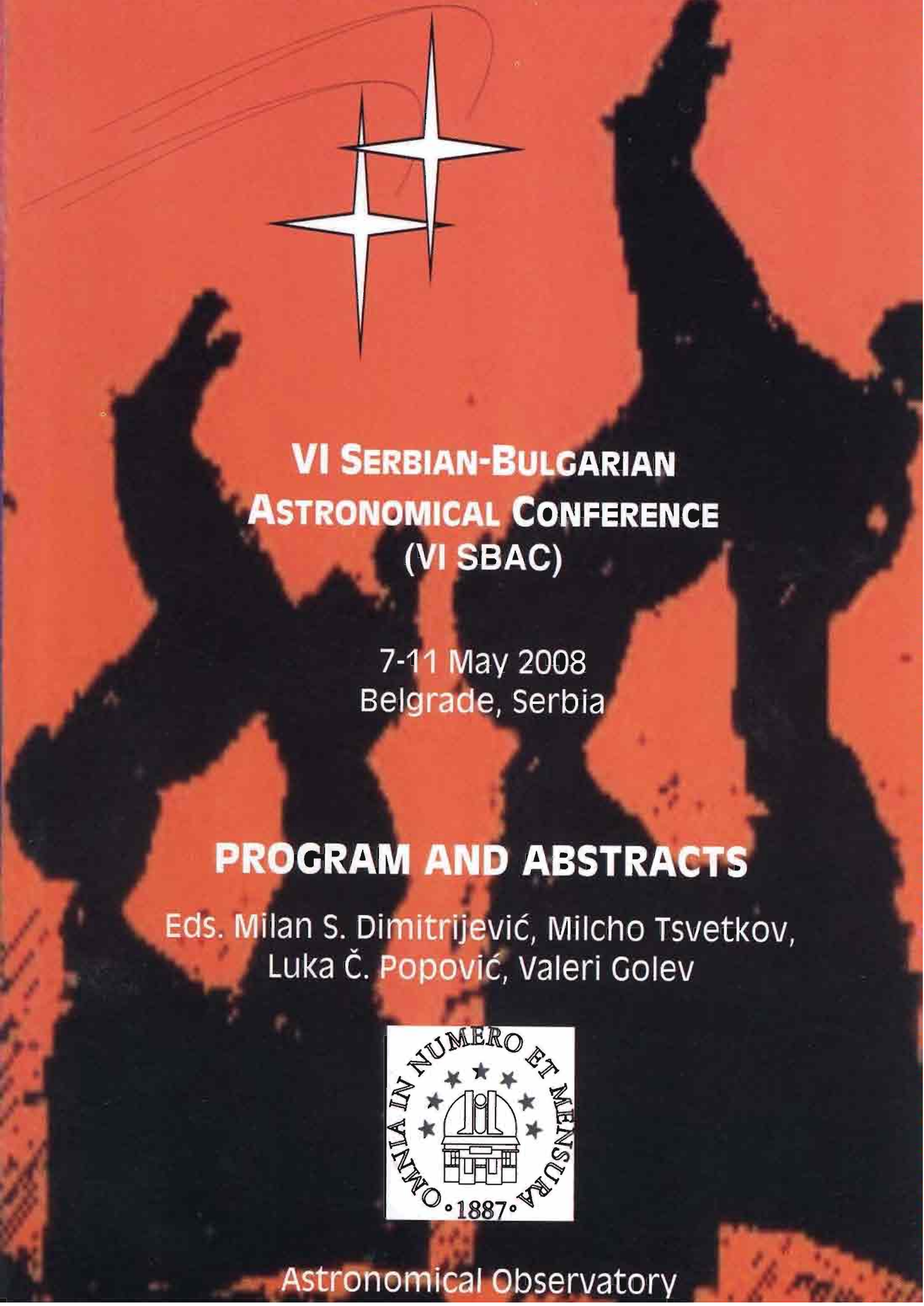

VI SERBIAN-BULGARIAN ASTRONOMICAL CONFERENCE (VI SBAC)

7-11 May 2008
Belgrade, Serbia

PROGRAM AND ABSTRACTS

Eds. Milan S. Dimitrijević, Milcho Tsvetkov,
Luka Č. Popović, Valeri Golev

Astronomical Observatory

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INVITED LECTURES

Invited lecture

FOUNDATION OF PHYSICS ON TOPOLOGICAL SPACES

DUŠAN ĆIRIĆ

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The aim of this paper is to introduce the notion of self-motion of every topological space, to prove some properties of such defined notion and to build a physics on every topological space. Idea is that every topological space has his own physics.

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LUKA Č. POPOVIĆ, VALERI GOLEV, ASTRONOMICAL OBSERVATORY, BELGRADE, 2008

Invited lecture

MASSIVE CLUSTER CANDIDATES IN M33: A MILTITELESCOPE VIEW

VALERI GOLEV[1], NADIA KALTCHEVA[2], EVGENI OVCHAROV[1], M. KONTIZAS[3]

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The study of the massive star-cluster systems in the Local Group provides important information about the integral properties of their stellar population and overall structural and chemical evolution. Since for these studies the completeness of the sample of detected clusters is critical, many extensive surveys have been recently initiated both from space and ground. The M33 galaxy is the only late-type spiral in the Local Group, and thus of particular interest. The most comprehensive catalogues available to date of confirmed genuine star-clusters in M33 are presented by Park & Lee (2007) and Sarajedini & Mancone (2007). The catalogues incorporate several recent studies based on HST/WFPC2 (Chandar et al. 2001) and HST/ACS (Bedin et al., 2005, Sarajedini et al., 2007) archive images. However, the areas of M33 covered by the HST-based surveys are much smaller than the entire area of the galaxy. Thus, a significant number of star-cluster candidates identified in early photometric surveys are omitted in the HST-based catalogues. The present work is focused on 46 star-cluster candidates located in the central 10′x10′ part of the M33 galaxy, most recently studied by Kunchev & Kaltcheva (1997). None of these candidates is included in the recent HST-based catalogues. We utilize CFHT and KPNO Megacams multicolor photometry, HST/ACS and WFPC2 archive images and 2MASS data to cast light on the nature of these objects.

