



XV NATIONAL CONFERENCE OF ASTRONOMERS OF SERBIA
Belgrade, 2-5 October 2008

BOOK OF ABSTRACTS

Eds. Olga Atanacković, Zorica Cvetković and Dragana Ilić



Faculty of Mathematics



Astronomical Observatory

Belgrade 2008

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Published by: Department of Astronomy, Faculty of Mathematics, Studentski trg 16, 11000 Belgrade, Serbia and Astronomical Observatory, 11060 Belgrade 38, Serbia

The publication of this issue is financially supported by the Ministry of Science and Technological Development of Serbia

Website: <http://www.astro.matf.bg.ac.yu/nkonf15/>

Computer text design: B. Arbutina and T. Milovanov

ISBN 978-86-7589-072-0

Printed by: "TULI" Printing Office, Vršac, Beogradska bb

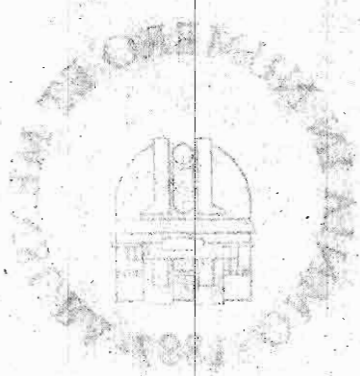
Number of copies: 150



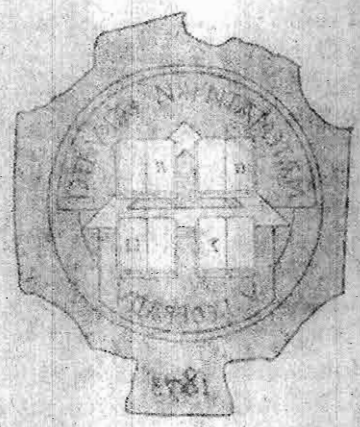
XV NATIONAL CONFERENCE OF ASTRONOMERS OF SERBIA
Belgrade, 5-6 October 2008

BOOK OF ABSTRACTS

Eds. Olga Atanackovic, Zorica Cvetkovic and Dragana Ilic



Astronomical Observatory



Faculty of Mathematics

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Invited reviews

Inverted reviews

Invited review

STRUCTURE AND DYNAMICS OF THE SOLAR ATMOSPHERE

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Czech Republic*

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I will review the current status of our understanding of the solar atmosphere. A special attention will be paid to spatial inhomogeneities of all atmospheric layers (photosphere, chromosphere, transition region and corona), as well as to highly dynamical nature of atmospheric structures. I will present latest high-resolution solar observations performed with ground-based as well as with space-borne instruments and show how recent radiation-hydrodynamical simulations can explain various phenomena. Energetic processes taking place in the solar atmosphere will be also reviewed.

Invited review

X-RAY FORMATION MECHANISMS IN MASSIVE BINARY SYSTEMS

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Massive, hot, luminous stars of type OB and WR have strong supersonic radiatively driven winds. Both single and binary early-type stars are known X-ray emitters. According to current understanding of X-ray formation mechanisms in the winds of single and binary early-type massive stars, binaries should be harder and more luminous X-ray sources than single stars. However, recent observational studies with the X-ray satellites XMM-Newton and Chandra show that, *on average*, X-ray properties of single and binary early-type massive stars are not very different. We review these studies and discuss a possible explanation to this discrepancy.

THE COSMIC EVOLUTION OF ACTIVE GALACTIC NUCLEI

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For many years, quasars (more generally speaking, Active Galactic Nuclei, short AGN) have posed interesting challenges for astrophysics. Only relatively recently, however, the relevance of AGN for the evolution of galaxies in general has started to become visible. In this review I summarise our statistical knowledge of the AGN population and its evolution over cosmic times. I begin with a review of recent advances in surveys for AGN, and their implications for fundamental diagnostics such as the AGN space density and the luminosity function. I then discuss the black hole - galaxy connection, and how observations of AGN and their host galaxies are currently of key interest to learn more about the interrelation of the two. In the end I mention a few persisting challenges, in particular concerning the poorly understood processes of AGN feedback.

ORBIT DETERMINATION FOR THE NEXT GENERATION SURVEYS

A. Milani

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The next generation whole sky surveys, such as Pan-STARRS and LSST, provide enormous opportunities and enormous challenges. I shall address the goals and problems of the Solar System part of these surveys.

Unlike star images, the detections of moving objects are not individually useful, but have to be assembled into sets of observations belonging to the same object: this is the identification problem. An acceptable identification requires to compute an orbit fitting to all the available observations. If the number N of observations in the same night is of the order of millions, methods for identification with superlinear computational complexity cannot be used.

In collaboration with the Pan-STARRS project, our group (based in Pisa and Belgrade) has succeeded in defining identification methods with computational complexity of the order of $N \log N$. We have confirmed their efficiency with full scale simulations. For large N , the critical problem is accuracy, that is avoiding false identifications: they can be a serious concern, especially in that most false orbits appear to be Near Earth Objects. For large datasets, accuracy needs to be achieved with fully automated statistical quality control.

Printed in 2008

ORBIT DETERMINATION FOR THE NEXT GENERATION SURVEYS

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The next generation wide sky surveys, such as Pan-STARRS and LSST, provide enormous opportunities and enormous challenges. I shall address the goals and problems of the Solar System part of these surveys.

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*I Astrophysical spectroscopy and
solar physics*

&

*II Stellar physics and physics of
interstellar medium*

I Astrophysical spectroscopy and
solar physics

&

II Stellar physics and physics of
interstellar medium

Invited lecture

SOLAR OPTICAL SPECTROSCOPY IN THE ONDŘEJOV OBSERVATORY

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Solar astrophysics based on spectroscopic methods and observations was implemented at the Ondřejov observatory in the middle of 1950's. First, the solar patrol started to use spectroheliograph for detection of flares and for measurement of the H α line width during flares. Then, the Multichannel Flare Spectrograph with an unique construction was put into operation in 1958 and was used for detection of photographic spectra in several diagnostically important lines simultaneously for more than 2 solar cycles. A prototype of large horizontal spectrograph (Czerny-Turner type) was build in 1960' and was mainly used for measurements of solar magnetic and velocity fields. Since 1980's two new horizontal solar telescopes with spectrographs delivered by Carl Zeiss Company are used in the Ondřejov Observatory. Physical properties and parameters of solar flare and prominence plasma based on spectral observations and computer modelling were studied intensively. Recently, the two spectrographs were modernized as concerns their optics, controlling electronics and detectors. Spectra of solar active phenomena obtained with a high spectral and temporal resolution are used together with data from space experiments to understand better some specific tasks of solar physics. The contribution briefly describes both instrumental spectroscopic facilities and results obtained using the solar spectral observations at Ondřejov.

Invited lecture

KINETIC ASPECTS OF THE SOLAR WIND: A BRIEF REVIEW

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Non-thermal electron and ion velocity distribution functions are permanently observed in the solar wind. The exact origins of such departures from equilibrium Maxwell-Boltzmann distributions remain unclear. It is however believed that the rarity of Coulomb collisions in most of the extended corona and solar wind plays a crucial role in the mechanisms which produce and/or maintain such distributions. I will review briefly the various observations concerning these distributions and discuss about their possible coronal origin and role in the Solar Wind acceleration processes.

Short talk

MODAL FREQUENCIES OF IONOSPHERIC PERTURBATIONS INDUCED BY SOLAR WIND IMPACTS

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Solar activity phenomena such as flares and coronal mass ejections (CME) may result into sudden and pronounced variations of solar wind parameters, which are then conveyed from the Sun away into the interplanetary space with characteristic speeds. At the location of the solar wind impingement on the geomagnetic field, the whole magnetosphere-ionosphere system gets perturbed and, consequently, forced to oscillate with some eigen-frequencies. In this work, we argue that such modal frequencies can be deduced from spectral analyses of time variations of amplitudes and phases of VLF (very low frequency) radio-waves emitted from a network of transmitters on the Earth and monitored by a receiver located at the Institute of Physics, Belgrade, Serbia. Since these oscillation frequencies are typical of the current physical state of the system magnetosphere-ionosphere, they may be applied in diagnostics of local plasma and for making models of processes induced by a particular type of solar activity.

Short talk

HIGH FREQUENCY OSCILLATIONS AND THEIR CONNECTION TO SOLAR ATMOSPHERIC HEATING

A. Andjić

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The high frequency oscillations are suggested as one of the heating mechanisms of the solar atmosphere. Recent research results, theoretical and observational, show that their exact role in heating is still unresolved. I will present the observational work which shows the observed level of the energy carried with the oscillations, their nature, behavior, propagation and locations in respect to the continuum images. Some of the results show implication that the magnetic flux concentration can be connected with the propagation of the detected oscillations. Also the new research plans and projects will be presented.

APPLICATION OF ARTIFICIAL NEURAL NETWORK TO THE CLASSIFICATION OF STELLAR SPECTRA

D. Zarić

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In this paper we present the application of an artificial neural network (ANN) based on a multi-layered back-propagation algorithm to the classification of stellar spectra. Using a part of catalogue's data in the training process, network learns to associate the appearance of a visual spectrum (hydrogen Balmer lines, continuum shape) with the classification parameters (MK spectral types). The performance of the network is evaluated by using it to classify the remaining data set and by comparing this ANN classification with the original catalogue one. ANN code is written in C++. It uses back-propagation algorithm for training and an approach that can be best described as "associative memory model" for prediction (classification).

DETECTION OF GLOBAL OSCILLATIONS IN SOLAR-LIKE STARS

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An understanding of the structure and evolution of stars remains a key challenge for astrophysics. It is now technologically possible to detect normal-mode pulsations (p-modes) which probe the stellar interior, and thus carry information on the physical conditions in regions of the star that are not accessible through ordinary observational techniques. Helioseismology has provided test of theoretical models of solar evolution and led to fascinating new insights into the complex dynamics of solar internal rotation. Of special interest is then application of the seismology to Sun-like stars which refer to stars on or near the main sequence that experience p-mode oscillations similar to those found in the Sun. The application of pulsation analysis techniques to solar-like stars is difficult because of extremely small variations in intensity and velocity associated with the pulsation modes and need to have adequate temporal coverage to resolve the modes of interest. Doppler ground-based measurements have been used with great success to measure stellar oscillations, the first clear evidence of oscillations in Procyon A was obtained by Martić et al. (1999). New results on Procyon are obtained from the most extensive campaign so far organized on any solar-type oscillator (eleven telescopes over more than three weeks in 2007). The properties of solar-like oscillations, the methods used to observe them and the results on a few other individual stars will be presented.

