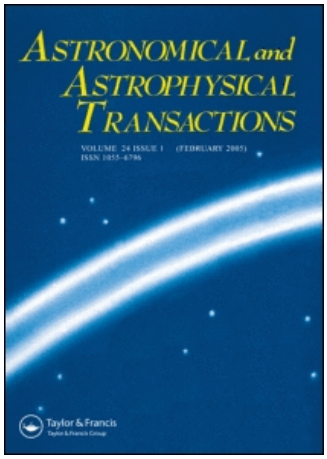

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VIIIth General meeting of the euro-asian astronomical society

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VIIIth General meeting of the euro-asian astronomical society

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The VIIIth General Meeting of the Euro-Asian Astronomical Society (hereafter, the official acronym, EAAS, will be used for the sake of brevity), with a concommitant symposium 'Astronomy 2005: Current State and Outlook', was held in Moscow on 1st–6th June 2005 at the Sternberg Astronomical Institute and the Moscow House for Creative Activities of Children and Youngsters. The symposium was organized jointly by EAAS, the Sternberg Astronomical Institute and the Scientific Council of the Russian Academy of Sciences.

Nearly 300 participants attended the scientific sessions of the symposium, with over 230 registered contributors. Among the participants, were astronomers from the newly independent states of the FSU and Baltic region, in addition to colleagues from Bulgaria, Serbia, Chernogoria, Spain and Australia.

The agenda of the VIIIth EAAS Meeting consisted of both plenary sessions and parallel topical sessions in the seven following sections:

Section 1. Astrometry and Celestial Mechanics (conveners: L. V. Rychlova and V. M. Chepurova)
Section 2. Solar Physics and Solar–Terrestrial Interactions (convener: V. N. Obridko)
Section 3. Galaxy and Cosmology (conveners: A. S. Rastorguev and O. K. Silchenko)
Section 4. Physics of Stars and Interstellar Medium (conveners: N. G. Bochkarev and N. N. Samus)
Section 5. Planetary Systems (conveners: V. V. Shevchenko and A. B. Makalkin)
Section 6. History of Astronomy and Archaeoastronomy (conveners: A. I. Eremeeva and T. M. Potyomkina)
Section 7. Astronomical Education (conveners: P. E. Zakharova and V. V. Ivanov)

A total of 21 invited discourses were presented during the plenary sessions, covering practically all essential fields of investigation in modern astronomy, astrophysics and cosmology. The full list is presented in Appendix A. A volume of abstracts, containing summaries of scientific contributions submitted to the Scientific Organizing Committee, was issued by the hosts and circulated among the attendees.

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Below are some highlights, selected from lectures submitted by keynote speakers during plenary sessions of 'Astronomy 2005: Current State and Outlook'.

Yu. Balega, *Astronomy with Big Telescopes*. Data on the operation of the SAO 6-m telescope of the Russian Academy of Sciences. Annually, about 80 observational programs are carried out, 22% of the observational time is allocated to joint programs with Western astronomers and nearly 100 papers are published in the world's leading astronomical journals based on observational material collected with the aid of this 6-m telescope. Among the most interesting recent results are the discovery of a brown dwarf of 0.115 solar mass in a binary system with component separation of 89.9 ms of arc, registration of light echo from gamma ray bursts and the discovery of new multiple systems using speckle interferometry techniques.

M. Smirnov, *Investigation of Small Bodies in Solar System*. Small bodies include both comets and small asteroids. There are no main differences between these two classes of objects: nuclei of comets have sizes ranging between 1 and 70 km (the nucleus of Halley's comet is 10–17 km across), hundreds of asteriods have trajectories similar to that of Halley's comet. After approximately 100 close passages, a comet <1 km across outgases and turns into a small asteroid. In the course of migration, some small bodies undergo closer encounters with our planet, presenting a potential hazard to life on earth. Objects of a size <20 m burn up in the atmosphere; at a size of 100 m–1 km, a local catastrophe could be anticipated; to cause global catastrophe, impact with a celestial body of 20 km is needed and, statistically, this should occur once every 30 million years.