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Invited lecture

THE PROCESSES OF (n-n')-MIXING IN ATOM-RYDBERG ATOM COLLISIONS IN STELLAR ATMOSPHERES

LJUBINKO M. IGNJATOVIĆ[1], MILAN S. DIMITRIJEVIĆ[2], ANATOLIJ A. MIHAJLOV[1], VLADIMIR A. SREĆKOVIĆ[1]

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In several previous papers it has already been shown that chemi-ionization processes in slow atom-Rydberg atom collisions play a very important role in weakly ionized plasmas, since they successfully competee with the known electron-atom ionization processes. However, recently appeared indications that (n - n')-mixing processes in atom-Rydberg atom collisions, due to their significant efficiency, also play significant role for weakly ionized plasma kinetics, because of their influence to excited states populations. The main aim of this work is to show that they have to be included in models of weakly ionized layers of stellar atmospheres, which is illustrated by examples of the photosphere and lower chromosphere of Sun (hydrogen case), and by photospheres of some DB white dwarfs.

Invited lecture

CEPHEID COMPLEXES OF THE MILKY WAY

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A method for identification of Cepheid complexes in Milky Way is applied. Based on the search algorithm and the data of Cepheids (Berdnikov et al. 2000) were found 18 Cepheid complexes of Milky Way with space (3D) density $ 5.0 \sigma $ density peak with an excess of about ten objects. The data for OB, WR stars, open clusters, stellar associations, and HII regions were used too. These objects have a hierarchical structure in space. The results show the existence of a correlation between OB associations, HII regions, and WR stars that trace the regions of massive star formation. Probably stellar associations, HII regions and open clusters from nearby sites of star formation form regions of 1kpc centered in the Cepheid complexes. We consider this fact as a ground for identification of 18 Cepheid complexes in the Milky Way.

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Invited lecture

ON THE MODELLING OF ASTROPHYSICAL SPECTRA USING PHOENIX

DARKO JEVREMOVIĆ[1], PETER HAUSCHILDT[2], EDWARD BARON[3], FRANCE ALLARD[4], ANATOLIJ A. MIHAJLOV[5], LJUBINKO IGNJATOVIĆ[5], MILAN S. DIMITRIJEVIĆ[1]

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We will review recent developments in general stellar atmosphere code Phoenix. Comparison between modeled spectra for variety of astrophysical objects from cool dwarfs, through stars with the winds up to supernovae and AGN's will be made. Also we will explore some of more 'exotic' problems such as Lithium isotopic ratio, chemi-ionization/recombination processes in red and white dwarfs, Stark broadening and its influence on line shapes.

Invited lecture

VARIATIONS IN AN ACCRETION DISK EMISSIVITY – REPERCUSSIONS TO THE Fe Kα LINE PROFILE

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The observed profiles of the Fe Kα line in case of some Active Galactic Nuclei (AGN) show certain irregularities which are not predicted by standard model of accretion disk. In this paper we propose a modification of disk emissivity law in order to explain the observed profiles. The disk emission was analyzed using the ray-tracing method in Kerr metric, assuming a modification of power-law emissivity which allows us to include perturbations in disk emission due to photoionization. When the emissivity law is modified in such way, we find that the corresponding variations in disk emission can explain the observed Fe Kα line profiles if the line is emitted from the innermost part of the accretion disk.

Invited lecture

CHEMI-IONIZATION – EXPERIMENTS, THEORIES, GEOCOSMICAL PERSPECTIVES

ANDREY N. KLYUCHAREV[1], MIKHAIL YU. ZAHAROV[1],
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Elementary chemi-ionization processes with optically excited atoms participation may be considered as a prototype of the elementary process of the radiation energy transformation into electrical one. These reactions involving highly excited Rydberg atoms (RA) in geocosmical plasmas traditionally attract researcher's attention (see, for example Mihajlov et al., 2003).

The systematic studies – experiment (Devdariani et al., 1978) and theory (Janev and Mihajlov, 1980; Duman and Shamatov, 1980) of the RA chemi-ionization was started relatively recently. The theory was later complicated taking into account effect of the Rydberg electron (RE) stochastic instability during one collision (Bezuglov et al., 1997).

Received results show that the resonant mechanism of the chemi-ionization (Janev and Mihajlov, 1980) at first suggested in (Smirnov and Mihajlov, 1971) and stochastic approach (Bezuglov et al., 1997) are adequate in a wide range of the RA principal quantum numbers and temperatures (Klyucharev et al., 2007).

Our attention will be paid to the ionization via RA+A and RA+B collisions – symmetrical and non-symmetrical cases:

$$RA + A \rightarrow (RA_2^*) \rightarrow A_2^+ + e$$
$$A_2^+ + e \rightarrow A^+ + A + e,$$
$$RA + B \rightarrow (RAB^*) \rightarrow AB^+ + e$$
$$AB^+ + e \rightarrow A^+ + B + e$$

Obtained rate coefficients are recommended for geocosmical plasma's models and possible further investigations and technological applications. We

assume that the conditions of the cold collisions will favor the observation of the diffusion processes in collisional reactions during one collision.

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Invited lecture

SOME ASPECTS OF ASTEROID MASS DETERMINATION

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There is a great variety of astronomical objects in the Universe. Each of these classes of objects follows a certain distribution function in size, luminosity or mass. Most individual mass distributions approximately follow a power law of the form $f(M) \propto M^{-2}$. A notable exception are planets and small bodies which seem to obey a flatter distribution. In spite of the rapidly growing number of newly detected extrasolar planets, our knowledge of the mass function of planetary and small bodies relay entirely on the our Solar System. If is there a "universal" mass distribution for astronomical objects on all scales, it will be very important to know mass distribution of small solar system bodies. Having in mind mentioned reasons we will present methods for asteroid mass determination as well as some of most interesting results.

Invited lecture

MILANKOVIĆ'S "THE END OF THE WORLD"

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The Milanković's numerical trajectory of secular changes of pole's rotation has shown that its latest positions in positive infinity can be observed on the North Pole of the Siberian plate. Milanković with his discovers "the end of the world" or total end of activity in astenosphere. In other words, he discovers plate tectonics of pole's (convergence, divergence, and transform movement), earthquakes, subduction zones, sea floor spreading, etc.