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Invited lecture

NLTE MODEL ATMOSPHERES OF HOT STARS

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Methods of the analysis of the atmospheres of hot stars are discussed with the emphasize to simultaneous solution of the equations of statistical equilibrium and radiative transfer both in static and moving media, including mass-loss rates determination.

Invited lecture

DISCRETE SPACE THEORY OF RADIATIVE TRANSFER: APPLICATIONS

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A concise description of the method of obtaining the solution of radiative transfer equation in spherical symmetry which is applied for different geometrical and physical systems is discussed. This paper deals with mainly: (1) interaction principle, (2) star product, (3) calculation of radiation field at internal points of the medium, (4) integration of monochromatic radiative transfer equation and derivation of r and t operators of the "cell" and (5) flux conservation. We have discussed some of the important applications of discrete space theory of radiative transfer in spherical symmetry, in particular: (a) reflection effect in close binaries and (b) stellar wind in O and B type stars: along with their results. Finally, we discussed merits and demerits of the method.

ASTEROSEISMOLOGY OF SUBDWARF B STARS AS A CRITICAL TEST FOR STELLAR EVOLUTION

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Observable variations in stellar light curves occur in stars across the Hertzsprung-Russel diagram, with periods ranging from tens of seconds in white dwarfs to hundreds of days in red giants. The phenomenon can cause variability in the luminosity and radius of a star, or it can cause almost imperceptible waves running through its atmosphere. A driving mechanism of the oscillation is coupled with the restoring force which dictates the type and period of oscillation within the star. Since different modes propagate in different layers in the interior of a star, the study of stellar oscillations provides a means to probe the interior of the star. This technique is called asteroseismology which stands for the detailed interpretation of detectable radial and non-radial oscillations in stars. Asteroseismology has been applied successfully to our Sun, white dwarfs, massive main-sequence stars and other classes of variable stars and it has provided fundamental tests of the stellar evolution theory. I will focus on the recent efforts in applying this technique to the pulsating subdwarf B stars. Subdwarf B stars are identified as extreme horizontal branch stars. They are believed to be post He-core flash products with core masses of about $0.5M_{\odot}$ surrounded by a very thin and inert hydrogen envelope. Even though the models describing their future evolution are generally accepted the current evolutionary state of subdwarf B stars is still under debate. The seismic tuning of the subdwarf B stellar structure models will allow us to discern their internal properties which will further allow us to evaluate the proposed evolutionary scenarios of these stars.

Short talk

MULTILEVEL LINE TRANSFER WITH THE ITERATION FACTORS METHOD

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The basic difficulty of the multilevel line transfer problem arises from the non-local and non-linear coupling of atomic level populations and the radiation field in the corresponding line transitions. For the solution of the problem an iterative scheme is required. Here we present the use of the Iteration Factors (IF) Method for its solution. The iteration factors defined as the ratios of angular and frequency integrated intensity moments are computed from the formal solution of the radiative transfer (RT) equation and then used as known quantities in the solution of non-linearly coupled equations, i.e. RT equation moments and statistical equilibrium equations. As good quasi-invariants, IFs provide fast convergence to the exact solution.

Invited lecture

MODELLING OF LIGHT AND RADIAL VELOCITY CURVES IN X-RAY BINARY SYSTEMS

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Synthesis methods for close binary systems allow one to reliably determine fundamental parameters of stars and relativistic objects (masses, radii, luminosities etc.). Our numerical models are designed to analyse light and radial velocity curves of various types of binary systems. In this work we focus on models developed for X-ray binaries. One of them was used for analysis of hard X-ray light curves (25-50 keV) of the unique object SS433 obtained by the INTEGRAL observatory. Orbital and precessional variability was computed in a model of a binary system containing a precessing accretion disk. We also present a model for a generic X-ray binary including a point X-ray source and an optical star. Heating of the optical star by the incident X-ray radiation is taken into account by model atmosphere calculations. The model allows one to compute absorption-line profiles and radial velocity curves of the optical component. Using this model we refined the masses of relativistic objects in the X-ray binaries Cyg X-1, Her X-1, 2S 0921-630 and others.

Invited lecture

MODERN MODELS DESCRIBING THE FLOW OF MATTER IN CATAclySMIC VARIABLES

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Light curve synthesis of close binary system is considered in a framework of the model in which a normal star - red dwarf - fills its Roche lobe, and a spherical star - white dwarf - is surrounded by an elliptical geometrically thick accretion disk. The comparison of four models is executed using the base program simulating an extended shock wave located along the edge of gas flow near external disk edge (hot line). These models take into account the presence in the system of 1) classical hot spot on outer side of the disk surface, 2) hot line situated outside of the disk, as well as 3) model, combining hot line and classical hot spot, and 4) model, combining a hot line and hot region towering over outer side of the disk surface. Results of interpretation of some cataclysmic variables in different phases of their activity within the framework of these models are given.

Short talk

ACCRETION DISK IN MASSIVE BINARY SYSTEMS

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The results of our investigations of some massive close binaries (CB) (RY Scuti, V448 Cygni, V455 Cygni and UU Cassiopea), based on the photometric and spectroscopic observations indicate the existence of accretion disk around the more massive component, located deep inside the Roche lobe. The light curve shapes of these system are similar to the light curves of the over contact systems like W UMa, but the nature of these massive CBs are completely different. Here we present the models of some of these systems and their basic elements.

THEORETICAL PREDICTION OF NEUTRINO INDUCED GAMMA RAY FLUX FROM NEARBY HYPERNOVAE

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Supernova explosions release burst of neutrinos (around 99% of entire supernova energy). We explore following process that those neutrinos induce in hydrogen-rich environments: $p + \bar{\nu}_e \rightarrow n + e^+$ in order to get an "early" direction and energy released in a nearby future hypernova explosion. During a high-energetic process like core-collapse supernova (energies released in form of neutrino radiation are of order 10^{53} erg), absorption of an electron antineutrino emitted from the proto-neutron star by proton in the hydrogen envelope produces neutron and positron. Neutron captures onto proton while the positron annihilates, which results in production of gamma rays of energy 2.22 and 0.511 MeV, respectively. Such explosions produce a measurable flux of neutrino flow in the interstellar space. For a Milky Way supernova at 10 kpc the expected number of neutrino events in Super Kamiokande detector is 10^4 . Our idea is to use the Sun to detect this kind of events early (before optical observatories) based on the neutrino-induced solar gamma rays expected from a hypernova with a 100 solar mass progenitor, like Eta Carinae for example. Hypernovae are characterized by explosion energies larger than 10^{52} erg, and Eta Carinae is hypergiant, luminous variable star located in the Carina constellation, some 8000 ly (approx. 2.5 kpc) from the Sun. Those fluxes may serve as a probe of the conditions in the hypernova progenitor, test the effects of these events on the galactic chemical evolution and cosmic baryon content, as well as indicate the possible negative effects on life on our planet, and habitable zone in general. This is basically a theoretical assessment of gamma ray flux, which is induced in surface layer of the Sun, due to interaction with neutrinos which were emitted during explosion of a nearby hypernova. We will also try to investigate possible model for probing the processes in the hypernova progenitor. This is the work in progress.

TRIGGERED STAR FORMATION IN NEARBY HIGH GALACTIC LATITUDE CLOUDS

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The importance of triggered star formation is a current matter of debate. In this paper we approach the issue by doing small-scale, deep-field study of low-mass star formation in Orion. Using the VLT/ISAAC we performed pointed observation in Js, H and K bands towards cometary-shaped, high Galactic latitude molecular clouds, which are dynamically influenced by the Orion-Eridanus bubble. We present photometry results and preliminary Young Stellar Object (YSO) classification, Class 0, I, II and III. Our aim is to investigate and/or confirm that triggered star-formation induced by the Ori OB1 association is currently progressing in a S-SE direction with respect to the association.

**X-RAY ANALYSIS OF GALACTIC SUPERNOVA REMNANT
G27.4+0.0**

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In this work, we present X-ray analysis results of SNR G27.4+0.0 observed by XMM-Newton X-ray satellite. MOS1, MOS2 and PN detectors are studied comparatively. The spatial and spectral analysis are performed, 0.3-10 keV (all band), soft, medium and hard X-ray images are constructed in order to define peculiar regions for further inspections. NEI (Non-equilibrium ionization) plasma model is used for spectral modeling. Electron temperature (kT), neutral hydrogen column density and ionization time are estimated in their physical ranges. Flux and luminosity values are calculated for hard (2-10 keV) X-ray band. Based on the analysis results we will interpret the undergoing physical mechanisms in SNR G27.4+0.0.

Short talk

**AN ANALYSIS OF THE POSSIBLE THERMAL EMISSION AT
RADIO FREQUENCIES FROM SUPERNOVA REMNANTS
G39.2-0.3 (3C396) AND G156.2+5.7**

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The presence of thermal emission at radio frequencies may be a useful tool for identifying interactions between supernova remnants (SNRs) and molecular clouds, and also for estimating the ambient density near SNRs using radio continuum data. In this paper possible thermal emission at radio frequencies from Galactic SNRs G39.2-0.3 (3C396) and G156.2+5.7 is analyzed. A model including a sum of non-thermal (purely synchrotron) and thermal (bremsstrahlung) component is applied for fitting integrated radio spectrum of SNRs. For SNR 3C396 a fit quality of this model appears to be better than for that of the purely non-thermal model, and the contribution of thermal component in total volume emissivity was estimated to be 47 %. In the case of the SNR G156.2+5.7, only four available data points are insufficient for a detailed statistical analysis. Despite the inability to get firmer conclusions about contribution of thermal component in total volume emissivity, from our rough statistical analysis of the SNR radio spectrum, we calculated its value to be 31.5 %.

