Astronomy section

March 16, 2023 *(Thursday)*

10.00 Opening speeches

10.05– 13.10 Morning session (chaired by Ilgmars Eglitis)

1) 10.10 – 10.30 Jorge Roberto del Pino Boytel, Janis Kauliņs , Kalvis Salmins

"A proposal for a asteroid 99942 Apophis European multi SLR 2029 observation campaign"

2) 10.35 – 11.05 Artis Aberfelds, Ivars Smelds

"Structure and variability of three methanol maser sources"

3) 11.10 – 11.30 Ilgonis Vilks

"Astronomijas sekcija Latvijas Universitātes zinātniskajā konferencē, 1963 – 2022"

4) 11.35 – 11.55 Boris Ryabov

“Coronal open-field corridors near Solar active regions”

5) 12.00 – 12.20 Dainis Dravins

“Searching for another Earth. Solar spectroscopy to enable radial-velocity searches for truly Earth-like exoplanets”

6) 12.25 – 12.45 Juris Kalvans

“Splitting of icy grains in interstellar clouds”

7) 12.50 – 13.10 Iryna Vavilova, Anatoliy Vasylenko, Oleg Ulyanov, Nadiya Pulatova, Volodymyr Vlasenko, Olena Kompaniets, Inna Izviekova

“Properties of isolated AGNs of the Local Universe in radio- and optical ranges”

13.10 - 14.00 Lunch

14.00 – 18.10 Afternoon session (chaired by Ilgmars Eglitis)

8) 14.00 – 14.20 Andris Slavinskis

“E-sail, ESME and ESTCube”

9) 14.25 – 14.45 Dmitrijs Bezrukovs

“On visibility of “dark coronal corridores” in microwaves”

10) 14.50 – 15.10 Andris Slavinskis, Janis Šate, Endija Briede, Kārlis Luksis, Jaan Praks, Mihkel Pajusalu,

“Öpik–Oort cloud Comet Interceptor and its OPIC instrument”

11) 15.15 – 15.35 Ilgmars Eglitis, Kristers Nagainis

“The research NEO and main belt asteroids in Baldone Observatory”

12) 15.40 – 16.00 Diana Haritonova, Ansis Zarins, Augusts Rubans

“Observations of artificial space objects by the optical tracking system of GGI”

13) 16.05 – 16.30 Dmitrii Kolotkov

“Quasi-periodic pulsations in solar flares and stellar superflares”

14) 16.35 – 16.55 Janis Kauliņs , Kalvis Salmins, Jorge Roberto del Pino Boytel, Ilgmars Eglitis, Kristers Nagainis, Viesturs Silamiķelis, Maris Abele, Aivis Meijers

“SLR 1884 Riga, Status Report”

15) 17.00 – 17.20 Atis Elsts, Aleksandrs Kalinovskis, Armands Ancāns, Dans Laksis, Vsevolods Stepanovs,

“Technology for High-Precision Measurement of Time-of-Arrival and Amplitude of Events”

16) 17.25 – 17.45 Svitlana Shatokhina, V. Andruk, A. Mullo-Abdolov, H. Relke, O. Yizhakevych

“FON Dushanbe catalog of asteroids as the final stage of the small bodies search on digitized Northern Sky Survey negatives”

17) 17.50 -18.10 Tetjana Artemenko

Book of abstracts

Jorge Roberto del Pino Boytel, Janis Kauliņs , Kalvis Salmins

Institute of Astronomy, University of Latvia

A proposal for a asteroid 99942 Apophis European multi SLR 2029 observation campaign

In the frame of the 22nd International Workshop on Laser Ranging celebrated in Guadalajara, Spain during November 7-11, 2022, our IA LU team presented a proposal about organizing a European-Wide SLR observation campaign during the Earth's close encounter with the asteroid 99942 Apophis on Friday, 13 April 2029.

The close approach moment is near 21:00 UTC and the Apophis trajectory will pass inside the geostationary belt.

This close approach period will occur during the local night in Europe and the minimum distance between Apophis and the European SLR stations will be on the order of 32000-35000 km.

If Apophis is treated as a man-made space debris object, then it is possible to carry out laser-ranging observations using the SLR multi-static space debris mode.

We will present our original proposal and comment about new observing possibilities appearing after the original presentation in November 2022.