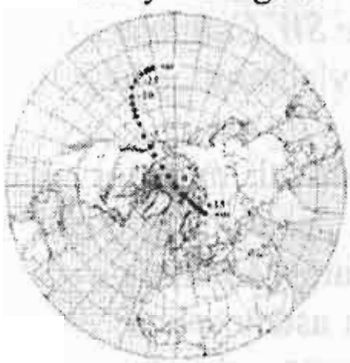
This is not just the end of the atmosphere existence, water or life on the planet, but also a geodynamic, co-mechanic and co-climatological climax. This is the beginning of the ice ages. The pole of rotation, by Milanković, reaches $\lambda = +49^\circ\ 34'$; $\varphi = +65^\circ\ 16'$ for the Northern Hemisphere or $\lambda = -130^\circ\ 26'$; $\varphi = -65^\circ\ 16'$ for Southern Hemisphere.

Based on this data and according to the pole spreading of lithosphere, it is possible to recognize future climatic zones under geographical latitudes and longitudes. These are also known as the green zones, the most endangered continental places. The entire Europe and the parts of Asia will be under ice. Studying the continent of North America we can observe only a part of Canada is under ice (up to 60 of geographical longitude). This will happen due to continuous Atlantic sea floor spreading, and also due to the counterclockwise rotation of the North American plate. This will cause the continents to move away from the North Pole.

The problem of some time units and numerical secular positions, Milanković calculated and graphically presented, still stands as one of the greatest planetary enigmas. Their close picture is available through geophysical, geodetic, and mathematical methods, satellites, stations on the Earth's surface and also through practicing new technology.

The mentioned "end of the world" does not present the end of the Earth's cosmic phase. It does not correspond to astronomical age determinants and further planetary deviation. Milanković has experienced and mathematically presented cinematic planetary model of continents. He further included the water areas, atmosphere, and living beings.

The Milanković's "end of the world" is just an end of the pole's tectonics, critical temperatures and fluidly fall in the atmosphere. Also, it is the ending of the seismic phase, rift genesis, subdaction, and radioactivity. However, all together will not have any further consequences on the other structures, especially not on the Earth's nucleus. The Milanković's end of the world resembles the minimization of mechanical secular changes of the pole rotation. The Earth's rotation itself stays unchanged or barely changed.



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Invited lecture

ASTRONOMICAL VIRTUAL OBSERVATORY. BULGARIAN VIRTUAL OBSERVATORY - PLACE AND ROLE.

GEORGI PETROV, MOMCHIL DECHEV, LYUBA SLAVCHEVA,
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Basic principles of the Virtual observatory are described. Steps of establishment of Bulgarian virtual observatory departments are marked – Bulgarian Solar Virtual observatory and Galaxian Virtual observatory. A brief description of the data, included in the Bulgarian Virtual observatory Date Base are presented.

Sun: The data from the solar coronagraph in the National astronomical observatory "Rozhen" and in the People's observatories around the country will be included. The basic instruments in the solar tower at NAO – Rozhen, which produce the data are the Lyot-coronagraph (150/2250) with Hα filter (1.8Å) and the solar refractor (150/1600).

Galaxies: Here will be presented the row and/or calibrated data from the 2_m RCC telescope of the National astronomical observatory "Rozhen", 60_cm telescope of the Belogradchick observatory and some data from other observatories. At the time being we have thousands of faint galaxies in voids, several tents of Box/Peanut galaxies and Active Galaxies Nuclei, quasars and BL Lac objects, gravitational lenses, ca. 30 open clusters and few planetary nebulae.

In the near future all the data will be distributed by means of MySQL or PostgreSQL databases.

Invited lecture

STELLAR POPULATIONS IN ACTIVE GALAXIES

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The activity of galaxies is linked to the growth of the black hole and to the building-up of the stellar population. By studying this stellar population, its history and kinematics, we get insight into the past evolution of the presently active nuclei. We will present the different diagnostics tools allowing to understand this history.

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Invited lecture

GEOPHYSICAL CONTRIBUTIONS IN PRECESSION-NUTATION

JAN VONDRÁK

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Recently we found, from the analysis of Very Long-Baseline Interferometry (VLBI) observations and using resonant effects in several forced nutation terms (Vondrák, Ron 2006a, 2006b, 2007), small quasi-periodic fluctuations of the period of retrograde Free Core Nutation (FCN), ranging from 429.8 to 430.8 days. In our preceding studies we were also able to demonstrate that the atmospheric and oceanic excitations are capable of exciting nutation near the resonance of FCN; both amplitude and phase of the geophysically excited pole are consistent with the values observed by VLBI, in the interval of tens of years. The geophysical excitations are now numerically integrated, using Brzezinski's broadband Liouville equations (Brzezinski 1994) in order to estimate the influence of the atmosphere and oceans on precession and nutation. It is then removed from the celestial pole offsets, observed by VLBI. The remaining part is then used to derive the period and quality factor of FCN in running intervals, and to study the temporal stability of these important Earth parameters.

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SHORT TALKS

Short talk

ON THE DISTANCE OF KR AURIGAE

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We estimated the distance of the cataclysmic variable KR Aur using the photometric measurements of the minimum brightness in BVRI bands and different kinds of empirical dependences on the P_{orb}, masses, absolute magnitudes and color-indexes of the components of the system. We used also 2MASS measurement of the K-magnitude received close to faintest state. The evaluation of the distance and other parameters of the KR Aur were compared with other ones of the similar VY Scl type variables.

Short talk

INVESTIGATIONS ON BELGRADE OBSERVATORY OF THE INFLUENCE OF COLLISIONAL PROCESSES ON ASTROPHYSICAL PLASMA SPECTRA IN 2006-2008

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The brief review of activities on the project "Influence of collisional processes on the astrophysical plasma spectra", from 1st January 2006 up to 1st May 2008 is given, in order to inform on our recent activities in this research field, with results of interest for the investigation, modeling and diagnostic of astrophysical, but also laboratory and industrial plasmas. Here is given our bibliography for the considered period in order to show possible directions for collaboration.

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Short talk

ON THE REGULARITIES OF STARK BROADENING PARAMETERS WITHIN SPECTRAL SERIES: Ar I LINES

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The Stark broadening parameters (the width and shift) of six Ar I spectral lines: 522.1, 549.6, 518.6, 560.7, 603.2 and 696.5 nm, corresponding to the transitions $3p^5nd \rightarrow 3p^54p$ for n = 7-5 and $4p' \rightarrow 4s$ have been calculated within the semi-classical perturbation approach. The considered lines are in the optical part of the spectrum and are particularly of interest for the research of surface wave discharges.

