

Volodymyr S. Akhmetov

Personal Data

Date of Birth: July 22, 1984

Place of Birth: Kharkiv region, Ukraine;

Nationality: Ukrainian



Marital status: Married, son (19.12.2011) and daughter (12.04.2013).

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Education:

2012 - Ph. D. (Ukrainian - Candidate of Sciences) in Astrometry and Celestial Mechanics. Main Astronomical Observatory of Ukrainian National Academy of Science, Kyiv, Ukraine. The title of the work is “The kinematics parameters of the Galaxy using data of modern astrometric catalogues”. This work is devoted to investigation of the Galaxy kinematics parameters by means data of the Tycho2, UCAC3, PPMXL and XPM catalogues. The first part is focused on creation of the XPM catalogue and study of systematic errors that may affect the determination of kinematics parameters. The second part of the work presents the results of determining the kinematics parameters of the galaxy obtained using the Ogorodnikov-Milne's model. *Supervisor: Dr. P.N. Fedorov.*

2006 - Masters Degree in Astronomy, Kharkiv National University, Kharkiv, Ukraine, with honors. The graduate thesis “Research kinematics parameters of the Galaxy using stars proper motions of XC1 catalogue” has been carried out in the Laboratory of Astrometry of the Institute of Astronomy of Kharkiv National University and was awarded with “excellent” grade. *Supervisor: Dr. P.N. Fedorov.*

Positions:

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| 2018 – present | Leading Research Scientist, Institute of Astronomy of Kharkiv National University, Kharkiv, Ukraine. |
| 2014 – present | Associated professor, Astronomy and Space Informatics Department of Kharkiv National University, Kharkiv, Ukraine. |
| 2015 – 2017 | Senior Research Scientist, Institute of Astronomy of Kharkiv National University, Kharkiv, Ukraine. |
| 2013 – 2016 | Research Scientist Radio Astronomy Institute of National Academy of Sciences of Ukraine, Kharkiv, Ukraine. |
| 2014 – 2015 | Research Scientist, Institute of Astronomy of Kharkiv National University, Kharkiv, Ukraine. |
| 2009 – 2013 | Junior Research Scientist, Institute of Astronomy of Kharkiv National University, Kharkiv, Ukraine. |
| 2006 – 2009 | Ph. D. student, Institute of Astronomy of Kharkiv National University, Kharkiv, Ukraine. |

Research interests: Large astronomical surveys; Astrometry reduction; Image analysis and processing; Analysis of astrometric catalogues; Reference Systems; Kinematics, structure and evolution of Galaxy; Object classification; Computer processing and analysis big-data.

Experience:

Ground-based observations;
Astrometric reduction of observations;
Creating and analysis of catalogues of stellar positions and proper motions;
Research into kinematic parameters of the Galaxy by means of tangential and space velocities of stars in frameworks of modern physical and mathematical models;
Solving the problem of celestial objects separation to stars and extragalactic sources using astrometric and photometric data;
Applying machine learning and statistical data analysis methods for classification of stars contained in modern astronomical catalogues;
Search and study of Globular Clusters in large astrometric catalogues;
The numerical computations with arbitrary precision arithmetic for large data array.

Programming skills:

Software development (Linux & Windows) C/C++ advanced knowledge;
Bash, AWK, SED, Gnuplot, Octave scripting - good knowledge;
Databases (PgSQL, MSSQL) – extensive experience;
Python, FORTRAN, PHP, JAVA, C# - good knowledge.

Teaching activities:

Lecture and practical courses for graduate and postgraduate students:

Winter semesters: Programming in C/C++ (since 2014) ;

Image analysis and processing in astronomy (since 2018)

Summer semesters: Mathematical Modeling and Numerical Methods (since 2015)

Supervision experience:

Supervision of several undergraduate (bachelor and master level) research projects on the topic of the kinematics studies of Galaxy; the mathematics methods of astronomical images processing; machine learning and statistical data analysis methods for objects classification.