M. Marov, *Migrational Processes in Solar System and Heterogenic Accretion*. Modeling of migrational processes and accretion, with the aid of N body simulations ($N = 2 \cdot 10^{-4}$) performed at the Keldysh Institute, indicated that many of the small bodies from transplutonian orbits were intercepted by Jupiter and approximately one asteriod of 1 km in size could reach Earth in a million years. Approximately $6 \cdot 10^{-4}$ solar masses (about one and a half of the mass concentrated in all Earth's water basins) could have be transported from the outskirts of the solar system over 4 billion years – more than 50% of this material is highly volatile and has evaporated. Four billions years ago, the accretion temperature in the vicinity of the Earth was 1500 K, with a lot of material in form of dust particles, whereas the lethal temperatures for bacteria adsorbed by dust is 1000 K higher. Thus, both water in the primordial Earth's oceans and seas, and the primitive building blocks of life, could have been safely transported from the Kuiper belt. This possibility is supported by existing evidence for the low density of many asteriods and the very high collision probabilities in the primordial solar system.

V. Kuznetsov, *Solar Studies from Cosmic Probes: Current State and Outlook*. Cosmic probes, such as ULYS, SOHO and RHESSI, permit the study of our daily star outside the ecliptic plane and close to the Sun. From these studies, the polar diagram of solar wind has been monitored recently in detail. It is now known that stable wind with velocities of $\sim$800 km/s emanates from subpolar regions, compared to the outflow from solar corona equatorial regions, with velocities of 400 km/s and high variability. Mg XII emission features, present at 8.42 A, indicate that, in the solar corona, there are areas with temperatures exceeding $20 \cdot 10^{-6}$ K. MHD models of steady magnetic reconnection of lines of force remain the basic mechanism for acceleration of charged particles in solar plasma. New cosmic probes, SOLAR-B, STEREO and the SDO Solar Probe, are scheduled for launch in 2006–2007.

A. Cherepashchuck, *Demography of Black Holes*. Up to now, several hundred massive, very compact objects have been discovered with properties characteristic of black holes, as predicted by the theory of general relativity. Statistical studies of these objects indicate that the mass of supermassive black holes residing in galactic nuclei is correlated with the luminosity of the galactic bulge and the mass of the galactic halo. In addition, the mass of putative black holes is correlated with the rotation velocity of the galaxy, which, in its turn, is determined

by the total mass of the latter. The distribution of neutron stars and black holes with stellar masses is bimodal, revealing a gap of between 2 and 4 solar masses.

R. Dagkesamansky, *Outlook for Long-Term Developments in Radioastronomy*. Rapid oscillations in radiofluxes from AGN have enabled the narrowing of the size of central objects down to several Schwarzschild radii for supermassive black holes of $10^{-6} - 10^{-8}$ solar masses. Radiopulses can provide information on the internal structure of neutron stars, and radiopulsars are ideal objects for 'screening' the interstellar medium, for example, the successful joint Russian–Japanese project of timing the pulses from the radiopulsar $1937 + 21$.

M. Panasyuk, *Cosmic Rays in Retrospective and Prospect*s. In the past, cosmic ray spectra and temporal behaviour had been studied in great detail for KeV and MeV energy ranges (mostly solar cosmic rays). Nowadays, studies are concentrated mostly on the GeV and PeV portions of the spectrum. In recent years, the 'weighting' of nucleons towards the higher energies has been experimentally confirmed with contributions from proton and He nuclei identification. The most urgent unsolved problem is the nature of the so-called 'iron knee' in the energy spectrum of cosmic rays, peaking at about 3 PeV. The nature of the cosmic 'pevatron' has not yet been clarified. The old theory of Baade and Zwicky that high energy cosmic rays are produced by SN explosions is still viable, but it has been found by numerical modeling that shock waves, produced during the explosions, are unable to accelerate particles above a 1-PeV threshold. Several ongoing projects are underway to find a solution to this problem.

A. Galper, *Gamma-Astronomy in the Pursuit of Dark Matter*. It is conceivable that at the end of the inflation stage of the early Universe, non-barionic dark matter consisted of weakly interacting massive particles (WIMPS). Supersymmetry models assume that the process of annihilation of WIMPS resulted in the production of pairs of gamma quanta, of electrons and positrons, protons and antiprotons etc. The discovery of traces of primordial positrons, antiprotons and antideutrons in the isotropic spectra of gamma radiation could serve as proof of the existence of relict dark matter. There are high hopes that new data from the next generation of gamma telescopes, AGILE, and the mass spectrometer PAMELA, to be launched on board a space platform, will be the key to the solution of this fundamental problem.