With the development of space-born spectroscopy, the importance of atomic data, including the Stark broadening parameters, for trace elements like argon, increases. For example argon is found in CVn binary σ^2 Coronae Borealis, and "Chandra's" X-ray spectra of young supernovas 1998S and 2003bg revealed argon over-abundance. Recently, argon lines are observed in the optical spectrum of the Be star Hen 2-90. Consequently, Stark line broadening parameters for neutral and ionized argon are of interest for the modelling and investigation of astrophysical plasmas. We note here, that lines within the optical spectral range are particularly significant.

In this paper, results of the determination of Stark broadening parameters within the semiclassical perturbation method (Sahal-Bréchot, 1969a,b) for four visible argon lines (737.2, 603.2, 549.6 and 522.1 nm within the spectral series $3p^54p\ ^2[5/2]_3{}^3D_3 - 3p^5nd\ ^2[7/2]_4{}^3F_4{}^\circ$ are presented, and used for the investigation of regularities and systematic trends.

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Short talk

KINEMATICS OF THE POST-ERUPTIVE PHASE OF AN ERUPTIVE PROMINENCE ON 8 MAY 1979

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The kinematic pattern of the post-eruptive phase of the quiescent prominence which erupted on 8 May 1979 was studied. The eruption of the helically-twisted polar prominence originated in the southern leg of the huge magnetic system (HMS) that later produce a coronal mass ejection (CME). The kinematic evolution of the post-eruptive process was estimated by height-time profiles of the heights of the two main flux ropes (FRs) composing the body of eruptive prominence (EP) and horizontal expansion between the main FRs feet. The inflow velocity of the prominence plasma back to the chromosphere increased with constant acceleration of 76 m/s^2 and it reached a value up to 200 km/s. The horizontal expansion between the main FRs feet of the EP increased with an average constant velocity of 12 km/s in first order approximation, but in fact it had changed non-linearly. The obtained results were discussed as indicative ones for the kinematics and evolution of the magnetic field at the bottom of the erupting HMS.

Short talk

LINE SHAPE VARIABILITY OF NGC 4151

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We study the broad line shape variability of active galaxy NGC 4151 in a 11-years period, from 1996 until 2006 (Shapovalova et al. 2008). We found that the shapes of the broad emission lines are very complex and that they were changing in the observed period, indicating that the structure of the Broad Line Region (BLR) is changing. To explain such line shape variability we assume an outflow in the BLR.

Short talk

H-APLHA BRIGHTNESS EVOLUTION DURING THE ERUPTION OF PROMINENCE OF 7 MAY 1979 AND 8 JUNE 1980.

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We study H-aplha brightness during the evolution of the eruptive prominences (EPs), observed in H-alpha, on 7 May 1979 and 8 June 1980. Variations in H-alpha brightness in different parts of prominence body with respect to the prominence destabilization is examinated .

The mean values of relative H-alpha brightness of EPs bodies in arbitrary units are used to probe the pre-eruption state of the prominences.

H-alpha brightness evolution of two prominences with respect to low atmospheric magnetic reconnection processes that might be responsible for their destabilization and acceleration is considered

Short talk

STELLAR POPULATIONS IN DWARF ELLIPTICAL GALAXIES

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The dwarf elliptical galaxies are the key for answering many questions of the modern cosmology. According to the prediction of the most popular cosmological theory - λCMD, they should be the most abundant type of galaxies (actually the predicted number exceed the observed number of dEs); they should contain big quantities of dark matter (M/L > 100Msun) ; they should be the first galaxies to form and those containing the oldest and most metal poor stars (not observed); they are valuable to study the effects of the environment (giving constraints on n-body simulations)...

All of this questions can be answered if we have knowledge about their stellar population and dynamics. Thanks to the new models, new tools of spectrum analyzing and new high quality observations we are starting to understand better this small galaxies.

We will present results for 15 dEs, observed with VLT (FORS1 and FORS2), analyzed with Pegase-HR models using full-spectrum fitting. Our conclusion is that this galaxies are more metal rich and younger then preciously thought, which already solved some puzzles (like CaT overabundance in the dEs).

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Short talk

THE ROLE OF OPTICAL Fe II ^{4}F, ^{6}S AND ^{4}G GROUP OF LINES IN AGN SPECTRA

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In order to investigate optical Fe II λλ4450-5350 Å lines, which extreme emission can not be explained by standard photoionization model, we separate them in three groups by lower term of transition: ^{4}F, ^{6}S and ^{4}G. We examine the relations between those Fe II groups of lines and their correlations with other lines in AGN spectra.

*Short talk**

ASTRONOMICAL SOCIETY "MAGELLANIC CLOUD"

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Astronomical society ***Magellanic cloud*** is founded in May 16. 2001. and it is sited in the town of Prokuplje, the South Serbia. It is established by A. Simonović, A. Valjarević, then students of geography at the University of Kosovska Mitrovica, Ž. Mijajlović professor of mathematics, S. Šegan, professor of astronomy, both at 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 vicinity. Also, it is explained the role of the Society in rising the Astronomical station of the Astronomical observatory in Belgrade at the mountain Vidojevica nearby Prokuplje.

* Last minute change to Poster.

Short talk

ASTROCLIMATIC CONDITIONS AT THE MOUNTAIN VIDOJEVICA

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Here are presented the main climate properties and weather conditions of Toplica, the region in the South Serbia. The particular emphasis is given to the astroclimate characteristics in the surrounding of the mountain Vidojevica nearby the town of Prokuplje. As it is known, there is situated the new astronomical station of the Astronomical Observatory in Belgrade, so astroclimate conditions may have important function in planning astronomical projects and observations. This article is based on various data, some of them collected since 1900. The data include the temperature, rainfall, insolation, relative humidity, cloudiness and number of days with clear sky. Both, macroclimate and microclimate characteristics are considered.

Short talk

METAPHYSICAL IDEAS IN PHYSICAL AND ASTRONOMICAL THEORIES

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Some philosophical ideas of interest to both physicists and astronomers are presented.

