Hurley, K., . . . , **Tsvetkova, A.** et al., *A bright gamma-ray flare interpreted as a giant magnetar flare in NGC 253*, Nature, 589, 211 (2021), DOI: <https://doi.org/10.1038/s41586-020-03076-9>
5. Ridnaia, A., Svinkin, D., Frederiks, D., . . . , **Tsvetkova, A.** et al., *A peculiar hard X-ray counterpart of a Galactic fast radio burst*, Nat. Astron., 5, 372 (2021), DOI: <https://doi.org/10.1038/s41550-020-01265-0>
6. Ursi, A, Tavani, M, Frederiks, D., . . . , **Tsvetkova, A.** et al., *AGILE and Konus-Wind Observations of GRB 190114C: The Remarkable Prompt and Early Afterglow Phases*, ApJ, 904, 133 (2020), DOI: <https://doi.org/10.3847/1538-4357/abc2d4>

7. Lysenko, A. L., Frederiks, D. D., Fleishman, G. D., . . . , **Tsvetkova, A.**, et al., *X-ray and gamma-ray emission from solar flares*, Phys. Usp., 63, 818 (2020), DOI: <https://doi.org/10.3367/UFNe.2019.06.038757>
8. Aptekar, R.L., Bykov, A.M., Golenetskii, S.V., . . . , **Tsvetkova, A.E.**, et al., *Cosmic gamma-ray bursts and soft gamma-repeaters – observations and modeling of the extreme astrophysical phenomena*, Phys. Usp., 62, 8 (2019), DOI: <https://doi.org/10.3367/UFNe.2018.11.038488>
9. Hurley, K., **Tsvetkova, A.E.**, Svinkin, D.S., et al., *A Search for Gravitationally Lensed Gamma-Ray Bursts in the Data of the Interplanetary Network and Konus-Wind*, ApJ, 871, 121 (2019), DOI: <https://doi.org/10.3847/1538-4357/aaf645>
10. D’Elia, V., Campana, S., D’Aì, A., . . . , **A. E. Tsvetkova**, *GRB 171205A/SN 2017iuk: A local low-luminosity gamma-ray burst*, A&A, 619, A66 (2018), DOI: <https://doi.org/10.1051/0004-6361/201833847>
11. **Tsvetkova, A.**, Frederiks, D., Golenetskii, S., et al., *The Konus-Wind Catalog of Gamma-Ray Bursts with Known Redshifts. I. Bursts Detected in the Triggered Mode*, ApJ, 850, 161, (2017), DOI: <https://doi.org/10.3847/1538-4357/aa96af>
12. Abbott, B. P., Abbott, R., Abbott, T. D., . . . , **Tsvetkova, A. E.**, et al., *Multi-messenger Observations of a Binary Neutron Star Merger*, ApJL, 848, L12 (2017), DOI: <https://doi.org/10.3847/2041-8213/aa91c9>
13. Atteia, J.-L., Heussaff, V., Dezalay, J.-P., . . . , **Tsvetkova, A. E.**, et al., *The Maximum Isotropic Energy of Gamma-ray Bursts*, ApJ, 837, 119 (2017), DOI: <https://doi.org/10.3847/1538-4357/aa5ffa>
14. Kuznetsov, V. D., Zelenyi, L. M., Zimovets, I. V., . . . , **Tsvetkova, A.**, et al., *The Sun and heliosphere explorer - the Interhelioprobe mission*, Ge&Ae, 56, 781 (2016), DOI: <https://doi.org/10.1134/S0016793216070124>
15. Kozlova, A. V., Israel, G. L., Svinkin, D. S., . . . , **Tsvetkova, A. E.**, et al., *The first observation of an intermediate flare from SGR 1935+2154*, MNRAS, 460, 2008 (2016), DOI: <https://doi.org/10.1093/mnras/stw1109>
16. Svinkin, D. S., Frederiks, D. D., Aptekar, R. L., . . . , **Tsvetkova, A. E.**, et al., *The Second Konus-Wind Catalog of Short Gamma-Ray Bursts*, ApJS, 224, 10 (2016), DOI: <https://doi.org/10.3847/0067-0049/224/1/10>
17. Lipunov, V. M., Gorosabel, J., Pruzhinskaya, M. V., . . . , **Tsvetkova, A. E.**, et al., *The optical identification of events with poorly defined locations: the case of the Fermi GBM GRB 140801A*, MNRAS, 455, 712 (2016), DOI: <https://doi.org/10.1093/mnras/stv2228>
18. Charikov, Yu. E., Aptekar, R. L., Golenetsky, S. V., . . . , **Tsvetkova, A. E.**, et al., *Analysis of hard X- and gamma-rays and microwave emissions during the flare of July 18, 2002*, Ge&Ae, 54, 1058 (2014), DOI: <https://doi.org/10.1134/S0016793214080027>
19. Pal’shin, V. D., Charikov, Yu. E., Aptekar, R. L., . . . , **Tsvetkova, A. E.**, *Konus-Wind and Helicon-Coronas-F observations of solar flares*, Ge&Ae, 54, 943 (2014), DOI: <https://doi.org/10.1134/S0016793214070093>
20. Volnova, A. A., Pozanenko, A. S., Gorosabel, J., . . . , **Tsvetkova, A. E.**, et al., *GRB 051008: a long, spectrally hard dust-obscured GRB in a Lyman-break galaxy at  $z \approx 2.8$* , MNRAS, 442, 2586 (2014), DOI: <https://doi.org/10.1093/mnras/stu999>