Artis Aberfelds, Ivars Šmelds

Ventspils International Radio Astronomy Center, Ventspils University of Applied Sciences

Structure and variability of three methanol maser sources

The variability studies of 6.7 GHz methanol masers have become a useful tool to improve the understanding of high-mass star-forming regions. Based on our single-dish monitoring data with Irbene telescopes, we have selected three sources with close sky positions. We obtained images of them by using the European Very Long Baseline Interferometer Network (EVN) and searched available data on VLBI archives. Deriving detailed changes in their structures and single maser spot variability. All three targets show a few groups of maser cloudlets with a typical size of 3.5 mas. The majority of them show linear or arched structures with velocity gradients of order 0.22 km s^{-1} mas^{-1}. Cloudlet's and overall source morphologies are remarkably stable on time scales of 7-15 yr supporting a scenario of variability due to changes in the maser pumping rate.

Igonis Vilks

Museum of University of Latvia, Institute of Astronomy, University of Latvia

Astronomy section at the scientific conference of the University of Latvia, 1963 – 2022

For the first time, astronomers participated in the Scientific Conference of the University of Latvia in 1963. Since then they regularly report the results of their research. During the past 60 years, the meetings of the Astronomy Section were held 53 times. Approximately 190 Latvian astronomers or people related to astronomy have prepared 552 reports, which is approximately 10 reports per year. Using many sources, the author collected the session agendas and analyzed them – who participated at the conferences, where and

when they took place. Astronomy problems presented at the conferences were closely related to the research topics of Latvian astronomical institutions. An overview table has been prepared, with the names of the reports of Latvian astronomers at the Astronomy section from 1963 to 2022.

Boris Ryabov

Ventspils International Radio Astronomy Center, Ventspils University of Applied Sciences

Coronal open-field corridors near Solar active regions

The slow solar wind of plasma flow is about two times slower than the fast solar wind from polar coronal holes. Some authors regard the narrow open-field corridors on the Sun as the sources of the slow solar wind, though the location, morphology, and plasma parameters of these sources are not well determined. The main question I tackle is the location and magnetic structure of the sources of slow solar wind. To this end, the dark lanes in extreme-ultraviolet images are compared with the location of solar filaments and coronal holes to reveal a narrow open-field corridor. The magnetic morphology is analyzed with a potential magnetic field model. Temperature and plasma density are measured near active regions on the way of dark lanes, where plasma upflows are found. I have revealed two narrow open-field corridors with magnetic flux tubes of rapid expansion and low plasma density. The active regions stimulate plasma to upflow via the open-field lines of these narrow coronal corridors.

Dainis Dravins

Lund Observatory, Lund University

Searching for another Earth. Solar spectroscopy to enable radial-velocity searches for truly Earth-like exoplanets

Many exoplanets have been found but a remaining challenge is to find planets similar to the Earth, i.e., with comparable mass, moving in year-long orbits around solar-type stars. A method to identify such planets could be the radial-velocity technique, measuring the changing stellar velocity during its motion around the common star-planet barycenter. Although the amplitude for an Earth-mass planet will only be some 10 cm/s, the most stable spectrometers are now reaching such levels of precision. However, the limitations are now set by natural fluctuations in stellar atmospheres. Granular convection, oscillations and magnetic features cause the apparent radial velocity of solar-type stars to jitter on levels of a few m/s, much greater than signatures from Earth-mass planets. Such fluctuations thus must be somehow calibrated before any exoEarth can be identified.

Small solar telescopes have been connected to some of the extreme precision radial-velocity spectrometers, to monitor the Sun seen-as-a-star and to try to identify the mechanisms of stellar velocity jittering. On La Palma, such a spectrometer has been in daily operation since 2015, with its first comprehensive data released in 2021. From these data, 1000 low-noise solar spectra are being analysed for patterns of micro variability in specific spectral lines. Photometric parameters for Fe I and Fe II, the Mg I triplet, the G-band, the Balmer lines, etc., augment the classical Ca II H&K line index toward a more comprehensive quantification of photospheric and magnetic activity, with the aim to find proxies and calibrations for solar radial-velocity excursions.

Iryna Vavilova[1], Anatoliy Vasylenko[1], Oleg Ulyanov[2], Nadiya Pulatova[1], Volodymyr Vlasenko[3], Olena Kompaniets[1], Inna Izviekova[1]

[1] Main Astronomical Observatory, NAS of Ukraine, Kyiv, Ukraine
[2] Institute of Radio Astronomy, NAS of Ukraine, Kharkiv, Ukraine
[3] National Space Facilities Control and Test Center, Zolochiv, Lviv region, Ukraine

Properties of isolated AGNs of the Local Universe in radio- and optical ranges

Among the 61 galaxies of the sample, flux densities at 1.4 GHz have been found for 51 galaxies. These values are in the range of 3–20 mJy for most isolated AGNs and in the range of 50–200 mJy for two galaxies PGC35009 and NGC6951, while two galaxies ESO483-009 and ESO097-013 have spectral flux densities of 352 and 1200 mJy, respectively. The flux densities of ten isolated AGNs are <3 mJy.