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Short talk

TECHNIQUE FOR TRACKING AND VISUALIZATION OF MOTION IN SEQUENCE OF IMAGES OF THE SOLAR CORONA

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The material represents specialized methodology for tracking and visualization the motion in sequence of pictures of the solar corona. The performance includes:

- Preliminary processing of each frame: initial analysis and elimination to atmospheric scattering of the light, image improvement using Gaussian filtering and a sharpen filtering for emphasizing of the contours;
- Processing to the series: clipping the area from the currently processed frame, alignment the clipping area with the same area in the initial frame, forming an image from the maximal brightness for each pixel of each picture of the sequence, calculation the –time-spatial gradient, determining the direction of gradient changes and visualization of the motion by transfer to saturation and colour hue for each pixel.

This technique is used for development of a special computer program working with pictures in FITS and JPG graphic formats.

The results from application the technique on the image sequences from the solar coronagraph of NAO Rozhen are showed.

Short talk

SPECTROSCOPICAL INVESTIGATIONS OF EXTRAGALACTIC OBJECTS AT ASTRONOMICAL OBSERVATORY (PERIOD 2006 – 2008)

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Here we will give an overview of the activity on the project (P 146002) "Astrophysical spectroscopy of extragalactic objects" financed by Ministry of Science of Serbia. The scientific activity can be divided into three subjects: (i) Investigation of Active Galactic Nuclei; (ii) Gravitational micro-lensing effect in spectra of quasars and (iii) Gamma-ray bursts. Besides of scientific work the participants of the project were involved in other activities as organizing international conferences, observations at other observatories, popularization of astronomy, etc. One of the significant results in mentioned period is development of international collaboration and accession to the observational facilities located at other observatories.

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Short talk

FUNDAMENTAL PLANE FOR DWARF AND NORMAL SPIRAL GALAXIES

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The existence of the fundamental plane of spiral galaxies is confirmed, which can be represented in observable terms by the absolute magnitude, the linear size of galactic disk and the rotation velocity. Applying the same formalism as for ellipticals: the virial theorem and an assumed homology (in both structure and kinematics) lead to a tigh three-parameter relation between the galaxy scaling parameters mentioned above. This fundamental plane is tested at several optical bands, and can reduce the residual of the Tully-Fisher relations by approximately 50%. A sample of dwarf spiral galaxies is tested for obeying the fundamental plane relation similar to that for spirals. It seems that the dwarf spirals obey the fundamental plane relation as well, which is mentioned in other works (Burstein et all. 1997; Graham A., 2001).

Short talk

WIDE-FIELD PLATE DATABASE AND PRESENT EXPLOITATION OF THE ARCHIVAL PLATES

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The last development of the Wide-Field Plate Database (WFPDB) - basic source of information for archived wide-field astronomical plates worldwide obtained with professional telescopes since the application of the photography for astronomical observations is present. The WFPDB collects at the moment information for more than 510 000 photographic plates (or 24% of all existed and stored 2 200 000 wide-field plates in astronomical observatories and institutions all over the world).

In order to enable future possible investigations on the base of the WFPDB a list of observational programmes used for plate receiving is compiled. The main characteristics of these programmes is their long duration and as a result - the accumulation of large knowledge about the observed phenomena.

Some examples of use of archival wide-field plates (composed light curves of interesting stars, searching for past eruptions of a pre-main sequence star, present use of CdC plates) are listed.

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Short talk

BULGARIAN-SERBIAN COLLABORATION IN THE ASTRONOMICAL WIDE-FIELD PLATE ARCHIVING

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The wide-field plates are the basic source for information on the astronomical objects back in time. Their archiving requires cataloging and storage of plate information in digitized form. We consider here the status of archiving the wide-field plate astronomical observations in Bulgaria and Serbia in the context of their repeated use for different tasks. In this connection the question of easy access to the plate information is very important. The undertaken plate digitization with flatbed scanners with making previews for quick plate visualization and photometric scans with good resolution is based of change of ideas and experience between the Bulgarian and Serbian astronomers.

*Short talk**

WIDE-FIELD PLATE DATABASE: INCLUDED UKRAINIAN PLATE CATALOGUES

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The last version of the Catalogue of Wide-Field Plate Archives (June 2007) contains 43 archives stored in the observatories located in Ukraine - Crimean Astrophysical Observatory (Nauchny and Simeiz), Kyiv University Observatory, L'viv University Observatory, Main Astronomical Observatory of the National Academy of Sciences of Ukraine (Golosiiv), Nikolaev Observatory and Odessa University Observatory. About 151 000 plates were obtained in the period 1898 - 2004 in the frames of the observing programmes: Small Solar System Bodies Observations, Investigations of the Emission Nebulae and Connected Stars, Spectral Classification of the Stars and Determination of the Stellar Absorption in the Direction of the Emission Nebulae, Photographic Survey of the Northern Sky (Fotografichny Ohlyad Neba, FON), Investigation of the Kinematics and the Structure in the Main Meridian Section of the Galaxy (MEGA), Selection of Reference Stars, Artificial Satellites Observations.

Up to the moment the basic information for 13 plate catalogues of the Main Astronomical Observatory (Golosiiv, Kyiv) and Crimean Astrophysical Observatory (Nauchny and Simeiz) are included into the Catalogue of Wide-Field Plate Indexes with 12609 plates. The plate digitization is just started with MICROTEK ScanMaker 9800 XL with Transparent Media Adapter-1600 with resolution 1200 dpi. Illustrations of the potential of some Ukrainian plate catalogues for future re-usage on the basis of data retrieval from the Wide-Field Plate Database are present.

* Last minute change to Poster.

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Short talk

THE CONTRIBUTION TO THEORY OF CELESTIAL MECHANICS PROBLEMS OF TWO AND THREE BODIES

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In the explanation of Definition of centripetal force (Def. *V*), Newton is stating that *the task of mathematician is to find such a force, which will keep an observed object at the given orbit, with given velocity, and the other way around: to find such curvilinear way in relation to which the given body is moved from the starting position at the given velocity.*"

The obtained formula for the attraction two bodies, more general from the formula of Newton's force of gravitation. Its importance is shown in three body way at the example of determining of the force of the Sun's and the Earth's acting on the Moon.

In the standard scientific literature written: that the Sun's force is 2.5 time bigger then the Earth's one; that the lunar theory of lunar motion is the most complicated theory being constructed differently than the rest theories of planet motion; that the Moon's motion theory cannot be developed in the basic of Kepler's geocentric ellipse.

But that result contradicts to the aspects in the nature and also to the laws of classical and celestial mechanics.