Short talk

THE CYGNUS RADIO LOOP: TEMPERATURE AND BRIGHTNESS

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Observations of the continuum radio emission at 1420, 820 and 408 MHz enable estimations of the brightness of the Cygnus Loop supernova remnant (SNR). We calculate the mean brightness temperatures and surface brightnesses of this loop at these three frequencies. Our results indicate that this radio loop emission is in good agreement with current theories of supernova remnant evolution. Also, with derived brightnesses, a method for estimation of the distance to this loop is suggested.

III Stellar and galactic systems

III Stellar and galactic systems

Invited lecture

REACHING FOR THE SKY WITH SDSS AND LSST

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Despite a several thousand years long history, sky surveying is experiencing a bonanza as detectors, telescopes and computers become ever more powerful. I will discuss how the unprecedentedly accurate and diverse data from the optical Sloan Digital Sky Survey have recently enabled numerous exciting discoveries. As an example, I will use the mapping of the Milky Way stellar distribution in a 7-dimensional phase space spanned by the position and velocity vectors, and metallicity. I also give a preview of what to expect from the upcoming next-generation surveys, such as the Large Synoptic Survey Telescope.

Short talk

BINARY CLUSTERS OF GALAXIES OBSERVED BY XMM-NEWTON

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Clusters of galaxies are thought to form by accretion of galaxies along the cosmic filaments, and by merging of clusters formed earlier. Observations and hydrodynamic simulations show the strong effects of mergers on physical conditions of Intra-Cluster Medium (ICM). In this work, we investigate five relatively nearby clusters; A3705 ($z = 0.0895$), A2440 ($z = 0.0906$), A2933 ($z = 0.0925$), A3888 ($z = 0.1529$), A115 ($z = 0.1930$). Temperature and metal abundance maps are created by wavelet algorithms and hardness-ratio studied comparatively. Peculiar regions are spectrally studied and large scale of deviations are observed. Based on the results, merging histories of our cluster sample are interpreted.

TURKISH NATIONAL OBSERVATORY (RTT-150) VIEW OF NEARBY CLUSTERS OF GALAXIES

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The clusters of galaxies are the largest aggregates of galaxies in the universe. They are formed by the gravitational collapse of the field galaxies and the subgroups which is a recurrent event and still ongoing at the present epoch. In this work we present X-ray selected clusters of galaxies by XMM-Newton and Chandra missions, and the optical observations obtained from Turkish National Observatory 1.5 meter telescope. The study investigates X-ray, radio and optical band relation of the clusters of galaxies as well. The member galaxies are spectrally studied by TFOSC spectrometer. Flux and luminosity relations are studied to explore possible interactions of ICM and member galaxies. Our findings show an increased galactic activity in the clusters. We suggest that X-ray emission is triggered by either elevated accretion rate onto LMXBs, feeding of AGNs and/or awakening of BHs.

*IV Astrometry, dynamical
astronomy and planetology*

VI Astronometry, dynamical
and planetology

FULFILMENT OF THE CONDITIONS FOR THE APPLICATION OF THE NEKHOROSHEV THEOREM TO ASTEROID BELT

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In the thesis the conditions for applying Nekhoroshev's theorem to a real dynamical system, such as the motion of asteroids perturbed by the major planets, are examined. The explicit expressions for the derivatives of the integrable part of the Hamiltonian up to the third order are given, which are needed for examining the fulfillment of the conditions of: convexity, quasi-convexity or 3-jet non-degeneracy. The phase space where asteroid families Koronis and Veritas are located is analysed. The obtained results show that only 71 members of the Koronis family, out of 2983 analysed ones, and 13 members of the Veritas family, out of 340 identified ones, fulfill none of the conditions. In this way the application of the spectral formulation of Nekhoroshev's theorem to selected members of the Koronis family, as well as to the members of the Veritas family showing a regular motion, is justified.

IMPROVEMENT OF ACCURACY OF PROPER MOTIONS OF HIPPARCOS CATALOGUE STARS USING OPTICAL LATITUDE OBSERVATIONS

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At 1995, Commission 19 (Earth Rotation) of IAU established the Working Group on Earth Rotation in the Hipparcos Reference Frame (WG ERHRF) to collect the optical observations of latitude and universal time variations, made during 1899.7 – 1992.0 in line with the Earth orientation programmes (to derive Earth Orientation Parameters – EOP). About 4.4 million observations of latitude/universal time variations made at 33 observatories were collected.

Nowadays, it is actual to correct the positions and proper motions of stars of Hipparcos Catalogue using ground – based observations of some Hipparcos stars. In this PhD thesis we use the latitude observations made with several types of classical astrometric instruments: visual (ZT) and floating zenith – telescope (FZT), visual zenith tube (VZT) and photographic zenith tube (PZT), as well as 26 different instruments located at many observatories all over the world. All data were received from Dr. Vondrák.

The task was to improve the proper motions in declination of the observed Hipparcos stars. The original method was developed. It consists of removing all known effects (polar motion and some local instrumental errors) from instantaneous observed latitude, and then using the corrected latitudes to calculate the corrections of the Hipparcos proper motions in declination. The Least Squares Method (LSM) is used with the linear model. The calculated results were compared with ARIHIP and EOC-2 data, and we found a good agreement. The newly obtained values of proper motions in declination are substantially more precise than those of the Hipparcos Catalogue. It is because the time interval covered by the latitude observations (tens of years) is much longer than the Hipparcos one (less than four years), and because of the great number of observations made during this interval. Also, it was an almost independent check of the proper motions of EOC-2. The main result of the thesis is a catalogue of proper motions in declination of 2347 Hipparcos stars.

**FULFILMENT OF THE CONDITIONS FOR THE APPLICATION
OF THE NEKHOROSHEV THEOREM USING
EXTENDED HAMILTONIAN**

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This paper represents a part of the project devoted to application of the theorem of Nekhoroshev to asteroids. Spectral formulation of the Nekhoroshev theorem has been applied by Guzzo et al. (2002) to selected asteroids with regular motion in the region of Koronis family and with chaotic motion in the region of Veritas family. In the paper by Pavlović and Guzzo (2008) the fulfilment of conditions for application of the Nekhoroshev theorem in the same regions have been checked by using an integrable Hamiltonian which consisted of Kepler's and Kozai's terms. Here we expand the Hamiltonian with the most important linear terms in e' and i' of Jupiter and Saturn. With such expanded Hamiltonian we checked the fulfilment of conditions of convexity, quasi-convexity and 3-jet non-degeneracy in the regions of the two families and in the vicinity of secular resonances. The obtained results are compared with results obtained previously.

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NUMERICAL INVESTIGATION OF AN A PRIORI UNSTABLE SYSTEM GIVEN WITH A 4 DIMENSIONAL SYMPLECTIC MAP

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The Nekhoroshev theorem, as one of the most important theorems in modern celestial mechanics, is very important in understanding the long term dynamics. This theorem applies to quasi integrable Hamiltonians, and with some additional analytical and geometrical conditions it provides stability of actions in exponentially long times. In this work, using Fast Lyapunov Indicator (FLI) we present numerical experiments on a model in a 4D symplectic map. The map is not in the quasi-integrable form (belongs to the class of so called *a priori* unstable systems), i.e. doesn't satisfy one of the main hypothesis of the Nekhoroshev theorem. Still, the numerical experiments show that in such systems it is possible to recover a certain Nekhoroshev like behavior. In this model we detected the coexistence of two different diffusion stiles, the slow Arnold like and the diffusion along the fast web.

Short talk

A CONSTRUCTION OF AN ADVANCED MEASURING SYSTEM FOR ASTRO-GEODETIC DETERMINATIONS

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The measuring system described in the paper is dedicated to fast and efficient performing of astro-geodetic determinations. It consists of (1) an optical instrument for precise determination of the local vertical tangent (zenitlot), (2) a professional CCD camera for acquiring a sky picture near zenith, (3) a specially constructed system for time-keeping purposes based on a GPS controller, (4) a laptop for maintaining the camera, and (5) a laptop with a driver program for time registration. The main contribution of the method is the elimination of the observer error from the measuring process.

*V Extragalactic astronomy
and cosmology*

V Extragalactic astronomy
and cosmology

CENTRAL ENGINES OF ACTIVE GALAXIES AS THE MOST POWERFUL SOURCES OF X-RAY RADIATION IN UNIVERSE

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Active galaxies are galaxies hosting a small, highly variable and very bright core (Active Galactic Nucleus), embedded in an otherwise typical galaxy. Active Galactic Nuclei (AGN) are powerful sources of radiation in a wide spectral range: from γ rays to radio waves. They derive their extraordinary luminosities (sometimes more than 10^4 times higher than luminosities of "ordinary" galaxies) from energy release by matter accreting towards, and falling into, a central supermassive black hole (BH). According to the unification model of AGN, their central engine consists of a supermassive BH ($10^7 - 10^9 M_{\odot}$) which is surrounded by an accretion disk that radiates in the X-ray band. Accretion disks could have different forms, dimensions, and emission, depending on the type of central BH, whether it is rotating (Kerr metric) or nonrotating (Schwarzschild metric). They represent an efficient mechanism for extracting gravitational potential energy and converting it into radiation, giving us the most probable explanation for the main characteristics of AGN (high luminosity, compactness, jet formation, rapid time variations in radiation and the profile of the Fe K α spectral line). A broad emission line Fe K α at 6.4 keV with asymmetric profile (narrow bright blue peak and a wide faint red wing) has been observed in a number of type 1 AGN. In some cases the line width corresponds to one third of speed of light, indicating that its emitters rotate with relativistic velocities. Therefore, the line is probably produced in a very compact region near the central BH of AGN and can provide us some essential information about the plasma conditions and the space-time geometry in vicinity of the BH. The X-ray radiation of AGN, in the line, as well as in the continuum, has rapid and irregular variability. This variability could be due to disk instability, resulting in perturbations of disk emissivity, or it could be caused by some external effects, such as gravitational microlensing (especially in the case of gravitationally lensed quasars) and absorption. Here we present a short overview and main results of our recent investigations of the Fe K α spectral line and X-ray continuum variability.