Honors and Awards:

2011- 2012 Scholarship from the Association of V. N. Karazin Kharkiv National University Alumni, Faculty and Friends for young scientists.

2014-2015 Scholarship from the Department of Education and Science of the Kharkov Region Government for young scientists.

2015 Scholarship from the Ukrainian Astronomical Association for young scientists.

Grants:

2009-2010 Grant of Joint Russian-Ukrainian research project

2017-2020 Header of young scientist research project of grant Ministry of Education and Science of Ukraine

Languages: Ukraine and Russian (Native Speaker); English (Intermediate).

[SAO/NASA ADS](#)

[Scopus](#)

Additional information:

Driving license «B», «C» categories;

Personal characteristics: purposeful, hardworking, responsible, work well in a team and individually.

Hobbies: bicycle, music, team sports.

References

Professor, Peter Fedorov: Kharkiv National University, pnfedorov@gmail.com;

Professor, Valerii. Shulga: Institute of Radio Astronomy NAS, shulga@rian.kharkov.ua;

Professor, Yuriy G. Shkuratov: Kharkiv National University, shkuratov@astron.kharkov.ua.

List of publications

1. P.N. Fedorov, **V.S. Akhmetov**, A.B. Velichko. Testing stellar proper motions of TGAS stars using data from the HSOY, UCAC5 and PMA catalogues // Mon Not R Astron Soc – 2018. Vol. 476, Iss. 2, -P. 2743-2750. (<https://doi.org/10.1093/mnras/sty415>)
2. V.P. Khramtsov, **V.S. Akhmetov**. Supervised automatic identification of extragalactic sources in the WISE×SuperCOSMOS catalogue // Odessa Astronomical Publications. –2017. –Vol. 30 , P. 178
3. Dmytrenko A.M., **Akhmetov V.S.** Astronomical image processing for high-accurate astrometry data // Odessa Astronomical Publications. –2017. –Vol. 30, P.163
4. **V.S. Akhmetov**, P.N. Fedorov, A.B. Velichko. The PMA catalogue as a realization of the extragalactic reference system in optical and near infrared wavelengths // Proceedings of the IAU, Vol.12, Symposium S330, pp. 81-82. (<https://doi.org/10.1017/S174392131700607X>)
5. A.B. Velichko, **V.S. Akhmetov**, P.N. Fedorov. Kinematics of our Galaxy from the PMA and TGAS catalogues // Proceedings of the IAU, Vol.12, Symposium S330, pp. 100-103.(<https://doi.org/10.1017/S1743921317006068>)
6. **V.S. Akhmetov**, P. N. Fedorov, A. B. Velichko, V. M. Shulga. The PMA Catalogue: 420 million positions and absolute proper motions// Mon Not R Astron Soc – 2017. Vol. 469, Iss. 1, -P. 763-773. (<http://mnras.oxfordjournals.org/content/469/1/763>)
7. **V.S. Akhmetov**, P. N. Fedorov, A. B. Velichko, V. M. Shulga. VizieR Online Data Catalog: The PMA Catalogue: 420 million positions and absolute proper motions (Akhmetov+, 2017) [Electronic resource] // Centre de Données astronomiques de Strasbourg – (<http://cdsarc.u-strasbg.fr/viz-bin/Cat?I/341>)
8. **V.S. Akhmetov**. The investigation of the FON3 catalogue data using Wielen method//Odessa Astronomical Publications. –2016. –Vol. 29, P. 116-119. (<http://oap.onu.edu.ua/article/view/85125>)
9. P.N. Fedorov, **V.S. Akhmetov**, A.B. Velichko, V.M. Shulga. The kinematics of the Galaxy by proper motion of stars // Space science and technology. –2015. –Vol. 21/6, P. 62-67 (in Russian)
10. **V.S. Akhmetov**, P.N. Fedorov, A.B. Velichko, V.M. Shulga. The kinematics parameters of the Galaxy using data of modern astrometric catalogues//Odessa Astronomical Publications. – 2015. –Vol. 28/2, P. 154-157. (<http://adsabs.harvard.edu/abs/2015OAP....28..154A>)
11. P. N. Fedorov, **V. S. Akhmetov**, V. M. Shulga. The reference frame for the XPM2 // Mon. Notic. Roy. Astron. Soc. – 2014. –Vol. 440, Iss. 1. –P. 624 (<http://mnras.oxfordjournals.org/content/440/1/624>)
12. I. B. Vavilova, L. K. Pakulyak, A. A. Shlyapnikov, Yu. I. Protsyuk, V. E. Savanevich, I. L. Andronov , V. N. Andruk, N. N. Kondrashova, A. V. Baklanov, A. V. Golovin , P. N. Fedorov , **V. S. Akhmetov**, I. I. Isak, V. V. Golovnya, N. V. Virun, A. V. Zolotukhina, L. V. Kazantseva, N. A. Virnina, V. V. Breus, S. G. Kashuba, L. L. Chinarova, L. S. Kudashkina, V. P. Epishev, Mazhaev A. E. Astroinformation resource of the Ukrainian virtual observatory: Joint observational data archive, scientific tasks, and software // Kinematics and Physics of Celestial Bodies –2012. –Vol. 28, Iss 2. P. 85–102.
13. Gontcharov, G. A.; Bajkova, A. T.; Fedorov, P. N.; **Akhmetov, V. S.** VizieR Online Data Catalog: Candidate subdwarfs and white dwarfs (Gontcharov+, 2011) [Electronic resource] // Centre de Données astronomiques de Strasbourg – (<http://cdsarc.u-strasbg.fr/viz-bin/Cat?J/MNRAS/413/1581>)