The above short summaries are just fragmentary glimpses from the symposium, dictated by the journal format, whereas a comprehensive overview of all scientific topics should follow with an in-depth analysis of available material.

One day of the EAAS General Meeting was allocated to organizational matters of the Society. In accordance with the statutes of the EAAS, elections of the Co-Chairmen and the Board were held. The General Meeting acknowledged the great achievements of the retiring Co-Chairman, Professor V. N. Obridko, in promoting the authority and special position of the Society within the scientific establishment, both in the FSU and beyond. A special resolution was adopted, granting Professor Obridko the status of an honourable member of the EAAS, with the award of a memorial medal. N. N. Samus, one of the leading authorities in the field of variable stars and GCVS, was elected to the post of new Co-Chairman. The new EAAS board consists of 25 people: I. Shmeld (Astronomical Institute of Latvian University, Riga) and I. Pustylnik (Tartu Observatory, Estonia) were nominated as the two Vice-Chairmen of the EAAS. Other important topics of discussion focused on international olympiads for schoolchildren, under the supervision of the EAAS, the situation of planetaria in Russia, the current state and prospects of the international journal *Astronomical and Astrophysical Transactions*, the collection of membership fees and other business. The internationally renowned German astronomer, Dr. Wilfried Schröder, known for his studies of aurora and historical minima of solar activity, was elected an honourable member of the EAAS.

In the general atmosphere of political instability prevailing in many regions of the FSU, notably in Central Asia and Caucasus, several observatories have experienced acute shortages

of electricity and numerous logistical problems. The complicated state of many observatories was described in detail by N. G. Bochkarev (Sternberg Astronomical Institute), whereas P. E. Zakharova (Ural State University) devoted her talk to the predicament of Russian University observatories. In her report, one of the EAAS Co-Chairmen, Dr. Sc. L. V. Rychlova, analyzed the state of the Terskol Observatory, vividly exemplifing current developments in FSU astronomical institutions. Geographically, this station is located on the top of the Terskol mountain, formally belonging to the Russian Federation, but its principal instrument, a 2-m Zeiss telescope, was installed by the Main Observatory of the Ukranian Academy of Sciences and, in the present political situation, the operation and maintainance of the instrument is an uneasy task, full of uncertainties and risky financial obligations, due to the lack of legal provisions regulating property issues between the scientific establishments of the two states.

The agenda of the Meeting included two special sessions to commemorate the scientific accomplishments of the veteran of Soviet astronomy, Professor Vitalij Gorbatsky (1920–2005) from St. Petersburg University and former Co-Chairman of the EAAS, and Professor Felix Tsitsin (1931–2005) from Sternberg Astronomical Institute, an expert in cometary physics, cosmogony and the history of astronomy. Both prominent scientists passed away in early 2005.

Since the foundation of the EAAS, Professor V. G. Gorbatsky was Co-Chairman, and his wisdom and diplomatic abilities were invaluable during the most difficult years of the formation and establishment of the Society. Born in the Russian provincial town of Nevel, since 1948, V. G. Gorbatsky has been linked with St.Petersburg University and its observatory, working first as a postgraduate student under Professor V. V. Sobolev and later as his close associate. In his invited discourse, Professor V. V. Ivanov summarized the main landmarks in the life and scientific career of the late Professor Gorbatsky, who nurtured three generations of astrophysicists/theoreticians at St. Petersburg University and was deservedly regarded as a world-renowned specialist in stellar gas dynamics, the physics of accretion discs in novae and nova-like stars, and the physical processes in galaxies and clusters of galaxies. He was an author of seven scientific monographs: *Non-Stationary Stars*, *Cosmic Gas Dynamics*, *Introduction to Physics of Galaxies and Galaxy Clusters*, *Novae and Nova-like Stars*, *Instabilities in Gas Dynamics of Astronomical Systems*, *Cosmic Explosions and Lectures on History of Astronomy*.