Short talk

VARIABILITY IN ACTIVE GALACTIC NUCLEI AND THE BROAD LINE REGION CHARACTERISTICS

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The flux variability in Active Galactic Nuclei can be used for the Broad Line Region investigations. Here we will report about our recent investigation in this field performed with the groups from the Special Astrophysical Observatory (Russia) and INAOE (Mexico).

Short talk

THE PROBLEM OF THE MASS-TO-LIGHT RATIO IN EARLY-TYPE GALAXIES

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In this contribution I will discuss the problem of the mass-to-light ratio in early-type galaxies. The observational evidence based on different and independent techniques suggest that interior to $\sim 3R_e$ (where R_e is the effective radius) from the center of these galaxies dark matter does not play important dynamical role and the mass is dominated by the visible, stellar component. The long-slit spectra observations enable us to deduce the full line-of-sight velocity distribution of a given galaxy, but are limited to $\sim 3 - 4R_e$. Fortunately, the kinematics can also be inferred beyond this limit using planetary nebulae (PNe) and globular clusters (GCs), but the anisotropies of orbits in this approach are not well constrained. I will show that some hints can nevertheless be obtained even using small samples available at this stage. Finally, I will use the X-rays methodology to infer the mass-to-light ratios in different early-type galaxies and to compare the results obtained with the aforementioned techniques while emphasizing the problems inherent in this methodology (e.g. possible lack of hydrostatic equilibrium).

Short talk

CONSTRAINING GALACTIC INFALL WITH DEUTERIUM OBSERVATIONS

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Measurements of deuterium in the local interstellar medium have revealed large variations in D/H along different lines of sight. Recent *Far Ultraviolet Spectroscopic Explorer* (FUSE) measurements indicate that this is due to significant deuterium depletion onto dust grains. This in turn implies that the total deuterium abundance in the local Galactic disk could be as high as $D_{\text{ISM}}/D_{\text{p}} \sim 84\%$ of the primordial D abundance. Because deuterium is heavily destroyed in stars it was proposed that the infall/accretion of pristine gas is needed to explain such a high deuterium abundance. In this work we explore the infall rate of pristine material that is needed to maintain a high present-day D/H, but also test the consistency of this infall rate with observations of Galactic gas fraction. We find that FUSE deuterium observations and Galactic gas fraction estimates can be reconciled in some models that demand a significant infall rate of pristine material that almost completely balances the rate of star formation. These successful models also demand a relatively low average fraction $R \leq 0.32$ of gas to be returned by dying stars.

Short talk

SOME REMARKS CONCERNING THE ACCELERATED ORBITAL MOTION OF CELESTIAL BODIES

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We propose a general explanation of the accelerated orbital motion of celestial bodies, based on nonstatic solutions, conformally equivalent to basic static ones, within the framework of Rosen's bimetric gravitation theory (a theory strongly criticized). The Birkhoff's theorem for spherically symmetric gravitational fields being not valid in that theory, gives a possibility to explain different phenomena of the orbital motion related to close binaries, but also to the planets of the Solar system.

GENERAL RELATIVISTIC ROTATION CURVES IN A POST-NEWTONIAN LIGHT

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The absence of a Keplerian fall-off in observed galaxy rotation curves represents the main classical evidence for the existence of dark matter on galactic scales. In a recent (2005–2007) series of works Cooperstock and Tieu argued that a general relativistic treatment of a galactic system may introduce effects that are qualitatively completely new in defiance of the fact that the involved velocities and fields are small because of the advent of non-linearities peculiar to general relativity. Cooperstock and Tieu proposed a concrete general relativistic model of a galactic system that both recovers a realistic density profile of the galaxy and is able to produce a flat rotation curve. However, the Cooperstock and Tieu model has been argued to be unphysical by a number of authors, mainly stressing the existence of exotic matter in the $z=0$ plane.

Nevertheless, the idea of a general relativistic galaxy model appears interesting, especially because of the striking lack of such physically acceptable and working models in the literature.

Here we want to dissect the Cooperstock and Tieu model in terms of a (Post)-Newtonian reasoning. By applying the full machinery of the Arnowitt-Deser-Misner split we illustrate the differences of a rotating, axially symmetric Post-Newtonian model to the proposed Cooperstock and Tieu solution. We aim at identifying the new physics coming in from the Cooperstock-Tieu model in the framework of a fully Post-Newtonian treatment with special emphasis on the galactic rotation curve.

ADELIC MODELING OF THE UNIVERSE

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We consider possible adelic structure of the Universe. Theoretically this is mainly motivated by developments in p -adic mathematical physics, and especially in p -adic and adelic string theory. Phenomenological motivation is related to accelerated expansion of the Universe, dark matter and dark energy. The main direction of this research is investigation of the Universe as an adelic physical system and exploration of possible p -adic effects. Here will be presented a brief overview of recent developments in adelic cosmology as well as some new results (Dragovich 2006, Barnaby et al. 2007).

REFERENCES

1. Dragovich, B., 2006, AIP Conf. Proc., 826, 25
2. Barnaby, N., Biswas, T., Cline, J.M., 2007, JHEP, 056

Short title

ADELIC MODELLING OF THE UNIVERSE

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REFERENCES

1. Dragovich, B.: 2006, AIP Conf. Proc. 826, 25
2. Bursary, N., Bursary, T., Cline, J.M.: 2007, JHEP, 056

*VI Interdisciplinary studies
(astrobiology, astrochemistry,
geophysics, atmospheric
physics, astronautics and
space science)*

VI Interdisciplinary studies
(astrobiology, astrochemistry,
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physics, astronautics and
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Short talk

ASTROBIOLOGICAL LANDSCAPE AND NEOCATASTROPHISM

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We review results of the simple 1-D models of the Galactic Habitable Zone performed within neocatastrophic paradigm. The emerging astrobiological landscape demonstrates the capability of this theoretical framework to resolve the classical puzzles of Fermi's paradox and Carter's anthropic argument against extraterrestrial intelligence. Preliminary results show that astrobiology offers a clear rationale for the "Copernican" assumption of typicality of the age of the terrestrial biosphere.

Short talk

OBSERVATION-SELECTION EFFECTS AND THE STRUCTURE OF TERRESTRIAL IMPACT RECORD

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Using the newly compiled database of terrestrial impact craters, we analyze the role of observation-selection effects in the impact record. In order to achieve non-biased sample of historical impactor populations, we need to take into account not only erosion and other well-known biases, but also the "anthropic" bias dealing with the underestimate of frequency large catastrophic events in recent geological epochs. We also investigate whether the correlations in the impact record can be explained by the present-day well-known NEO population.

**ORBIT DETERMINATION AND PARAMETER ESTIMATION:
EXTENDED KALMAN FILTER VERSUS LSQOD**

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In the age of intensive exploration of the solar system, many professional and non-professional astronomers become interested in calculation of basic data regarding solar system planets. We have considered some concepts of the planet's physical ephemeris calculation as a task in a rounding of increasing number of powerful computers available to everyone. Elementary comparison among various international conventions in this calculation practice during the last 20 years is done. As an effective result you can find interactive program for practical calculation of the planet's physical ephemerides.

*VII History, philosophy and
teaching of astronomy*

VII History, philosophy and
teaching of astronomy

Short talk

DJORDJE STANOJEVIĆ IN ASTRONOMY AND ASTROPHYSICS

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11000 Belgrade, Serbia*

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A review of contributions of Djordje Stanojević (1858-1921) to Astronomy and Astrophysics is presented on the occasion of 150 years since his birth.

Short talk

DJORDJE STANOJEVIĆ IN WORKS OF JULES JANSSEN

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Jules Janssen (Paris 1824 - Meudon 1907) is well known as the founder of the "Observatoire d'Astronomie Physique de Paris (sis à Meudon). He was also professor and collaborator of Djordje Stanojević, the first Serbian astrophysicist, rector of the Belgrade University and the second person on the head of Belgrade Astronomical Observatory, the first builder of hydro power plants in Serbia, the author of the first color photography and the first book with color fotografies (Srbija u slikama - Serbia in photos) in Serbia, pioneer of electrification and industrialization of our country. His articles in the journal of the French Academy of Sciences (Comptes Rendus de l'Academie des Sciences) are in the Serbian Astronomy the first modern scientific papers. They are presented and commented in Academy by Jules Janssen, who also mentions Stanojević in his works in various contexts. In this contribution, presence of Djordje Stanojević in contributions of Jules Janssen and his comments on Stanojević's work in Comptes Rendus are analyzed. Also, the work and life of Jules Janssen are presented briefly.

Short talk

UNIVERSITY TEXTBOOKS ON ASTRONOMY BY VOJISLAV MIŠKOVIĆ

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Vojislav Mišković (1892-1976), the professor of the Belgrade University and the director of the Astronomical observatory in Belgrade wrote three university textbooks on astronomy. In this article we present the content of these books, also some interesting facts related to them. The first book, *General astronomy*, part one (published in 1960), mainly deals with spherical trigonometry. The other two books are in fact collections of solved problems on general astronomy. The first collection was published in 1956. The interesting fact is that the second textbook was intended to be the second part of the collection of problems. However, it was never published. There is left only one hand-written copy of the book, now in the possession of the author of this article. All three books were and still are used in teaching of astronomy at the Faculty of Mathematics. The books are digitized and they are included into the NCD (National Center for Digitization) Virtual library, <http://elib.matf.bg.ac.yu:8080/virlib/>.

Short talk

THE ALEXANDRIAN MILLENIUM (A.D. 2009) AND ASTRONOMICAL DATA

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The beginning of the contemporary system of chronology is connected with the year of Christ's birth as a man. This year was calculated in VI century by the roman monk Dionysius Exiguus. It is the usual practice that Dionysius made a miscount in the computation. In the present work we make an attempt to determine this miscount through astronomical and calendar computations. For that purpose we use information from church tradition and St. John's Gospel. It was found that the miscount of Dionysius regarding Christmas is 9 years i.e. the alexandrian annalists were right. If it so we must celebrate 2000 years from Christmas in 2009 on December 25th.