14. Fedorov, P. N.; **Akhmetov, V. S.**; Yatskiv, Ya. S. The XPM catalogue as a realisation of the extragalactic reference system in optical and near infrared wavelengths//Proceedings of the Journées 2010 "Systèmes de référence spatio-temporels" ISBN 978-2-901057-64-2, p. 117-120
15. P. N. Fedorov, **V. S. Akhmetov**, V. V. Bobylev. Residual rotation of the Hipparcos/Tycho-2 system as determined from the data of the XPM catalogue // Mon. Notic. Roy. Astron. Soc. – 2011. – Vol. 416, Iss. 1. – P. 403–408. (<http://mnras.oxfordjournals.org/content/416/1/403>)
16. P. N. Fedorov, **V. S. Akhmetov**, V. V. Bobylev, A. G. Goncharov. The XPM catalogue as a realization of the ICRS in optical and near-infrared ranges of wavelengths // Mon. Notic. Roy. Astron. Soc. – 2011. –Vol. 415, Iss. 1. – P. 665–672. (<http://mnras.oxfordjournals.org/content/415/1/665>)
17. Fedorov P., Myznikov A., **Akhmetov V.** XPM-1.0 Catalog of positions and proper motions [Electronic resource] // Centre de Données astronomiques de Strasbourg – 2011. (<http://cdsarc.u-strasbg.fr/viz-bin/Cat?I/319>)
18. G.A. Gontcharov, A.T. Bajkova, P.N. Fedorov, **V.S. Akhmetov**. Candidate subdwarfs and white dwarfs from the 2MASS, Tycho-2, XPM and UCAC3 catalogues // Mon. Notic. Roy. Astron. Soc. – 2011. – Vol. 413, Iss. 3. – P. 1581–1599. (<http://mnras.oxfordjournals.org/content/416/3/1581>)
19. P. N. Fedorov, **V. S. Akhmetov**, V. V. Bobylev, A. T. Bajkova. An investigation of the absolute proper motions of the XPM catalogue // Mon. Notic. Roy. Astron. Soc. – 2010. – Vol. 406, Iss. 3. – P. 1734–1744. (<http://mnras.oxfordjournals.org/content/406/3/1734>)
20. V.V. Bobylev, P.N. Fedorov, A.T. Bajkova, **V.S. Akhmetov**. Determining the Orientation Parameters of the ICRS/UCAC2 System using the Kharkov Catalog of Absolute Stellar Proper Motions // Astronomy Letters. –2010. –Vol. 36, No. 7. – P. 506–513. (<http://arxiv.org/abs/1006.5154>)
21. **V. S. Akhmetov**, P. N. Fedorov. Kinematic parameters of the Galaxy derived using 270 million the absolute proper motion of stars // Известия Главной астрономической обсерватории в Пулковке. –2009. –No.219.Iss.4. – P. 39–44 (in Russian)
22. P. N. Fedorov, A. A. Myznikov and **V. S. Akhmetov**. The XPM Catalogue: absolute proper motions of 280 million stars // Mon. Notic. Roy. Astron. Soc. – 2009. – Vol. 393, Iss. 1. – P. 133 – 138. (<http://mnras.oxfordjournals.org/content/393/1/133>)