Ratio R of the SFD in the radio frequency range to those in the optical bands have been calculated. Since the flux spectral flux densities at 5 GHz on the basis of relationship $S\nu \propto \nu$ densities at 5 GHz are measured only for eight isolated AGNs, the required values for galaxies of the Seyfert type have been calculated by using the radio flux density values at 1.4 GHz and assuming that the spectral index is equal to $\alpha = 0.7$. We have found that 51 isolated AGNs are radio quiet sources ($R < 10$), the radio properties of nine objects are absent, and ESO483-009 is a radio-loud galaxy ($R = 20.72$, Sy3/LINER, and SAB00 pec). $-\alpha$

We propose observational methods to determine the flux densities of radio-quite isolated AGNs. Systematization of the properties of 61 low-redshift isolated AGNs in the radio frequency range, 36 of which are in the northern sky and 25 in the southern sky, is aimed at pursuing the future goal of establishing a program of radio astronomical observations for the assessment of flux densities and setting up a monitoring study for more detailed mapping of the radio emission characteristics of these galaxies in comparison with their optical and X-ray properties.

Juris Kalvans

Ventspils International Radio Astronomy Center, Ventspils University of Applied Sciences

Splitting of icy grains in interstellar clouds

In radio astronomical observations of the 21st century, molecules (for example, organic compounds) originating from chemical reactions on the surfaces of interstellar grains have been detected. These molecules have been observed in the gas phase, and the mechanism that induced their desorption from the dust grains is unknown. Among possible mechanisms are mutual collisions of the grains that split off fragments of a grain's icy mantle. The fragments are subsequently destroyed by radiation, allowing for the molecules to appear in the gas. If the conditions of about 50 m/s collisional velocity and sufficiently fast disintegration of the fragments are fulfilled, this mechanism can explain the observations.

Andris Slavinskis

Tartu Observatory, University of Tartu

E-sail, ESME and ESTCube

Electric solar wind sail (E-sail) is a novel propellantless system concept. Electric Sail Mission Expeditor (ESME) is a newly established simulation development project for analyzing E-sail trajectories and missions. Electric Sail Test Cube (ESTCube) Programme has worked for nearly 15 years on E-sail in-orbit demonstration missions. This talk will provide an overview of E-sail, ESME, and ESTCube principles, history, and ongoing & new projects as well as my personal involvement in this humanity's project to sail the Solar System and beyond.

Dmitrijs Bezrukovs

Ventspils International Radio Astronomy Center, Ventspils University of Applied Sciences

On visibility of "dark coronal corridores" in microwaves

The interest in coronal holes and coronal hole-like areas associated with open magnetic fields as an eventual origin of the slow solar wind and space weather is permanently growing up.

The analysis of spectral microwave observations of coronal hole-like areas offers the possibility of direct measurements of plasma parameters into a "dark coronal corridor" at different heights in the corona. Ordinary the microwave emission of coronal holes has low contrast and is observed as areas of reduced brightness temperatures below quiet Sun ones. Thus the clear detection of narrow elongated coronal hole-like areas in microwaves is sophisticated and still needs to be discussed.

The presentation concerns to modeling of the microwave emission of a "dark coronal corridor" and the discussion of limitations of its visibility.

Andris Slavinskis, Janis Šate, Endija Briede, Kārlis Luksis, Jaan Praks, Mihkel Pajusalu

Tartu Observatory, University of Tartu

Öpik–Oort cloud Comet Interceptor and its OPIC instrument

Comet Interceptor has been selected as ESA's new Fast-class mission. It will be the first spacecraft to visit either a truly pristine comet or an interstellar object that is only just starting its journey into the inner Solar System. This talk will present the Optical Periscopic Imager for Comets, an instrument of Comet Interceptor's Probe B2, led by UT Tartu Observatory (PI Mihkel Pajusalu) with FPGA development by Latvian BitLake Technologies. I will share my personal experience in establishing Comet Interceptor in Estonia, Finland (Aalto University), and now in Latvia.