Short talk

GNOSEOLOGICAL STATUS OF ASTRONOMICAL AND PHYSICAL THEORIES

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In the paper the gnoseological status of astronomical and physical theories is considered. In other words, the question is whether theories can be considered as true or false predicaments and if this is possible, then in what sense? The basic characteristics and disadvantages of the descriptivistic, instrumentalistic, conventionalistic and realistic understanding of theory are studied. In the framework of the realistic comprehension of theory a special attention is devoted to the metaphysical realism.

Short talk

ASTRONOMY EDUCATION IN SERBIA 2005-2008

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In this paper a triennial review of the activities in astronomy education in Serbia is given. Special attention is paid to the reform of university education and the new European Credit Transfer System (ECTS) that is introduced at all universities in Serbia. The re-introduction of astronomy as the compulsory course in the secondary schools curricula is announced. Due attention is given to the activities of numerous amateur astronomical societies in public astronomy education as well as to the ever better achievements of Serbian team at the International Astronomy Olympiad in the last three years.

Short talk

ASTRONOMY IN PHYSICS TEACHING IN THE PRIMARY SCHOOL

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Every day astronomy gives to the world an increasing number of information about nature and universe. These information are attractive as they discover a new world and expand the boundaries of human mind. Every discovery itself is attractive, therefore, astronomy is very interesting for pupils of primary schools. But, unfortunately, the curricula of primary schools do not contain astronomy themes. Physics as primary natural science is compatible with astronomy, so it is logical that physics lessons should include some astronomy topics. But, nowadays these topics are usually modest and outdated, and no recent and popular discoveries are mentioned. Moreover, physics use classical examples from the environment and Earth, but should also use examples from astronomy and astrophysics. That would help childrens mind to expand, and thus would make the picture of the world richer.

Short talk

DEPARTMENT OF ASTRONOMY OF PETNICA SCIENCE CENTER – 25 YEARS

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The Petnica Science Center (PSC) was founded in 1982. The Department of Astronomy of PSC exists from the beginning and has had several periods of activities in the field of astronomy education. Different types of programs and activities are presented, from informal camps at the beginning to currently implemented specialized two-year programs. The PSC, as very important non governmental organization and informal educational institution for all interested secondary school pupils, has its own "school" of astronomical education and first steps into the scientific research.

*VIII Amateur astronomy,
sociology of astronomy,
astronomy in arts and
culture*

VIII A treatise
of astrology
in arts and
culture

Short talk

INTERNATIONAL YEAR OF ASTRONOMY 2009 (IYA2009) IN SERBIA – GLOBAL CORNERSTONE PROJECTS

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In more than 105 countries the IAU and IYA2009 Secretary have considered 11 global cornerstone projects dedicated to IYA2009 that are coordinated with UNESCO worldwide activities. National Node Serbia is already recognized as very active member of IYA2009 Secretary. The IYA2009 brochure is translated, project coordinators have been set for all 11 projects, national website for IYA2009 has been prepared and some potential sponsorships have been found in media and UNESCO Participating Programme. The most important support has been found in Radio Belgrade I Programme, "One step to science", TV Metropolis, "Starry detectives" (twice a month) and daily newspapers "Večernje novosti" (special IYA2009 column once a week).

Short talk

POPULARIZATION OF ASTRONOMY THROUGH ASTRONOMICAL SOCIETIES

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Specific ways of popularization of astronomy through work of the astronomical societies are presented. Two types of activities are recognized: internal and external. Different programs and activities for the members of the astronomical societies are presented in the context of astronomical education and popularization (internal type). Also all types of popularization of astronomy in public such as video projections, lectures, debates, public observations are presented. Importance of media presentation and explanation in the public of the astronomical events are underlined, and specific actions are described, such as preparation of thematic booklets, sky maps, press releases, etc. All presented ideas are collection of the work of astronomical societies in Serbia in recent years.

Short talk

ASTRONOMICAL SOCIETY "MAGELLANIC CLOUD"

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Astronomical society *Magellanic cloud* was founded on May 16, 2001 and it is located in the town of Prokuplje, in South Serbia. It is established by A. Simonović, A. Valjarević, at the time students of geography at the University of Kosovska Mitrovica, Ž. Mijajlović professor of mathematics, S. Šegan, professor of astronomy, both from the University of Belgrade, and D. Ćirić, professor of mathematics at the University of Niš. In this article we present the activities of the society in the popularization of astronomy and mathematics in Prokuplje and its vicinity. Also, the role of the society in building the Astronomical station of the Astronomical observatory in Belgrade at the mountain Vidojevica nearby Prokuplje is explained.

Short talk

ASTRONOMY IN ASTRONOMICAL SOCIETY "RUDJER BOŠKOVIĆ"

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Amateur astronomical observations in Astronomical Society "Rudjer Bošković" (ASRB) have very long tradition. First observations were done soon after foundation of Public Observatory in 1964. In 2008 ASRB has organized 6th Summer School of Astronomy (6th SSA) on the mountain Kopaonik (1800 m above sea level) with six sections: methodology of amateur astronomical observations, physical properties of meteors, variable stars, Sun spots observations, practical astrophotography and observation material processing. In this work observational equipment in ASRB will be presented as well as some of results and suggestions for future work and development.

FIRST TEST OF LOW-RESOLUTION CCD DEVICE FOR DEEP-SKY OBJECTS

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The CCD device, based on high sensitivity monochromatic sensor with resolution of approximately 0.25 megapixels will be tested. The model of CCD device is Deep-Sky Imager PRO, manufactured by Meade, USA. The RGB Color Filter Set will be used in order to obtain color images. We will try to photograph planets and various deep-sky objects and then compare obtained images with those obtained with classic DSLR camera (Nikon D70s). The influence of different setting parameters (exposure, contrast, histogram sliders, dark subtraction) on the image quality will be discussed.

Short title

FIRST TEST OF LOW-RESOLUTION CCD DEVICE FOR DEEP-SKY OBJECTS

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Posters

Posters

ACTIVITIES OF THE GROUP FOR ASTRONOMICAL SPECTROSCOPY 2005-2008

M. S. Dimitrijević¹, L. Č. Popović¹, D. Jevremović¹, M. Dačić¹,
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Fellows of the Astronomical Spectroscopy Group are participants of projects "Influence of collisions with charged particles on astrophysical plasma spectra", "Spectroscopy of extragalactic objects" and "Serbian Virtual Observatory", working together on the spectroscopy of cosmic plasmas, like Active Galactic Nuclei and stellar atmospheres. First two projects are supported by Ministry of Sciences of Serbia, and the third is proposed for funding to this Ministry as technological project. Within the 2005-2008 period fellows of the Group published more than 100 papers in peer reviewed international publications, among them 8 in ApJ, 2 in ApJS, 6 in MNRAS, 3 in PASJ, 3 in New Astronomy, 2 in New Astronomy Review, 2 in Rev. Mex. Astron. Astrophys., 2 in PASP, 2 in Astron. Nachrichten etc. They organized 5 conferences (5th and 6th Serb. Conf. Spect. Line Shapes in Astrophys, Development of Astronomy among Serbs 4 and 5, and 6th Serb. Bulg. Astron. Conf.) and one school. We have also international collaboration with France, Greece, Italy, Russia, Germany, Tunisia, Spain and Bulgaria and within the considered period we had almost one hundred visits of foreign scientists and students. In this contribution we will present results of our activities within the considered period.

Poster

1D AND 2D REVERBERATION MAPPING APPLIED ON H_{β} LINE OF NGC 4151

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Here we present some preliminary results of application of reverberation method on H_{β} line of NGC 4151 in order to estimate its BLR size.

Poster

SPECTRA TAKEN DURING THE TOTAL SOLAR ECLIPSE WITH THE CIRCULAR REVERSIBLE SPECTROGRAPH

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For the total solar eclipse of August 11th, 1999 we made a circular reversible spectrograph with aperture of $D/F=92/500$ mm. Using color film Konica 100 we recorded spectra of the Sun before the eclipse, the flash spectrum, the spectra of diamond ring and the internal corona. The camera and the spectra were presented at the XII National Conference. The aims of building and spectrograph were to obtain spectra for presentation in educational purposes. Obvious differences in form (which corresponds to the form of object) and colors of the spectra were good enough for presentation in the education. In meantime we developed a program for analyzing and calibrating the obs. spectra. The results which will be presented are a good illustration of what are the dominant chemical elements and thermal conditions in the solar photosphere, chromosphere and corona.

Poster

ESTIMATING THE OPTICAL THICKNESS OF PROMINENCES ON THE SUN

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Here we present a method for estimating the optical thickness of prominences from H α emission line profiles. The method is based on fitting the profile with a theoretically derived function of optical thickness and source function. The method was applied on 52 prominences observed in Ondřejov, CR, from April 2007 to March 2008. Results have been compared with the values of the optical thickness estimated by other methods (by using integral intensity of H α emission line, and by some numerical modeling).

Poster

PRELIMINARY ANALYSIS OF TYPE III RADIO BURSTS FROM STEREO/SWAVES DATA

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Solar Type III radio observations in the range 125 kHz – 16 025 kHz from the STEREO/SWAVES experiment have been preliminary analyzed. These bursts are generated by energetic electrons traveling away from the Sun along open magnetic field lines. A subset of 88 burst has been selected for this study. The dependence of the observed intensity radiation as a function of time at given frequency has been fitted with a Gram-Charlier type A function. The flux density spectra for all the selected type III radio bursts at each frequency channel have been determined. This preliminary analysis gives an empirical expression for the frequency drift rate as a function of frequency for the type III radio bursts.

IMPROVING ALGORITHM FOR AUTOMATIC SPECTRA PROCESSING

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Testing and improving the computer program for automatic processing of a great number of solar spectra obtained with the horizontal heliospectrograph HSFA2 has been done. This program is developed in the Astronomical Institute of Academy of Sciences of the Czech Republic in Ondřejov. An irregularity in its work has been discovered i.e. the results of the processing for some of the spectra had unreal values. To discover a cause of this error an algorithm has been developed, and a program for examination of the parallelism of reference lines of the spectral slit on recordings of solar spectra has been made. The standard methods for data processing have been applied – calculating and analyzing higher-order moments of distribution of radiation intensity. The spectra with the disturbing parallelism of the reference lines have been eliminated from further processing. In order to improve this algorithm of smoothing of spectra and isolation and removal of the harmonic made by a sunspot with multiple elementary transformations of ordinates (Labrouste's transformations) are planned. This project was accomplished at the first summer astronomy practice of students of the Faculty of Mathematics in 2007 in Ondřejov.