Abstracts:

1. **V.S. Akhmetov**. Comparison and analysis of modern catalogues data in GAIA era // Abstract Book of “International meeting on variable stars research “KOLOS 2017” (November 30 - December 2, 2017, Stakchin, Slovakia)
2. A.B. Velichko, **V.S. Akhmetov**, P.N. Fedorov. Kinematics of our Galaxy from stellar proper motions of modern catalogues // Abstract Book of “International meeting on variable stars research “KOLOS 2017” (November 30 - December 2, 2017, Stakchin, Slovakia)
3. V. P. Khramtsov, **V.S. Akhmetov**. Catalogue of 8 million extragalactic objects: identification in high-dimensional colour space with autoencoders // Abstract Book of “International meeting on variable stars research “KOLOS 2017” (November 30 - December 2, 2017, Stakchin, Slovakia)
4. **V.S.Akhmetov**, P.N.Fedorov, A.B.Velichko The comparison and analysis of data modern astrometric catalogues in GAIA era // Abstract Book of “17-th Gamow Summer School: “Astronomy and beyond: Astrophysics, Cosmology, Cosmomicrophysics, Astroparticle Physics, Radioastronomy and Astrobiology” (August 13-20, 2017, Odessa, Ukraine).
5. Velichko A.B., **Akhmetov V.S.**, Fedorov P.N. Kinematics of our Galaxy from the PMA and TGAS catalogues // Abstract Book of “17-th Gamow Summer School: “Astronomy and beyond: Astrophysics, Cosmology, Cosmomicrophysics, Astroparticle Physics, Radioastronomy and Astrobiology” (August 13-20, 2017, Odessa, Ukraine).
6. Khramtsov V.P., **Akhmetov V.S.** Candidates in extragalactic sources from the WISE×SCOSMOS catalogue // Abstract Book of “17-th Gamow Summer School: “Astronomy and beyond: Astrophysics, Cosmology, Cosmomicrophysics, Astroparticle Physics, Radioastronomy and Astrobiology” (August 13-20, 2017, Odessa, Ukraine).
7. Dmytrenko A.M., **Akhmetov V.S.** Astronomical image processing for high-accurate astrometry data // Abstract Book of “17-th Gamow Summer School: “Astronomy and beyond:

- Astrophysics, Cosmology, Cosmomicrophysics, Astroparticle Physics, Radioastronomy and Astrobiology” (August 13-20, 2017, Odessa, Ukraine).
8. Mykhailo Illiashyk, **V. S. Akhmetov**, P. N. Fedorov, A. B. Velichko. The kinematic research of Galaxy using data of PMA catalogue // Abstract Book of ”24rd Young Scientists' Conference on Astronomy and Space Physics”. (April 24–29, 2017, Kyiv, Ukraine)
 9. Velichko A. B., **Akhmetov V. S.**, Fedorov P. N. Kinematics of our Galaxy from the PMA and TGAS catalogues // Abstract Book of ” International Conference Astronomy and Space Physics in Kyiv University”. (May 23–26, 2017, Kyiv, Ukraine)
 10. **V.S. Akhmetov**, P.N. Fedorov, A.B. Velichko. The PMA catalogue as a realization of the extragalactic reference system in optical and near infrared wavelengths // Abstract Book of “Astrometry and Astrophysics in the Gaia sky” IAU Symposium 330. (24-28 April 2017, Nice, France).
 11. A.B. Velichko, **V.S. Akhmetov**, P.N. Fedorov. Kinematics of our Galaxy from the PMA and TGAS catalogues// Abstract Book of “Astrometry and Astrophysics in the Gaia sky” IAU Symposium 330. (24-28 April 2017, Nice, France).
 12. **V.S. Akhmetov**, P.N. Fedorov, A.B. Velichko. The PMA catalogue. astrometric and multiband photometric data for more then 400 millions objects//Abstract Book of “International meeting on variable stars research “KOLOS 2016” (December 1-3, 2016, Stakchin, Slovakia)
 13. V.P. Khramtsov, I.G. Slusarev, V.G. Shevchenko, **V.S. Akhmetov**. Statistical time-series analysis of photometric data for variable stars detection//Abstract Book of “International meeting on variable stars research “KOLOS 2016” (December 1-3, 2016, Stakchin, Slovakia)
 14. **V.S. Akhmetov**, P.N. Fedorov, A.B. Velichko. Modern method of create and research the large astrometric catalogs//Abstract Book of “International Conference “Actual Questions of Ground-based Observational Astronomy” (September 26-29, 2016, Mykolaiv, Ukraine)
 15. A.B. Velichko, **V.S. Akhmetov**, P.N. Fedorov. Kinematic parameters of the Galaxy using the XPMc catalogue data //Abstract Book of “International Conference “Actual Questions of Ground-based Observational Astronomy” (September 26-29, 2016, Mykolaiv, Ukraine)
 16. P.N. Fedorov, **V.S. Akhmetov**, A.B. Velichko. Corrections of the absolute proper motions of the XPM catalogue//Abstract Book of “International Conference “Actual Questions of Ground-based Observational Astronomy” (September 26-29, 2016, Mykolaiv, Ukraine)
 17. **V. S. Akhmetov**. An investigation of the FON3 catalogue data using Wielen method//Abstract Book of “16-th Gamow Summer School: “Astronomy and beyond: Astrophysics, Cosmology, Cosmomicrophysics, Astroparticle Physics, Radioastronomy and Astrobiology” (August 14-20, 2016, Odessa, Ukraine).
 18. **V. S. Akhmetov**, A.B.Velichko, P.N.Fedorov, V.M.Shulga. The kinematics research of the Galaxy using of Vector Spherical Harmonics// Abstract Book of “16-th Gamow Summer School: “Astronomy and beyond: Astrophysics, Cosmology, Cosmomicrophysics, Astroparticle Physics, Radioastronomy and Astrobiology” (August 14-20, 2016, Odessa, Ukraine).
 19. B. Velichko, **V. S. Akhmetov**, P. N. Fedorov. Kinematic parameters of the Galaxy using the XPM catalogue data. // Abstract Book of ” International Conference Astronomy and Space Physics in Kyiv University”. (May 24–27, 2016, Kyiv, Ukraine)
 20. Mykhailo Illiashyk, **V. S. Akhmetov**, P. N. Fedorov, A. B. Velichko. The kinematics research of the Galaxy using of XPM catalogue data. // Abstract Book of ” 23rd Young Scientists' Conference on Astronomy and Space Physics”. (April 25–29, 2016, Kyiv, Ukraine)
 21. **V. S. Akhmetov**, P. N. Fedorov, A.B. Velichko, V. M. Shulga. The kinematics parameters of the Galaxy using stars proper motion of XPM2 catalog. // Abstract Book of “15-th Ukrainian Conference on Space Research”. (August 24-28, 2015, Odessa, Ukraine).
 22. **V. S. Akhmetov**, P. N. Fedorov, A.B. Velichko, V. M. Shulga. The catalogue XPM2. // Abstract Book of “15-th International Astronomical Gamow Summer School: “Astronomy and beyond: Astrophysics, Cosmology, Cosmomicrophysics, Astroparticle Physics, Radioastronomy and Astrobiology” (August 16-23, 2015, Odessa, Ukraine).
 23. **V. S. Akhmetov**, P. N. Fedorov, V. M. Shulga. The kinematics parameters of the Galaxy using data of modern astrometric catalogues. // Abstract Book of “15-th International Astronomical Gamow Summer School: “Astronomy and beyond: Astrophysics, Cosmology, Cosmomicrophysics, Astroparticle Physics, Radioastronomy and Astrobiology” (August 16-23, 2015, Odessa, Ukraine).