The author of this paper suggests the solution of problem in theory of Moon's motion, as task system motion two and three material points from the axioms of the classical mechanics. Analytical proofs are closed to the facts that can be found in the scientific literature. Digression from completely true facts, if those facts exist at all, don't influence the author's conclusion - that the force of Earth's attraction of the Moon is larger than the force of the Sun. We have to start from our new the formula considering the fact that the eccentricity of the Moon's and the Earth's path is small, so we have to considered the motion along the circular path in the ecliptic plane. We are suggests one solution for dynamic paradox of theory of the Moon's motion from the point of the classical mechanics.

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POSTER PAPERS

Poster paper

CCD PHOTOMETRY OF MINOR PLANETS AT THE BELGRADEASTRONOMICAL OBSERVATORY 2006-2008

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In this paper a summary of activities and results in the field of CCD minor planet photometry performed with 40.6 cm f/10Schmidt-Cassegrain telescope in the period July 2006 – March 2008 at the Belgrade Astronomical Observatory is presented. Light curves were constructed and some basic parameters (rotational periods and light curve amplitudes) were obtained for 10 minor planets (9 main-belt asteroids and 1 NEO) using a five star differential photometry.

Poster paper

PHOTOELECTRIC STUDY OF THE FLARE ACTIVITY OF AD LEO

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AD Leo has been observed in 2006 and 2007 during campaigns of simultaneous observations at Bulgarian NAO–Rozhen and AO–Belogradchik. High–speed electro photometric monitoring has been carried out in U-band. Enhanced flare activity was observed. In the period January–March 2006 and optical oscillations were detected during several large flares. In this paper we present some preliminary results of our study.

Poster paper

COHERENT CATASTROPHISM THROUGH MYTH

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We argue that cometary impacts and other catastrophic astronomical events strongly influence culture and mythology. This perspective is present in the crucial oldest myths of all major world religions and traditions. We critically investigate the hypothesis of coherent catastrophism (Clube, Bailey, Napier and others). We speculate that the main icon of Mithraic religion could represent an event that happened around 4000 BC, as a time location of one such cataclysmic event.

Poster paper

MODELING OF AGN BROADE EMISSION LINES

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We present investigation of one-peaked broad line shapes of a sample of AGN. Using two-component model of Broad Line Region we are trying to determine the disk emission in these profiles. Also, we estimate the possible parameter domains of the accretion disk.

Poster paper

CCD MEASUREMENTS OF DOUBLE AND MULTIPLE STARS AT NAO ROZHEN

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The Belgade team performed three series of observations of double and multiple stars at the Bulgarian NAO Rozhen in the period from 2004 to 2006.

The first series of observations of double and multiple stars performed with a CCD camera attached to the 2-m telescope took place in the middle of October 2004. The telescope is of the Ritchey-Chretien-Coude type with the focal length of 16 m. The frames were obtained by using the Photometrics AT200 CCD camera. The chip dimensions are 1024x1024 pixels, the pixel size is 24x24 micrometers. The angle corresponding to one pixel is 0.31 arcsec. The results have been published in (Pavlović et al. 2005).

The second series took place in the end of October 2005. The results have been published in (Cvetković et al. 2006). The third series took place on December 16/17, 2006. The results have been published in (Cvetković et al. 2007). In the second and third series the frames were obtained by using the CCD camera VersArray:1300B. The chip dimensions are 1300x1300 pixels, the pixel size is 20x20 micrometers. The angle corresponding to one pixel is 0.258 arcsec.

We presented the results for the position angle and separation for 70 double or multiple stars (129 pairs) which were measured in the three papers given below.

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Poster paper

CLASSICAL OBSERVATIONS OF LATITUDE AND THE IMPROVED REFERENCE FRAME

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It was decided at the General Assembly of IAU in 1997 at Kyoto that the International Celestial Reference Frame materializes the International Celestial Reference System from the beginning of 1998, and the HIPPARCOS Catalogue was accepted as the primary representation of the International Celestial Reference System in optical wavelengths. HIPPARCOS is one of the two catalogues (another one is Tycho) of ESA mission, and it gives for each of 118218 stars: very precise positions, proper motions, parallaxes, etc. However, nowadays we can see that the proper motions of some stars (mostly double or multiple) have problematic values because the mission was too short, less than four years. To improve these proper motions , it is possible to use also the ground-based long history optical observations of latitude/universal time variations (near 4.4 million observations of more than four thousand stars were collected), and the reference frame can be more stable. The goal is the Earth Orientation Catalogue (EOC). In this paper, we present some results of proper motions in declinations of HIPPARCOS stars observed with Photographic Zenith Tubes (PZT) throughout the 20th century.

Poster paper

STARK BROADENING OF NEUTRAL TELLURIUM SPECTRAL LINES IN WHITE DWARF ATMOSPHERES

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With the development of astronomical observations from space, even elements like tellurium are found in stellar atmospheres, so that the broadening parameters of its spectral lines are needed for the better analyzis and synthesis of stellar spectra. In order to provide the needed spectroscopic data, we determined, Stark widths and shifts for four Te I multiplets, of interest for modellisation, investigation and diagnostic of stellar plasma, by using the semiclassical perturbation method. Results were applied for the investigation of the influence of Stark broadening mechanism in ultraviolet, optical and infrared part of the spectrum of A-type and white dwarf star atmospheres. The obtained results demonstrate that, in the considered case, Stark broadening is more important in optical and infrared, than in the ultraviolet part of the spectrum, and that this effect should be taken into account for the analysis and modeling of particular layers in A-type and white dwarf stellar atmospheres and subphotospheric layers.

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Poster paper

PHOTOMETRIC STUDY OF RY SCUTI

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The UBVR light curves of the massive eclipsing binary RY Sct, obtained at the Maidanak Observatory from 1979 to 1994, were reanalyzed in order to prove the hypothesis of the presence of an accretion disk in the system. This possibility is supported by the new spectroscopic study of Grundstrom et al. (2007), and by a specific light-curve shape exibiting a slight asymmetry around the secondary minima and a small difference in the height of the successive maxima. The light-curve analysis was performed by using a Roche model of a binary containing a geometrically and optically thick accretion disk around the more massive primary star. By solving the inverse problem, the orbital elements and the physical parameters of the system components and of the accretion disk were estimated for all individual UBVR light curves. The model gives a consistent solution for RY Sct binary system and supports the hypothesis of the existence of an optically thick disk around the massive component. Our results suggest a mass exchange between the components and a mass loss from the system. This could be considered as a possible mechanism of the formation of the accretion disk around the more massive component and of the circumstellar envelope of toroidal form in the orbital plane of the system.