Ilgmars Eglitis, Kristers Nagainis

Institute of Astronomy, University of Latvia

The research NEO and main belt asteroids in Baldone Observatory

NEO Nr 11411 and four main belt asteroids Nr.4774, 5255, 15433, and 17866 were studied at the Baldone Astrophysical Observatory in the time span range 2018-2022. The obtained light curve data together with published MPCs data are analyzed with Fourier series, Lomb-Scargle (L-S) periodogram, and Phase dispersion minimization (PDM) methods. The results computed from different observatory data are compared and mean-weighted periods are obtained.

Table 1. Periods obtained from data from Observatories by different methods of analyze

Code and passband	Number of obserbvations	Observation range	Period (L-S) h	W proba-bility	Period (PDM) h	Θ proba-bility
Asteroid 5255=Jonsophie=1988 KF; Weighted mean period 57.747 ± 0.003 h						
T080	247	2019.05.09-2022.06.22	57.744	0.64	57.744	0.64
T050	81	2019.02.15-2022.03.11	57.748	0.65	-	-
T05c	126	2019.06.04-2022.03.05	57.748	0.68	57.600:	0.44
703	143	2020.10.08-2022.06.26	57.768	0.58	57.744	0.53
L41r	144	2020.10.08-2022.06.16	57.744	0.63	57.741	0.59
L41g	74	2019.06.24-2022.04.30	57.744	0.76	-	-

Asteroid 4747=Jujo=1989 WB; Weighted mean period 10.591 ± 0.002 h

T080	301	2019.05.09-2022.06.26	10.593	0.61	10.593	0.57
T050	150	2019.05.15-2022.03.12	10.584	0.56	10.594	0.68
T05c	166	2019.05.31-2022.06.25	10.584	0.52	10.594	0.68
703	165	2020.10.08-2022.06.17	10.584	0.52	10.635:	0.43
L41r	179	2020.07.30-2022.05.16	10.068:	0.42	10.594	0.55

NEO asteroid 11411=1999 HK1; Weighted mean period 9.021±0.002 h

T080	230	2019.01.17-2022.08.24	9.024	0.68	9.017	0.77
T050	74	2019.01.15-2022.08.20	9.159:	0.45	9.159:	0.50
T05c	79	2019.01.11-2022.08.22	8.952:	0.39	9.356:	0.38
703	94	2020.11.11-2022.07.06	9.024	0.65	9.022	0.77
L41r	79	2019.04.13-2022.07.25	9.024	0.61	9.016	0.70

Asteroid 15433=1998 VQ7; Weighted mean period 63.787 ± 0.071 h

T080	378	2019.01.14-2022.03.10	63.576	0.71	63.578	0.68
T050	129	2018.12.19-2022.03.05	63.480	0.53	63.666	0.59
T05c	133	2019.01.12-2022.03.05	64.104	0.55	64.106	0.63
703	133	2020.09.25-2022.06.04	58.656:	0.14	64.763	0.77
L41r	108	2018.11.28-2022.07.02	65.016:	0.29	64.987:	0.36

Asteroid 17866=1998 KV45; Weighted mean period 4.575 ± 0.005 h

T080	228	2019.07.07-2022.07.19	4.464	0.08	4.884	0.78
T050	88	2019.07.27-2022.03.12	4.392	0.44	-	-
T05c	117	2019.07.31-2022.06.29	4.416	0.43	4.884	0.75
703	101	2021.10.19-2022.06.17	4.512	0.23	4.767	0.75
L41r	138	2019.08.17-2022.06.01	4.767	0.16	4.710	0.80
L41g	83	2019.08.01-2022.06.03	4.386	0.28	-	-
069	132	2022.03.31-2022.04.02	4.464	0.36	4.471	0.67

The Fourier series method gives usable results analyzing long series observation in multiple following nights when the rotation period isn't longer than 7-10 hours. In cases of small series of observations scattered over a large period of time, with uncertainties in brightness, the L-S and PDM methods work more reliably. All three methods can be safely used if the number of observations greatly exceeds a hundred. It should be noted, that the PDM method is particularly sensitive to a small number of observations. If the number of observations is less than a hundred, the PDM method mostly does not give good results.

Acknowledgments. This research is funded by the ERDF project No. 1.1.1.5/19/A/003

Diana Haritonova, Ansis Zarins, Augusts Rubans

Institute of Geodesy and Geoinformatics, University of Latvia

Observations of artificial space objects by the optical tracking system of GGI

The Institute of Geodesy and Geoinformatics (GGI) of the University of Latvia (UL) is focused on positional astrometric observations of satellites, space debris and near-Earth objects (NEOs) by the optical tracking system (OTS) developed there along with a software package for this purpose.