Poster

STRUCTURAL ANALYSIS OF ABELL 2034 CLUSTERS OF GALAXIES

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We present the analysis results of X-ray and optical observations of Abell 2034. It locates at the moderate redshift ($z=0.113$). The best-fit single temperature model defines the hot plasma at 7.6 keV. X-ray observation is obtained from the XMM-Newton archival data. The cluster is observed by ground based optical Turkish National Observatory RTT-150 telescope. X-ray spectra of the individual sources from the cluster outskirts are studied. The intra cluster medium (ICM) temperature and metal distributions are constructed by wavelet algorithms. We explore the morphology and dynamical history of the cluster based on our multi-wavelength analysis results.

Poster

DYNAMICS OF FAINT CLUSTERS OF GALAXIES

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Recent studies with high-resolution cameras have extensively showed that clusters of galaxies are not as relaxed as we considered. With its advent technology XMM-Newton allows us to obtain temperature and metal abundance map in detail. In this study, we present our results on six (A194, A1056, A1674, A1882, A2634, A2638) nearby ($z < 0.14$) clusters. These clusters have very poor X-ray atmosphere (ICM), therefore they are very efficient to study individual galaxies and their evolution within ICM. Based on the temperature maps and morphology of bright member galaxies, we try to understand perturbed galaxy emissions and dynamics of the clusters themselves.

Poster

EVOLUTIONARY EFFECTS ON BRIGHTEST CLUSTER GALAXY (BCG) DETECTIONS IN THE CFHTLS-DEEP FIELDS

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Brightest cluster galaxies (BCG) are the most massive and most luminous galaxies in the universe. These galaxies dominate the galaxy clusters and lie at the top of the potential well of clusters. Investigation of these galaxies can improve our understandings on galaxy cluster evolution. In this work, evolutionary effects on BCG detections are emphasized. For detecting BCGs, CFHTLS (Canada-France-Hawaii Telescope Legacy Survey) of galaxy clusters, detected by Olsen et al. (2007) were used. To make a proper BCG detection, a model of galaxy colors should be evolved according to redshift. In this work, it is shown how unevolved galaxy colors can effect BCG detection.

Poster

ANALYSIS OF SPACE MOTION OF STARS FROM ARIHIP CATALOGUE

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A sample containing 4 614 stars with available space velocities and qualitative kinematical data from the ARIHIP Catalogue is formed. The components of the solar motion with respect to the dynamical local standard of rest, the elements of the velocity ellipsoid and the value of the asymmetric drift are obtained in two different ways: according to space velocity and color index. The results agree very well with the values found in the literature. For the purpose of detaching galactic subsystems, the cumulative distribution of space velocities is studied. The fractions of the three subsystems are found to be: thin disc 92%, thick disc 6% and halo 2%. These results are verified by analyzing the shape and size of the galactocentric orbits of the sample stars, i. e. by analyzing the planar and vertical eccentricities of the orbits.

**ON THE COEXISTENCE OF PHASES IN A LENNARD JONES
FLUID: FIRST RESULTS**

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The aim of this paper is to investigate the conditions for the coexistence of phases in a Lennard Jones fluid. The calculation has been performed within the virial development, and as a result, a simple approximate relation has been obtained between the number densities of two coexisting phases and the interparticle interaction potentials in them. The results of this work could have implications of modelling of giant planet interiors. This has become more important than ever, due to the discovery of nearly 300 extrasolar systems with planets.

FORMATION OF PLANETS IN GASEOUS VORTICES AND THE LAW OF PLANETARY DISTANCES

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The protoplanetary nebula probably passed through the stage of an accretion disk. The disk contained the gaseous and dust components. Its evolution led to the formation of planetesimals, which eventually accumulated into the planets. Due to the difficulties of the 'standard' model of the Solar System formation, there has been a revival of the theories of the 'persistent gaseous vortices' recently. The assumption that planets formed near the centers of the vortices in one of the theories (Barge and Sommeria 1995) yields a law of planetary distances. Within the accepted range of values for the main parameter of the nebula (the inverse power of the radial temperature dependence), the law predicts an increase of the planetary distances that is considerably stronger than linear on the *logarithmic* scale. We show that this is unreconcilable with the actual distances. The increase is so strong that it is doubtful if planet migration during the early evolution of the system and the later dynamical evolution can bring the distances into an agreement. However, the law of planetary distances follows from an additional assumption and it is not a necessary consequence of the theory. Thus the failure of the law could simply mean that the theory is not predictive of the planetary distances, not that the theory is false.

REFERENCES

1. Barge, P., Sommeria, J., 1995, A&A, 295, L1

Poster

RECALCULATED MASS OF (4) VESTA OBTAINED FROM THE MOTION OF (17) THETIS

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We present the result for the mass of (4) Vesta derived from the close approach with the asteroid (17) Thetis, which occurred in June 16, 1996 at mutual distance of 0.0194 AU and at relative velocity of 1.181 km/s. Gravitational effects of (4) Vesta on the motion of (17) Thetis are significantly larger than its effects on the motion of any other asteroid during close encounters that occurred so far. The method used for mass determination is based on connecting of two separate orbits of perturbed asteroid: one determined from pre-encounter and the other one from post-encounter observations. The obtained relative uncertainty for the mass of (4) Vesta is less than 0.1 percent, which is smaller than uncertainties in previous asteroid mass determinations.

Poster

PRELIMINARY AGE OF THE FY12 ASTEROID FAMILY BY METHOD OF CHAOTIC CHRONOLOGY

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Some of the asteroid families can be approximately dated using so called *method of chaotic chronology*. Whether or not a family can be dated by this method depends mainly on dynamical characteristics in the region occupied by a family and on number of known family members. In this work we investigate possibility to apply this method to the FY12 asteroid family and our results suggest that it is suitable case. Thus, preliminary estimation of the family's age is given here.

Poster

ORBIT OF BINARY 15 MONOCEROTIS

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In the paper new orbital elements obtained from speckle interferometric measurements only for 15 Mon are reported. For this binary they were determined earlier by combining spectroscopic and speckle measurements and spectroscopic and astrometric measurements. A new speckle measurement dating after the periastron passage of the secondary has a significant discrepancy from the ephemeridal value. Our revised orbit has a period significantly longer than the earlier ones. With regard that in the case of the earlier orbits the period was determined from spectroscopic measurements, i.e. from radial velocity data, the existing data of such kind for this binary are analyzed here and combined with our orbital elements. The first speckle measurement originates from 1988 and up to now three more speckle measurements have been made. This pair is bright (apparent magnitude of primary 4.66, i.e. 5.9 of secondary), of an early spectral type (primary O7V, secondary O9.5Vn) and is a member of open cluster NGC 2264. The distance to this cluster has been determined many times and different values have been reported. By analyzing the available data we find that the distance to 15 Mon is most likely about 750 pc, i.e. the total mass most likely about $53.4M_{\odot}$. The new orbital elements combined with this distance yield a total mass expected for the spectral types of the components.

Poster

REVIEW OF CCD OBSERVATIONS OF BINARIES AT NAO ROZHEN

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In this work we present review of the measurements of binaries whose frames were obtained using 2-meters telescope at NAO Rozhen in the period from 2004 to 2006. Distributions of measured pairs as functions of separation and position angle are given. Also, we analyzed how the errors of our measurements depend on separation among the stars. For those binaries which have had previously published orbital elements, residuals (O-C) in both coordinates (separations and position angles) are given as well.

MOND VS. NEWTONIAN DYNAMICS IN EARLY-TYPE GALAXIES: THE CASE OF NGC 4649 (M60)

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The kinematics of the early-type galaxy NGC 4649 (M60) is used in order to compare the predictions of two different approaches regarding the existence of unseen matter in its outer parts: modified Newtonian dynamics (MOND) and the classical Newtonian dynamics. We use the recently published kinematical data of NGC 4649 out to $\sim 6R_e$ (where R_e is the effective radius) which were obtained using globular clusters (GCs) to calculate the full velocity profile. We then compare thus obtained values of the velocity dispersion with the predictions of the spherical Jeans equation. We show that the Jeans models based on the constant mass-to-light ratio model and different MOND models provide a good agreement with the observed values of the velocity dispersion. The best fits of the velocity dispersion were obtained using the mass-to-light ratio in the B -band equal to 7 implying that there is no need for large amounts of dark matter in the outer parts (beyond $\sim 3R_e$) of this galaxy. We also find that tangential anisotropies are present in NGC 4649.

Poster

PROBING THE COSMIC FILAMENTS BY MEANS OF X-RAY OBSERVATIONS

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Recent observations and numerical simulations show that galaxies are not distributed in the Universe randomly. They are placed like the pearls of a necklace. The matter is spread into the space in the form of cosmic filaments and voids. The intersection regions of these cosmic filaments are what we observe as "clusters of galaxies". In this work we selected 9 clusters of galaxies (A1644, A1736, A3528, A3530, A3532, A3556, A3558, A3560, A3562) from SHAPLEY super cluster region, the largest concentration of galaxies in our nearby Universe. The XMM-Newton and Chandra archival data is used for the analysis. We interpret the morphology of the clusters in the region and gravitational perturbations due to close encountering in the Shapley. The cosmic filaments and webs are portrayed from the Shapley super cluster region analysis results.

Poster

MINIHALO MODEL OF THE LYMAN-ALPHA FOREST IN NEW LIGHT

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We show that some observational properties of low- and intermediate-redshift Lyman-alpha forest clouds, i.e. the column density distribution function, may be explained in more details by the classical minihalo model postulated by Rees. Further, we propose a simple way of estimating the quantity of baryons residing in absorbing clouds in the arbitrary redshift range, unlike the estimates based only on the observed forest lines.