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Poster paper

MODELLING THE STELLAR POPULATION IN ACTIVE GALAXIES

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We are going to present our analysis of synthetic spectrum composed of AGN and stellar population spectra. The goal of the work was to test the accuracy of extracting kinematics, age and metallicity of the stellar population in the inner kpc of active galactic nuclei, based on pixel fitting of high-resolution spectra with synthetic stellar populations. We conclude that our method can efficiently restore kinematics, age and metallicity of the stellar population, as well as the AGN contribution to the continuum.

Poster paper

OBSERVATIONS OF M81 GALAXY GROUP IN NARROW BAND [SII] AND Hα FILTERS

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We present preliminary results of the observations made with 2m telescope at NAO Rozhen, using narrow band [S II] and Hα filters. The main target was to identify supernova remnant candidates in interaction regions in M81 galaxy group, particularly in the so-called Arp's loop and Holmberg IX. Tidal interaction between galaxies in this group is supposed to led to enhanced star formation which will result in a number of supernovae, which remnants we have tried to detect.

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Poster paper

ON THE RELATION BETWEEN RADIAL ALIGNMENT OF DARK MATTER SUBHALOS AND HOST MASS IN COSMOLOGICAL SIMULATIONS

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The dependence of the radial alignment of dark matter subhalos on the mass of the their host halo is explored. In a sample of 25 well resolved host halos with masses 10^{15} h^{-1} to 10^{12} h^{-1} $M_{\odot}$ the subhalos tend to be more spherical than isolated objects and their distributions of sphericity and triaxiality of subhalos are Gaussians. It turns out, that the radial alignment is independent on host halo mass.

Poster paper

BLUE-TO-RED STARS RATIO IN STELLAR COMPLEXES AND ASSOCIATIONS IN M33 GALAXY

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Massive stellar content of stellar complexes and associations in M33 is studied combining deep UBV photometry from the Local Group Survey (Massey et al. 2006) and JHK photometry from the 2MASS. The blue-to-red stars ratios (OB stars vs. red supergiants) and their application for deriving the star formation history in this galaxy are discussed.

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Poster paper

THE DISTORTIONS IN DENSITY PROFILES OF STAR CLUSTERS OF THE MAGELLANIC CLOUDS AND THEIR RELATION TO THEIR STRUCTURAL PARAMETERS

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The Magellanic Clouds are known to have a large variety of star clusters of various ages and morphology. Unlike the Milky Way, the Magellanic Clouds have suffered strong interactions among themselves and our galaxy through their lifetime. During those episodes, bursts of star and cluster formation has occurred, so a large number of star clusters are in the process of forming or very young still embedded in very disturbed environments and often in pairs.

A study of the imprints of such interactions has revealed that these clusters display distorted density profiles. The observed distortions and their relation to the structural parameters (central density, core radii, half-mass radii, tidal radii, Spitzer radii) of the selected clusters is discussed.

*Poster paper**

ENVELOPES OF COMET TRAJECTORIES

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We consider comet trajectories from the stand point of Nonstandard analysis (Leibniz's) analysis, a relatively new branch of mathematics. In particular, we consider parabolic comets paths. It appears that in a sense every parabola is an ellipse. Let **E** be an ellipse having focuses at the points (0,1) and (0,H) where H>0 is an infinite real number. Then all standard points of **E**, i.e. the points laying in the real plane R^2, R is the set of real numbers, are the points of loci of an "ordinary" parabola **P**. We show that **P** is in the fact the envelope of the family of all ellipses having one focus in (0,1), the other one in (0,*b*), *b* is a positive real number.

Here one can recognize the difficulty in determination of the nature of the comets orbits having distant second focus. In fact, the preceding example shows that every comet's orbit which is measured (observed) as parabolic actually is elliptical. But, its second focus is too remote to measure it.

* Last minute change to Short talk.

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Poster paper

INFLUENCE OF THE PHASE OF THE SPHERICAL PLANET ON THE POSITION OF ITS PHOTOCENTER

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The analysis of the reasons influencing a position of photocenter of the spherical planet under various conditions of its illumination intensity and various conditions of its observations is carried out. According to the indicated reasons various methods of determination of the position of photocenter of the planet in which the photocenter of the planet is considered as center of an illuminated part of its visible disk or as light center of its disk are offered.

The considered problem for ground-based observations is solved in an orthographic approximation: boundary of a visible planetary disk is the orthographic limb, and boundary of its illuminated part – orthographic terminator.

Let's consider a diffuse reflection of light from surface of the planet and assume to a first approximation, that the brightness is uniformly distributed over the illuminated part of its visible disk.

If the observable image of a visible planetary disk is resolvable, then the photocenter of the planet will coincide with the center of an illuminated part of its visible disk.

If the observable image of a visible disk is nonresolvable (in case of the planetary satellite or the spherical asteroid), then the photocenter of this object is considered as light center of its visible disk.

If reflection of light from the surface of the planet is absolutely mirror, then in any case the photocenter of the planet will coincide with the mirror point of an illuminated part of its visible disk.

For both models of allocation of brightness over the illuminated part of the visible planetary disk the dependences of the position of photocenter on the phase angle are obtained. As a result of the analysis of these dependences some regularity of illumination of visible disks of planets are established.

The example of determination of a position of photocenter of Mercury is given.

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Poster paper

TREATING SURFACE BRIGHTNESS PROFILES IN THE FIELDS OF GLOBULAR CLUSTERS

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A discussion concerning the relationship between the surface brightness and surface mass density in the fields of globular clusters is given.

Poster paper

LONG-TERM VARIABILITY MONITORING OF THE Z ~ 0.8 QSO SDSS J0754+3033. I.OBSERVATIONS AND PHOTOMETRY

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We report preliminary results of our 4-year optical (VRI) monitoring of the flat spectrum radio quasar SDSS J0754+3033 at redshift z = 0.80 with the 2m-RCC telescope at the NAO Rozhen, Bulgaria. The data reduction is described, light curves and preliminary structure function analysis are presented. The quasar exhibited variations with amplitude of up to a few tenths of the magnitude during our campaign. We also obtained narrow-band images of the field searching for associated emission line objects at the redshift of the quasar.