21. Frederiks, D. D., Hurley, K., Svinkin, D. S., . . . , **Tsvetkova, A. E.**, et al., *The Ultraluminous GRB 110918A*, ApJ, 779, 151 (2013), DOI: <https://doi.org/10.1088/0004-637X/779/2/151>
22. Mazets, E. P., Aptekar, R. L., Golenetskii, S. V., . . . , **Tsvetkova, A. E.**, *Studies of cosmic gamma-ray bursts and soft gamma repeaters in the Russian-American Konus-Wind experiment*, JETP Lett., 96, 544 (2012), DOI: <https://doi.org/10.1134/S002136401220012X>

**Peer-reviewed  
Conference  
Articles**

1. Svinkin, D.S., Temiraev, Yu. R., . . . **Tsvetkova, A.** et al., *Spectral evolution of long gamma-ray bursts observed with Konus-Wind*, J. Phys.: Conf. Ser., 1697, 012003 (2020), International Conference PhysicA.SPb/2020; St.Petersburg, Russian Federation; 19–23 October 2020, DOI: <http://doi.org/10.1088/1742-6596/1697/1/012003>
2. Svinkin, D.S., Aptekar, R.L., Golenetskii, S.V., . . . , **Tsvetkova, A.E.**, *Classification of gamma-ray bursts observed with Konus-Wind*, International Conference PhysicA.SPb/2019 J. Phys.: Conf. Ser., 1400, 022010 (2019), DOI: <http://doi.org/10.1088/1742-6596/1400/2/022010>
3. Kozlova, A.V., Svinkin, D.S., Lysenko, A.L., . . . , **Tsvetkova, A.E.** et al., *A search for transient events in Konus-Wind data*, International Conference PhysicA.SPb/2019 J. Phys.: Conf. Ser., 1400, 022014 (2019), International Conference PhysicA.SPb/2019; St.Petersburg, Russian Federation; 22–24 October 2019, DOI: <http://doi.org/10.1088/1742-6596/1400/2/022014>
4. **Tsvetkova, A.E.**, Svinkin, D.S., Frederiks, D.D., *Gravitational lensing probability for the Konus-Wind gamma-ray bursts detected in the triggered mode*, International Conference PhysicA.SPb/2019 J. Phys.: Conf. Ser., 1400, 022043 (2019), International Conference PhysicA.SPb/2019; St.Petersburg, Russian Federation; 22–24 October 2019, DOI: <http://dx.doi.org/10.1088/1742-6596/1400/2/022043>
5. Ulanov, M.V., Aptekar, R.L., Golenetskii, S.V., . . . , **Tsvetkova, A.E.**, *Konus-UF and Helicon-I gamma-ray burst experiments*, International Conference PhysicA.SPb/2019 J. Phys.: Conf. Ser., 1400, 022049 (2019), International Conference PhysicA.SPb/2019; St.Petersburg, Russian Federation; 22–24 October 2019, DOI: <http://dx.doi.org/10.1088/1742-6596/1400/2/022049>
6. **Tsvetkova, A.**, Frederiks, D., Golenetskii, S., et al., *The Konus-Wind catalog of gamma-ray bursts with known redshifts. I. Bursts detected in the triggered mode*, 7th International Fermi Symposium, IFS 2017; Garmisch-Partenkirchen, Germany; 15–20 October 2017, PoS (IFS2017) 064.
7. Frederiks, D., Svinkin, D., Aptekar, R., . . . , **Tsvetkova, A.**, et al., *Konus-WIND observation of the ultra-luminous GRB 110918A*, Gamma-ray Bursts: 15 Years of GRB Afterglows – Progenitors, Environments and Host Galaxies from the Nearby to the Early Universe, Gamma-ray Bursts: 15 Years of GRB Afterglows, Málaga, Spain, EAS Publications Series, 61, 71 (2013), DOI: <http://doi.org/10.1051/eas/1361009>.