CHINESE CALENDARS

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This article tries to answer the question how and why did Chinese ancient astronomy come into being and how did one lonesome and original calendar system on the very end of the world develop. At the beginning, Chinese people distinguished time of the year by the annual cycles of plants and animals, but soon began to determine seasons by observing celestial bodies. Early successful measurements of tropical year and synodic month made possible for Chinese people to issue first calendars very early. Spring and Autumn (Chunqiu) period (770 - 476 BC) brought forward first official calendars. Further improvement of calendars was caused owing to the development of new astronomical instruments.

Chinese calendars also originate from the metaphysical concepts of Qi, Yin-Yang and 5 elements. 5 elements were connected with Chinese 5 seasons of the year and this was the first form of solar calendar. Later, it developed into solar calendar with 10 months.

In the next phase, Chinese calendar turned into lunisolar calendar which also has its evolution. Chinese people invented Calendar "with division by four" (the name of this calendar). They also added 24 solar terms to make calendar harmonize with natural cycles. Li Chunfeng rearranged intercalations and used month without main solar term and divided months into short and long months. Sexagesimal system of time measuring refers to the system of Chinese 10 Heavenly Stems and 12 Earthly Branches. Its purpose is to measure time and define years, months, days and hours.

GRADUATED STUDENTS IN ASTRONOMY AT THE UNIVERSITY OF BELGRADE

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Basic biographical data of graduated astronomy students were attempted to be collected. Preliminary results and the corresponding analysis is presented.

Poster

BAZA - BELGRADE ASTRONOMICAL COMMUNITY DATABASE

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We present preliminary Belgrade astronomical community web site whose purpose is to provide basic information about students graduated from the Department of Astronomy, Faculty of Mathematics, University of Belgrade, as well as our current students and friends worldwide, and to help them communicating. BAZA (from Serbian: Beogradska Astronomska ZAJednica) is available at <http://alas.matf.bg.ac.yu/~astrobaza/> and <http://astro.matf.bg.ac.yu/baza/>.

Poster

35 YEARS OF ASTRONOMY GROUP OF RESEARCH SOCIETY IN VALJEVO

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Research Society "Vladimir Mandić Manda" was founded in 1969 and its Astronomy group in 1973. From the beginning members of this Group were doing projects on observation of meteors, planets, the Moon, as well as projects on the solar activity, astrophotography and ethnoastronomical researches. Every important astronomical event was covered and observed (lunar and solar eclipses, planets transits). Also, very important parts are astronomical education of members and popularization of astronomy in the public of Valjevo. All results of the projects are presented in papers in the Proceedings of Research Society. For these 35 years, the Group had around 500 members, realized around 50 projects, and organized few hundred of public events.

Poster

MATHEMATICS AND ASTRONOMY IN THE EDUCATIONAL SYSTEM OF SERBIA IN THE SECOND HALF OF THE 19TH CENTURY

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In the second half of the 19th in Serbia solid fundamentals of the educational system were formed as a prerequisite to follow the contemporaneous development in Europe. Mathematics and astronomy (cosmography) found an important place in this educational system thanks to, above all, distinguished intellectuals who were pioneers in the foundation of various institutions, such as mathematicians Dimitrije Nešić, Bogdan Gavrilović and Mihailo Petrović-Alas and astronomers Milan Nedeljković, Milan Andonović and Djordje Stanojević.

Poster

ASTROPHYSICS PARADOXES

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Astrophysical paradoxes are the paradoxes of physics. The main motivation of a formulated paradox is clearly recognized in the scientific environment because the phenomenon of a paradox itself has become interesting. There is an explanation of how and why the phenomenon of paradox started to exist, as there is an explanation for the existence of any phenomenon. A paradox has its structure, which defines the functional aim of creating paradoxes. According to the structure there are different types of paradoxes in astrophysics and some of them are going to be classified and analyzed here. Astrophysical paradoxes have mostly been solved or else there are theoretical premises for their solution. Their structure is recognizable in two distinct ways that lead to the solution through changing the paradigm or through a hierarchical sequence ending in the solution.

Poster

ASTRONOMICAL PAPERS IN THE PROCEEDINGS OF PETNICA SCIENCE CENTER (2003-2007)

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One part of the educational work of the Petnica Science Center (PSC) is organization of the Student Conference at the end of every year, and publishing of the Proceedings of the Conference (named "Petničke sveske"). The best projects from all 15 departments are being presented (approx. 70 papers every year). In this paper, results of astronomical projects during the period from 2003 to 2007 are presented, as well as their papers published in the PSC Conference Proceedings.

Poster

ASTRONOMICAL CREW IN PRIMARY SCHOOL "VASA ŽIVKOVIĆ" – PANČEVO

B. Krstin

Primary school "Vasa Živković", Pančevo, Serbia

The oldest primary school (founded in 1878) in Pančevo, "Vasa Živković" is well known after educational and cultural mission in this region since it has been the place where many young generations acquired knowledge about world, nature and universe itself. One of numerous school sections is astronomy. This activity started after student's initiative to know more about astronomical phenomena, Solar System, Milky Way and structure of the Universe. Since its foundation, "Astronomical crew" (AC) gathered more than 50 primary school students. AC organized two summer schools (in 2007 and 2008) of astronomy (together with art colony) on the mountain Divčibare, and has started cooperation with Astronomical Society "Rudjer Bošković" (taking part in manifestation Belgrade Astronomical Weekend 2007 and 2008). Practical and theoretical lessons have been given using methods of informal learning and 'student to student' teaching method. Thanks to donation of student's parents, AC has one small telescope that is in use for amateur astronomical observations. AC activities have been considered as very important for increasing universe and ecological awareness at very young ages, followed by great interest of local TV Pančevo and Radio Belgrade YOUTH PROGRAMME: "One step to the science". 'Crew' members are very keen to communicate astronomy with public and share their spirit with other students, especially with artists. First artistic work made by art colony members was inspired by astronomical phenomena and first look through telescope (enabled by AC).

HOW TO IMPROVE WORK IN PLANETARIUM?

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Modernization of a planetarium does not have to be financially demanding. Modern planetarium does not imply the existence of most expensive equipment and technical devices, but it requires modern and creative approach in dealing with problems. How with limited founding and a good idea we can create transition between classic (mechanical) sky projection to modern digital technology of the 21st century is explained here.

IMPORTANCE OF THE ETHNOASTRONOMY RESEARCH

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In this paper some main aspects of the recent ethnoastronomical researches in Serbia, and importance of this kind of research for astronomy, history of astronomy, ethnology and national heritage are presented. Interdisciplinary connection of astronomy with other sciences as with social sciences is underlined.

BOOK REVIEW: UNIVERSE BEYOND TIME

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When presenting a black hole schematically, on an endlessly long way towards singularity, there are three points, three states that essentially transform the matter. These are the *event horizon*, a space pressed into a *stable ring* and the *singularity*. The third one is the end of all reasonable analysis, but it is a challenge for the curious ones, since the way is endlessly long, and what then? The answer "that's it" is not an answer and therefore – all presumptions, ideas and imagination have the right of existence, because only those who ask for, may find an answer. The book that talks about these issues is the subject of this poster and the title itself – *Universe beyond time* – offers some solutions of the problem. The stated points, as independent units, will serve in this experiment as the basic structure of elementary particles - photons, electrons, protons, the new world that will be the birthplace of life and sense. This experiment opens many difficult questions, but it does make an effort to find an answer and recorded on DVD it may serve as illustration to the poster, as well as a support to the book.

DOES FLATTENED SKY DOME REDUCES PERCEIVED MOON SIZE

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At the horizon, Moon is being perceived as bigger than at the zenith. This phenomenon is called the Moon illusion. One of the theories suggests that change in perceived size of the Moon is due to a change in perceived distance. Rock and Kaufman suggested so called Flattened sky dome model, presuming that perceived distance towards zenith is shorter than perceived distance towards horizon. Namely, if perceived distance of zenith Moon is shorter, and Moon subtends the same visual angle as it is on the horizon, visual system could conclude that zenith Moon is smaller. Rock and Kaufman presumed that distance towards zenith is perceived as shorter because of lack of distance cues, according to which visual system estimates distance. In order to examine this model, two experiments were done, in a dark room, in which distribution of depth cues is the same towards horizon as towards zenith. In the first experiment 14 participants had the task to equalize the perceived distances of three stimuli in three directions (horizontal, tilted 45 degrees and vertical). That is, one of the stimuli was considered as the standard, and participants directed experimenter to move other two until they appear approximately at the same egocentric distance. In the second experiment 16 participants had the task to estimate the perceived sizes of three stimuli in the same three directions. They estimated sizes by touching and choosing one of the bars which appeared similar in size as the observed stimuli. Participants in both experiments performed estimates while sitting on the floor, wearing special glasses (with 1mm wide aperture) in order to prevent the subjects' eye movements. So, they could only move their head from horizontal to vertical direction. For distance estimates we found such differences between three directions. that as the head tilts upwards, the perceived space is being elongated, which is the opposite than flattened sky dome. That is, perceived distance towards zenith is longer than perceived distance towards horizon. For size estimates we found no difference between the three directions. These results suggest that perceived size and distance are not directly correlated, and that perceived distance is probably not the cause of differences in perceived Moon size on two directions.

**IYA2009 GLOBAL CORNERSTONE PROJECT: GALILEOSCOPE
IN ASTRONOMICAL SOCIETY "RUDJER BOŠKOVIĆ" -
COOPERATION WITH AMATEURS IN MACEDONIA
AND CROATIA**

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The IYA2009 project "Galileoscope" wants to give 10 million people their first look through an astronomical telescope in 2009. This is achievable if, for example, 100 000 amateur observers each show the sky to 100 people. Millions of small telescopes are sold every year, but anecdotal evidence suggests that most are rarely used for astronomy. The worldwide Telescope Amnesty programme will invite people to bring their little-used telescopes to IYA2009 events, where astronomers will teach people how to use them and offer advices on repairs, improvements and/or replacements, encouraging more people to stay involved in that hobby. We encourage the organisers of IYA2009 celebrations in all countries to promote similar activities, with a common goal of giving 10 million people worldwide their first look through an astronomical telescope.