The system includes twin optical tube assemblies (OTAs) (0.41 m aperture) on an Alt-Alt mount, which has its advantages in the tracking (moving) mode. The preparation of the system during its installation at a new site is implemented as a post-doctoral project. The stage of hardware and software complementing and adjustment for astrometric tasks is almost completed. The methodology for positional astrometric observations using the system is being developed.

This research aims to assess the efficiency of the OTS to perform positional observations of objects in geostationary orbit or in orbits close to it and observations of satellites in lower orbits. It was found, that the

minimum brightness of the star has a magnitude of about 15 at 1-second exposures, and it can be improved by applying longer exposures or stacking many frames: at summary exposures of several hours it should be possible to reach the magnitude of about 20 or higher. Observations of stars ensure the position accuracy of about 0.2-0.5 arc seconds. For moving objects relative to stars, both magnitude limit and accuracy are decreased. For geostationary satellites, the limit of magnitude is about 17, with an accuracy of about 0.3 -1 arc seconds.

Application of calculated mount error model has ensured resulting positioning accuracy of about 1 arc minute, which should already be adequate for blind low-orbit satellite tracking. After optimization of the mount error model structure and some mechanical adjustments, the positioning accuracy of up to 5–10 arc seconds is expected.

The location of the optical tracking system in a city means relatively bad astroclimate and high level of microseismic, but from the point of view of work conditions and accessibility by scientific staff and students, the House of Science of the UL is a perfect place for educational and popular science activities, and the development of methodology for observations of space objects.

Project No: 1.1.1.2/VIAA/4/20/619.

Dmitrii Kolotkov

Centre for Fusion, Space and Astrophysics, Physics Department, University of Warwick, United Kingdom, Ventspils International Radio Astronomy Center, Ventspils University of Applied Sciences

Quasi-periodic pulsations in solar flares and stellar superflares

A highly powerful technique for the diagnostics of physical conditions in active regions of the Sun's corona is the method of coronal seismology. Traditionally, coronal seismology is based on direct imaging and/or spectroscopic observations of magnetohydrodynamic (MHD) wave processes and their use as natural probes. It allows for the diagnostics of magnetic properties of the Sun's corona, such as the coronal magnetic field strength, twist, geometry, free energy, and fine cross-field structuring, as well as fundamental thermodynamic parameters of the coronal plasma, including the enigmatic coronal heating function, which are difficult or even impossible to measure otherwise. For stars, however, in the absence of direct spatially resolved observations, the only proxy of the oscillatory dynamics in stellar coronal active regions is the phenomenon of quasi-periodic pulsations (QPP) in flaring lightcurves, which have recently been understood to carry unique but yet unexplored seismological information about the flare onset, development, and surrounding plasma conditions.

In this talk, multi-wavelength observations of QPP events in powerful stellar flares and superflares (more than a thousand times stronger than the most powerful solar flare ever observed) will be discussed. In particular, it will be demonstrated how QPP observations in the white-light band can be used for assessing the habitability zones in the vicinity of the flare-hosting stars. Likewise, the first simultaneous detection of QPP in a stellar superflare in soft X-rays and white light and its use for the diagnostics of a flare development at different heights of the stellar atmosphere and revealing the physical nature of a flare loop as an equivalent electric LCR-circuit will be presented.

Janis Kauliņs , Kalvis Salmins, Jorge Roberto del Pino Boytel, Ilgmars Eglitis, Kristers Nagainis, Viesturs Silamiķelis, Maris Abele, Aivis Meijers

Institute of Astronomy, University of Latvia

SLR 1884 Riga, Status Report

The SLR station 1884 Riga started 2020/2021 a process of upgrading the SLR system and adding new components to support multi-static laser ranging and satellite photometry. After the completion of this process, the SLR system has been recalibrated. The new ITRF2020 coordinate solution for the SLR 1884 Riga is significantly improved in relation to the ITRF2008 and ITRF2014 solutions.

The preliminary results show that our system has a range bias error of the order of 1 cm or less, which is a very good value for an SLR system. If confirmed at the end of the quarantine analysis, our station will be in the top tier of the ILRS global network in the range bias error category.

We present an overview of the major upgrades and new techniques introduced, the current situation, and the next development steps. Several of the first results of the new capabilities are shown.