**Proceedings of  
conferences**

1. **Tsvetkova, A.**, Frederiks, D., Svinkin, D. et al., *Konus-Wind Observations of Gamma-Ray Bursts With Known Redshifts*, Proceedings of the Yamada Conference LXXI: Gamma-ray Bursts in the Gravitational Wave Era 2019 (2020)
2. Frederiks, D., Svinkin, D., **Tsvetkova, A.** et al., *GRB observations with Konus-WIND experiment*, Mem. S.A.It. Vol. 90, 67 (2019)

3. **Tsvetkova, A.**, Frederiks, D., Svinkin, D. et al., *The Konus-Wind observations of gamma-ray bursts with known redshifts*, in Proceedings of the International Conference “The multi-messenger astronomy: gamma-ray bursts, search for electromagnetic counterparts to neutrino events and gravitational waves”, Russia, Nizhnij Arkhyz (SAO RAS), Terskol (BNO INR RAS), October, 7 - 14, 2018, Publishing house SNEG, Pyatigorsk, 2019, pp. 234-241.
4. Charikov, Yu. E., Melnikov, V. F., Aptekar R. L., . . . , **Tsvetkova, A. E.**, *Observation of hard x-ray/gamma and microwave radiation of Solar flares: comparative analysis*, Russian annual conference “Solar and solar-terrestrial physics – 2013”, St. Petersburg, Russia, Pulkovo Observatory, 25–27 September 2013, Proceedings of conference “Solar and solar-terrestrial physics – 2013”, p. 273 (in Russian).
5. Pal’shin, V. D., Charikov, Yu. E., Aptekar, R. L., . . . , **Tsvetkova, A. E.**, *Dynamics of Solar flare energy spectra observed in hard x-rays and gamma-rays in Konus-Wind and Helicon experiments*, Russian annual conference “Solar and solar-terrestrial physics – 2013”, St. Petersburg, Russia, Pulkovo Observatory, 25–27 September 2013, Proceedings of conference “Solar and solar-terrestrial physics – 2013”, p. 195 (in Russian).

**Participation in  
Conferences,  
Seminars, and  
Schools**

1. Invited talk, Seminar of Department of Physics and Earth Science (University of Ferrara, Italy, December 2021).
2. Contributed Talk, INTEGRAL: towards the third decade of X and Gamma ray observations (Sardinia, Italy, October 2021).
3. Contributed Talk, Yamada Conference LXXI: Gamma-ray Bursts in the Gravitational Wave Era 2019 (Yokohama, Kanagawa, Japan, October 2019).
4. Contributed Talk, Ioffe Workshop on GRBs and other transient sources: 25 Years of Konus-Wind Experiment (Ioffe Institute, St. Petersburg, Russia, September 2019).
5. Contributed Talk, High energy astrophysics today and tomorrow (Moscow, Russia, December 2018).
6. Contributed Talk, The multi-messenger astronomy: gamma-ray bursts, search for electromagnetic counterparts to neutrino events and gravitational waves (Special Astrophysical Observatory, Russia, October 2018).
7. Invited Talk, High Energy Astrophysics Seminars (Space Research Institute, Moscow, Russia, April 2018).
8. Invited Talk, Ya. B. Zeldovich Seminars on Astrophysics (Sternberg Astronomical Institute of Moscow University, Moscow, Russia, April 2018).
9. Invited Talk, Joint Astrophysical Seminars (Ioffe Institute, St. Petersburg, Russia, April 2018).
10. Invited Talk, High Energy Astrophysics Seminars (MPA, Garching, Germany, October 2017).
11. Contributed Talk, 7th International Fermi Symposium (Garmisch-Partenkirchen, Germany, October 2017).
12. Contributed Talk, Russian annual conference “Solar and solar-terrestrial physics – 2017” (St. Petersburg, Russia, Pulkovo Observatory, October 2017).
13. Contributed Talk, Joint IAPSO-IAMAS-IAGA Assembly (Cape Town, South Africa, September 2017).

14. Contributed Talk, International Conference “Bursting Universe by Robots Eyes” (Moscow, Russia, August 2017).
15. Contributed Talk, Russian Astrophysics Highlights (Moscow, Russia, December 2016).
16. Contributed Talk, Ioffe Workshop on GRBs and other transient sources: 20 Years of Konus-Wind Experiment (Ioffe Institute, St. Petersburg, Russia, September 2014).
17. Poster, High energy astrophysics today and tomorrow (Moscow, Russia, December 2013).
18. Participation in school “Observational and theoretical cosmology” (Special Astrophysical observatory, Russia, 2011).
19. Participation in school “Nuclear astrophysics” (Pushchino Radio Astronomy observatory, Russia, 2010).

### **Grants**

- Grant of Russian Foundation For Basic Research 21-12-00250, Co-I (2021–2023)
- Grant of Russian Foundation For Basic Research 15-02-00532 A, Co-I (2015–2017)
- Grant of Russian Foundation For Basic Research 15-02-03717, Co-I (2016–2017)
- Grant of Russian Foundation For Basic Research 15-02-03835 A, Co-I (2015–2017)
- Grant of Russian Science Foundation 17-12-01378, Co-I (2017–2019)
- Grant of Russian Foundation For Basic Research 18-02-00062 A, Co-I (2018–2020)

### **Organization of Conferences and Seminars**

- Member of LOC of the Ioffe Workshop on GRBs and other transient sources: 25 Years of Konus-Wind Experiment (2019)
- Member of LOC of the Ioffe Workshop on GRBs and other transient sources: 20 Years of Konus-Wind Experiment (2014)
- Member of LOC of the Ioffe Workshop on Problems of Modern Physics and Cosmology (2009)