A former student of V. G. Gorbatsky, Dr. N. Sotnikova, described the astrophysical seminars conducted for more than 20 years by Professor Gorbatsky. A modest personality, even ascetic in his habits, with diverse scientific interests, he invariably attracted young people with his deep insight and youthful vigour till the very last days of his life. Apart from science and philosophy, he was deeply interested in history and literature, to mention only a few of his hobbies. In old age, he climbed the mountains of Central Asia and Caucasus, trekked numerous tourist trails (among those of the Baikal and Kamchatka peninsula) and studied, with his young colleagues, the petroglyphs carved on the cliffs and stones around Lakes Ladoga and Onega.

A veteran of lunar research in Soviet Union and a leading expert in cosmogony, E. Ruskol, from the Institute of Terrestrial Physics in Moscow, dedicated her invited discourse to F. Tsitsin's studies in planetary cosmogony and the personal fate of the founder of the Soviet School of Cosmogony, O. Yu. Schmidt, investigated in great detail by F. Tsitsin. Close associates of F. Tsitsin, Dr. V. Chepurova (Sternberg Astronomical Institute) and Dr. I. Genkin (Astronomical Institute, Alma-Ata), discussed Tsitsin's approach to the origin of cometary nuclei and his personal contribution to the solution of this problem. The wife of F. Tsitsin, Dr. Alina Eremeeva from Sternberg Astronomical Institute, dedicated her talk to his life and scientific accomplishments. One of the peculiarities of the creative style of the late Professor Tsitsin was the strong interdisciplinary aspect of his approach to various problems in astronomy, for instance, his in-depth analysis of the thermodynamical models of the Universe and their inherent paradoxes. This feature of his scientific legacy was discussed in detail by the well-known Russian specialist in methodology and philosophy of science, Professor

V. Kazyutinskij. A special volume of publications, summarizing the scientific legacy of the late Professor F. Tsitsin, is in preparation.

Within the framework of the section *History of Astronomy and Archaeoastronomy*, a round-table discussion, initiated by an expert from UNESCO, Mrs. A. Sidorenko-Dulom, took place. The debate centered on the listing of archaeoastronomical monuments and the promotion for an inventory of cultural and historical memorials situated within the territory of the Russian Federation. According to the speaker, the main objective of the UNESCO initiative, *Astronomy and World Heritage*, is to establish a link between science and culture on the basis of research aimed at acknowledging the cultural and scientific value of sites connected to astronomy. The identification, safeguarding and promotion of these sites are the three lines of actions for implementation of the project.

Appendix A

I. M. Podgorny, *On the Problems and Prospects of Computer Modeling of Solar Flares*.
B. V. Somov, *Physics of Solar Flares*.
V. D. Kuznetsov, *Solar Studies from Cosmic Probes: Current State and Outlook*.
Yu. Yu. Balega, *Astronomical Research with Big Telescopes*.
A. D. Chernin, *The Year of Physics – Einstein's Triumph*.
N. G. Bochkarev, *On the Role of Small and Middle Size Telescopes in Astronomy*.
A. M. Cherepashchuk, *Demography of Black Holes*.
A. M. Galper, *Gamma-Astronomy in the Pursuit of Dark Matter*.
L. M. Gindilis, *Forty years of SETI program in USSR and Russia*.
V. N. Rudenko, *Gravitational Wave Astronomy in Russia, New Independent States and the World*.
M. A. Smirnov, *Investigation of Small Bodies in the Solar System.*
M. Ya. Marov, *Migrational Processes in the Solar System and Heterogenic Accretion*.
P. E. Zakharova, *University Observatories: Current State and Prospects*.
N. G. Bochkarev, *On the Current State of Astronomical Research in Russia, New Independent States and Baltic Countries*.
A. S. Guliev and E. S. Babaev, *Optical Telescopes of Shemaha Astrophysical Observatory: Current State and Prospects*.
G. M. Idlis, *The Current State and Prospects of Studies in the Field of History of Astronomy and Archaeoastronomy.*
A. V. Zasov, *Kinematics and Evolution of Spiral Galaxies*.
R. D. Dagkesamansky, *Outlook for the Long-Term Developments in Radioastronomy.*
M. I. Panasyuk, *Cosmic Rays in Retrospective and Prospects*.
A. A. Boyarchuk, *Astronomical Investigations with Cosmic Telescopes*.
E. Alfaro, *Twenty-Five Years in the Development of Spanish Astronomy: From a Marginal Position to the Current State*.