Atis Elsts, Aleksandrs Kalinovskis, Armands Ancāns, Dans Laksis, Vsevolods Stepanovs

Institute of Electronics and Computer Science, Latvia

Technology for High-Precision Measurement of Time-of-Arrival and Amplitude of Events

Event timers, such as the A033-ET1 and A040-ET2 have the ability to measure the timing of events with a high degree of precision (<= 5 and <3 picosecond error respectively) and are widely used in satellite laser ranging applications. However, they have some drawbacks, including sensitivity to environmental factors such as temperature, and the loss of important information regarding the amplitude of the event.

As part of the TIME-AMP project at the Institute of Electronics and Computer Science, we have developed a new generation timer that has improved parameter stability and are in the process of developing a new system for simultaneous time of arrival and amplitude measurement of nanosecond width pulses – Event Time and Amplitude Meter (ETAM).

Preliminary testing results show improvements in precision and temperature stability. The new timing system design also has decreased dead time and improved gate signal generator functionality.

The pulse amplitude measurement technology used in the new device is based on the digitization of peak-detected signal. A similar peak-detector mechanism was earlier used as part of the Time Selector / Amplitude-to-Time Interval Converter (TS/ATIC) device, which was also developed by EDI and is currently in operation at the Riga SRL station. The main drawback of the ATIC approach to amplitude measurement is the high (microsecond) dead-time, which will be greatly improved in ETAM – down to approximately 40 nanoseconds.

Table 1 shows expected performance of EDI Event Time and Amplitude Meter (ETAM), based on design and preliminary test results.

Compared with the previous best Event Timer, ETAM is expected to have improved timing precision and timing precision stability, as well as reduced dead-time. Additionally, it introduces new functionality in a form of fast and accurate event pulse amplitude measurements.

Acknowledgments. This research was funded by the European Regional Development Fund (ERDF) project No. 1.1.1.1/20/A/076.

Svitlana Shatokhina[1], V Andruk[1], A Mullo-Abdolov[2], H Relke[3], O Yizhakevych[1]

[1]Main Astronomical Observatory of NASU, Kyiv, Ukraine
[2]Institute of Astrophysics of AS of Republic of Tajikistan, Dushanbe, Tajikistan
[3]Walter Hohmann Observatory, Essen, Germany

FON Dushanbe catalog of asteroids as the final stage of the small bodies search on digitized Northern Sky Survey negatives

At present, all observations from the most representative three components of the Northern Sky Survey project, namely the Kyiv, Tashkent and Dushanbe parts, have been digitized and processed. Based on the results obtained, stellar catalogs were compiled containing equatorial coordinates for the observation epoch and magnitudes of stars up to B-magnitude 17.2.

In parallel with the implementation of the main goal of the project, we analyzed the results of processing digitized observations in order to search for images of small bodies in the Solar system. Now we present the result of this work in the form of a compiled catalog of positions and magnitudes of asteroids obtained from observations of the third Dushanbe part of the project. Recall that it is represented by approximately 1529

photographic plates obtained in 1985-1992 on the Zeiss-400 astrograph of the Gissar Astronomical Observatory of the Institute of Astrophysics of the Academy of Sciences of Tajikistan.

The compiled catalog contains more than 2000 positions of asteroids with visual magnitudes from 7 to 16.5. Based on the results of the comparison of the catalog data with an ephemeris, an analysis of the O-C differences was carried out. Statistical characteristics and accurate estimates for the FON-Dushanbe asteroid catalog were compared with similar asteroid data from the FON-Kyiv and FON-Tashkent parts of the project. The authors note some differences in the accuracy of the compared catalogs, as well as analyze the reasons and possibilities for reducing their impact.

In addition, the compiled catalog includes several positions of Pluto and comets, which were also identified in the negatives.

Tetjana Artemenko

Main Astronomical Observatory of NASU, Kyiv, Ukraine

The catalog of faint stars as an astrometric international project and the participation of observatories of Ukraine in its implementation

Some results of the international astrometric program "Catalogue of the faint stars(KSZ)" and the role of the astronomical observatories of Ukraine are discussed. The aim of the KSZ program was to make astrometrical tying of faint stars to the galaxies that gives a possibility to obtain absolute proper motions of stars and inertial coordinate system without dependence from motions of stars in our Galaxy. Proper motions, related to the galaxies, make it possible to determine systematic errors of fundamental catalogs, obtain the precession constant in an independent way, and also to clarify the star-kinematic Galaxy parameters.

The role of the observatories of Ukraine in the implementation of the international astrometric program for the creation of a catalog of faint stars is described.