Basic idea of this project could be easily implemented in main activities in the Astronomical Society "Rudjer Bošković" concerning the fact that every weekend, Friday and Saturday night, on the top of the Public Observatory people can watch planets and the Moon trough the telescope. This could be the starting point for attracting general public to learn more about astronomical observations, at least to learn about discoveries made by Galileo in 1609: Jupiter's moons, Saturn's rings and details on the Moon.

In the frame of this project telescope should be put on the streets, parks and public places in cities all around Serbia. In this sense, cooperation with amateurs in Macedonia and Croatia is also very important.

**MUSEUM OF ASTRONOMY IN SERBIA: CONCEPT, PROJECT,
DESIGN, NEW LIFE OF OLD INSTRUMENTS**

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The author of this paper initiated creation of the Astronomy Museum in 2005. It was fully approved by Scientific Council of the Belgrade Astronomical Observatory. This year, after many preparation works the general design of the Museum has got support of all relevant members of the scientific and cultural community, especially from Ministry of Science of Republic of Serbia. In 2009 that was acclaimed for International year of Astronomy opening of the Museum on the occasion of National Night of Museums is prepared.

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CONFERENCE PROGRAMME¹

Thursday, October 2

08:30-09:30 Registration

09:30-10:00 Opening ceremony

10:00-11:00 Cocktail

Invited reviews

11:00-11:40 P. Heinzel STRUCTURE AND DYNAMICS OF THE SOLAR ATMOSPHERE

11:40-12:20 I. I. Antokhin X-RAY FORMATION MECHANISMS IN MASSIVE BINARY SYSTEMS

Coffee break

12:40-13:20 L. Wisotzki THE COSMIC EVOLUTION OF ACTIVE GALACTIC NUCLEI

13:20-14:00 A. Milani ORBIT DETERMINATION FOR THE NEXT GENERATION SURVEYS

Lunch break

Session I: Astrophysical spectroscopy and solar physics &

Session II: Stellar physics and physics of interstellar medium

15:30-16:00 P. Kotrč SOLAR OPTICAL SPECTROSCOPY IN THE ONDŘEJOV OBSERVATORY (IL)

16:00-16:30 M. Maksimović KINETIC ASPECTS OF THE SOLAR WIND: A BRIEF REVIEW (IL)

16:30-16:45 V. Čadež, D. Šulić and V. Srećković MODAL FREQUENCIES OF IONOSPHERIC PERTURBATIONS INDUCED BY SOLAR WIND IMPACTS (ST)

16:45-17:00 A. Andić HIGH FREQUENCY OSCILLATIONS AND THEIR CONNECTION TO SOLAR ATMOSPHERIC HEATING (ST)

17:00-17:15 D. Zarić APPLICATION OF ARTIFICIAL NEURAL NETWORK TO THE CLASSIFICATION OF STELLAR SPECTRA (ST)

Coffee break

17:30-19:00 Poster session

Friday, October 3

Session II: Stellar physics and physics of interstellar medium

09:00-09:30 M. Martić DETECTION OF GLOBAL OSCILLATIONS IN SOLAR-LIKE STARS (IL)

¹Legend: IL - Invited lecture, ST - Short talk, PhD - PhD thesis, MSc - MSc thesis.

- 09:30-10:00 J. Kubát and B. Šurlan NLTE MODEL ATMOSPHERES OF HOT STARS (IL)
- 10:00-10:30 M. Srinivasa Rao DISCRETE SPACE THEORY OF RADIATIVE TRANSFER: APPLICATIONS (IL)
- 10:30-10:45 M. Vučković ASTEROSEISMOLOGY OF SUBDWARF B STARS AS A CRITICAL TEST FOR STELLAR EVOLUTION (ST)
- 10:45-11:00 O. Kuzmanovska-Barandovska MULTILEVEL LINE TRANSFER WITH THE ITERATION FACTORS METHOD (ST)
- Coffee break
- Session II: Stellar physics and physics of interstellar medium*
- 11:30-12:00 E. A. Antokhina MODELLING OF LIGHT AND RADIAL VELOCITY CURVES IN X-RAY BINARY SYSTEMS (IL)
- 12:00-12:30 T. S. Khruzina MODERN MODELS DESCRIBING THE FLOW OF MATTER IN CATAclysmic VARIABLES (IL)
- 12:30-12:45 G. Đurašević, I. Vince and O. Atanacković ACCRETION DISK IN MASSIVE BINARY SYSTEMS (ST)
- 12:45-13:00 I. Horvat et al. THEORETICAL PREDICTION OF NEUTRINO INDUCED GAMMA RAY FLUX FROM NEARBY HYPERNOVAE (ST)
- Lunch break
- 14:30-15:00 Poster session
- Session II: Stellar physics and physics of interstellar medium*
- 15:00-15:15 N. Martinović et al. TRIGGERED STAR FORMATION IN NEARBY HIGH GALACTIC LATITUDE CLOUDS (ST)
- 15:15-15:30 A. Sezer et al. X-RAY ANALYSIS OF GALACTIC SUPERNOVA REMNANT G27.4+0.0 (ST)
- 15:30-15:45 D. Onić, D. Urošević and B. Arbutina AN ANALYSIS OF THE POSSIBLE THERMAL EMISSION AT RADIO FREQUENCIES FROM SUPERNOVA REMNANTS G39.2-0.3 (3C396) AND G156.2+5.7 (ST)
- 15:45-16:00 V. Borka Jovanović and D. Urošević THE CYGNUS RADIO LOOP: TEMPERATURE AND BRIGHTNESS (ST)
- Coffee break
- Session III: Stellar and galactic systems*
- 16:30-17:00 Ž. Ivezić REACHING FOR THE SKY WITH SDSS AND LSST (IL)
- 17:00-17:15 B. Beygu, M. Hüdaverdi and E. N. Ercan BINARY CLUSTERS OF GALAXIES OBSERVED BY XMM-NEWTON (ST)
- 17:15-17:30 M. Hüdaverdi et al. TURKISH NATIONAL OBSERVATORY (RTT-150) VIEW OF NEARBY CLUSTERS OF GALAXIES (ST)
- Coffee break

Session VI: Interdisciplinary studies (astrobiology, astrochemistry, geophysics, atmospheric physics, astronautics and space science)

- 18:00-18:15 M. M. Ćirković and B. Vukotić ASTROBIOLOGICAL LANDSCAPE AND NEOCATASTROPHISM (ST)
- 18:15-18:30 T. Jakšić and M. M. Ćirković OBSERVATION-SELECTION EFFECTS AND THE STRUCTURE OF TERRESTRIAL IMPACT RECORD (ST)
- 18:30-18:45 S. Šegan and D. Marčeta ORBIT DETERMINATION AND PARAMETER ESTIMATION: EXTENDED KALMAN FILTER VERSUS LSQOD (ST)

Saturday, October 4

Session IV: Astrometry, dynamical astronomy and planetology

- 09:00-09:30 R. Pavlović FULFILMENT OF THE CONDITIONS FOR THE APPLICATION OF THE NEKHOROSHEV THEOREM TO ASTEROID BELT (PhD)
- 09:30-10:00 G. Damljanović IMPROVEMENT OF ACCURACY OF PROPER MOTIONS OF HIPPARCOS CATALOGUE STARS USING OPTICAL LATITUDE OBSERVATIONS (PhD)
- 10:00-10:15 R. Pavlović and Z. Knežević FULFILMENT OF THE CONDITIONS FOR THE APPLICATION OF THE NEKHOROSHEV THEOREM USING EXTENDED HAMILTONIAN (ST)
- 10:15-10:35 N. Todorović NUMERICAL INVESTIGATION OF AN A PRIORI UNSTABLE SYSTEM GIVEN WITH A 4 DIMENSIONAL SYMPLECTIC MAP (MSc)
- 10:35-10:50 V. Ogrizović A CONSTRUCTION OF AN ADVANCED MEASURING SYSTEM FOR ASTRO-GEODETIC DETERMINATIONS (ST)

Coffee break

Session V: Extragalactic astronomy and cosmology

- 11:15-11:45 P. Jovanović and L. Č. Popović CENTRAL ENGINES OF ACTIVE GALAXIES AS THE MOST POWERFUL SOURCES OF X-RAY RADIATION IN UNIVERSE (IL)
- 11:45-12:00 L. Č. Popović and D. Ilić VARIABILITY IN ACTIVE GALACTIC NUCLEI AND THE BROAD LINE REGION CHARACTERISTICS (ST)
- 12:00-12:15 S. Samurović THE PROBLEM OF THE MASS-TO-LIGHT RATIO IN EARLY-TYPE GALAXIES (ST)
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COBISS SR-ID 12128256
- Австраркт (c) Комоловнија - Австраркт
в) Австраркт (b) - Австраркт (b) - Австраркт

ISBN 978-86-7289-072-0

Тираж 120. - Регистар.

24 cm

Astronomy, 2008 (Višac : Tuli). - 98 str. :
Faculty of Mathematics, Department of
Cvejković and Dragana Ilić - Belgrade :

October 2008 ; eds. Olga Atanacković, Zorica
of Astronomers of Serbia, Belgrade, 2-2

Book of Abstracts \ XV National Conference

(15 ; 2008 ; Beograd)

NATIONAL Conference of Astronomers of Serbia

113119 (048)

520224 (048)

Народна библиотека Србије, Београд
CIP - Каталогизација у публикацији

CIP – Каталогизација у публикацији
Народна библиотека Србије, Београд

520/524 (048)
113/119 (048)

**NATIONAL Conference of Astronomers of Serbia
(15 ; 2008 ; Beograd)**

Book of Abstracts / XV National Conference
of Astronomers of Serbia, Belgrade, 2-5
October 2008 ; eds. Olga Atanacković, Zorica
Cvetković and Dragana Ilić. – Belgrade :
Faculty of Mathematics, Department of
Astronomy, 2008 (Vršac : Tuli). – 98 str. ;
24 cm

Tiraž 150. – Registar.

ISBN 978-86-7589-072-0

а) Астрономија – Апстракти б) Астрофизика
- Апстракти с) Космологија - Апстракти
COBISS.SR-ID 151378956