24. **V. S. Akhmetov**, P. N. Fedorov, A.B. Velichko, V. M. Shulga. Creating XPM2 catalogue. Obtained position and absolute proper motions of billions of stars // Abstract Book of “14th Ukrainian conference for space research” (September 8-12, 2014, Uzhgorod, Ukraine).
25. **V. S. Akhmetov**, P. N. Fedorov, A.A. Myznikov, V. M. Shulga. The reference frame for the XPM2 // Abstract Book of “13th Ukrainian conference for space research” (September 2-6, 2013, Evpatoria, Ukraine).
26. P. N. Fedorov, **V. S. Akhmetov**, A.A. Myznikov. The coincidence of the HCRF with the XPM as necessary step in densification of the optical reference frame. // Abstract Book of “IAU Joint Discussion 7” (August 27-29, 2012, Beijing, China)
27. Ya. Yatskiv, P. Fedorov, **V. Akhmetov**. The XPM catalogue as a realisation of the extragalactic reference system in optical and near infrared wavelengths // Abstract Book of International Conference Journees 2010 – “New challenges for reference systems and numerical standards in astronomy”. September 20–22, 2010, Paris, France. – P. 11–12.
28. **Akhmetov V. S.**, P. N. Fedorov. Kinematical parameters of the Galaxy on the basis of the data of the modern catalogues // Abstract Book of International Conference “Astronomy and Space Physics in Taras Shevchenko National University of Kyiv” (May 24-28, 2010, Kyiv, Ukraine). – P. 51-52.
29. P. N. Fedorov, **V. S. Akhmetov**. The XPM Catalogue as a realization of the extragalactic reference system in optical and near infrared range // Abstract Book of International Conference “Astronomy and Space Physics in Taras Shevchenko National University of Kyiv”. (May 24–28, 2010, Kyiv, Ukraine.). – P. 51.
30. P. N. Fedorov, **V. S. Akhmetov**. The XPM Catalogue as a realization of the extragalactic reference system in optical and near infrared range // Abstract Book of International Conference “Methods and instruments in astronomy: From Galileo telescopes to space projects”. May 17–20, 2010, Mykolaiv, Ukraine. – P. 19.
31. **V. S. Akhmetov**, P.N. Fedorov. The XPM Catalogue. Absolute Proper Motions of 280 Millions Stars // 16th Young Scientists' Conference on Astronomy and Space Physics, 27 April – 1 May. –2009, Kyiv, Ukraine. – P.48.
32. **V.S. Akhmetov**. Determining brightness equation in XC1 catalogue by means of kinematical method // 14th Young Scientists' Conference on Astronomy and Space Physics, Abstracts, 23 April – 27 April. –2007, Kyiv, Ukraine. – P.30.