Poster paper

ASTRONOMY IN THE TOPLICA REGION

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In this article we present the undertakings connected with astronomy in the Toplica region. Until recently all activities were linked to the popularization and education of astronomy and other mathematical sciences. First attempts in this area rose at the beginning of the 20th century when the Gymnasium in Prokuplje was founded (1908), but they were not so successful. Here should be mentioned attempts in the twenties of Aleksa Savić, the prominent medical doctor, humanist and donator who lived in Prokuplje. First amateur telescopes were brought in Prokuplje in the beginning of seventies, and at the same time started the regular education of astronomy in high-schools. The turning point was 2001 when the amateur astronomical society ***Magellanic cloud*** was founded. Immediately the idea of rising of an astronomical station of the Astronomical observatory in Belgrade (AOB) at the mountain Vidojevica nearby Prokuplje was renewed. Soon the building of the station started due to the efforts of the staff of AOB, first of all Milan Dimitrijević (the previous director of AOB) and Zoran Knežević (the actual director of AOB) and the astronomers of the Chair for astronomy of the Faculty of mathematics of he University of Belgrade, first of all professor Stevo Šegan. The significant role in this mission played the astronomical society Magellanic cloud and the administration of the Toplica County. Popularization of astronomy was intensified and most prominent Serbian astronomers delivered public lectures there.

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Poster paper

THE PHYSICAL CHARACTERISTICS OF STARS HARBORING PLANETS

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Kolmogorov-Smirnov test is applied for samples the planet bearing stars and stars without discovered planet systems. The parametric space of mass, radius, age, rotational period, metallicity and z-coordinates is thoroughly search in order to find significant differences. These efforts focus on improving the probability to have a planet around a star based on its physical properties.

Poster paper

BULGARIAN VIRTUAL OBSERVATORY. MULTICOLOR OBSERVATIONS OF BOX /PEANUT GALAXIES

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CCD images for 30 edge-on galaxies - with and without Box/Peanut structures are taken on the 2_m (24 galaxies) and 60_cm (17 galaxies) telescopes as follow:

(U), B, V, R, I CCD frames on the 2-m RCC telescope on Rozhen observatory with typical resolution 12"/mm = 0.62"/px with binning and rarely 0.31"/px, CCD camera "Photometrics" and (B), V, R, I frames on the 60_cm telescope on Belogradchick observatory with typical resolution of 27.5"/mm = 0.78"/px with 3x binning, CCD camera ST-8.

Every night the standards in selected clusters - M92, NGC 7790 or M67, bias, dark and flat field frames were taken to calibrate the observations.

Typical exposure times for these observations was 2 to 5 min, so the bulge/disk regions are clear visible.

All the objects, taken in the optics were reduced in the same manner as explained above. For all observed and reduced images distribution of the surface brightness were examined using MIDAS reduction package.

Basic results from these observations:

1) Ca. 25 % of the edge-on galaxies, classified as type 4 and 5 - i.e, non Box/Peanut, but ellipsoidal or impossible to classify objects in fact are type 3 Box/Peanut bulges - from the listed above these are NGC 5014, 6368, UGC 8085, 9389 and probably NGC 5610 with definitely Box/Peanut shape of the bulges, but with smaller inclination angles, so the spiral structure is clearly visible.

2) There is no significant difference in the bulge/disk shapes in the different colors, so, it is enough for detailed study to use e.g. B and R images only.

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Poster paper

BULGARIAN VIRTUAL OBSERVATORY. MULTICOLOR OBSERVATIONS OF OPEN CLUSTERS IN OUR GALAXY

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Ca. 900 CCD frames in U,B,V,R,I on the 2-m RCC telescope and in B,V,R,I on the 60-cm telescope have been taken for 30 open clusters, including 7 bright clusters, 16 (8 x 2) probably double open clusters and 7 clusters in the anticenter of the Galaxy.

For photometric reduction Stetson's DAOPHOT and ALLSTAR program packages, implemented in MIDAS were used. Standards in several star clusters were used - the clusters M92 (mainly), NGC 7790, NGC 4147 an M67 and the improved standard sequences from the latest years have been taken.

Poster paper

UNABSORBED SEYFERT 2 TYPE GALAXIES WITH AND WITHOUT HIDDEN AGN SOURCE

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We have compiled a sample of nearby unabsorbed Seyfert 2 type galaxies to investigate them whether there is hidden or nonhidden AGN source. This question in some way coincides with the presence of Hidden Broad Line Region (HBLR) and non- HBLR in Sy2. Our sample contains Sy2 type galaxies selected by two criteria: (i) Sy2's with unabsorbed X-rays which column densities are $N_H < 10^{22}$ cm^{-2}, and (ii) Sy2's with known flux f_{5007} in emission line $[OIII]\lambda 5007$. For this sample we have derived the ratio $(N_{ph}/N_{ion})_{h\nu>55\,\mathrm{eV}}$ of the number of photons N_{ph} traced by the $[OIII]$ emission line to the number N_{ion} of high-ionization photons (with energies $h\nu > 55$ eV) provided by the central AGN source. This ratio probed the collimation hypothesis in the Unified Model and in the anisotropic case should be considerably larger than 1. We show that a large fraction of unabsorbed Sy2s in our sample possess a hidden AGN source and, also, the Sy2s with hidden AGN source have significantly smaller Eddington's ratios L_{bol}/L_{Edd}.

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Poster paper

INFLUENCE OF BARRIER FORM ON THE SHAPE OF THE GRB LIGHT CURVE PULSES

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In this contribution we will investigate the influence of shape of barrier formed by the material ejected by the decelerated shock waves, on the light curve pulses. This research is done in the frame of internal shock wave model which is broadly accepted to explain evolution and mutual interaction of relativistic shock waves in the first phase of gamma ray bursts. We have used the model which we develop in earlier work to follow the evolution and interaction of single shock wave. In order to investigate evolution of hydrodynamical parameters, as well as the effects on radiation which create light curve pulse, we replace the Gaussian profile of barrier with more suitable. Comparation and discussion with observational results is also presented.

Poster paper

ON THE STARK BROADENING OF Cr II $3d^5 - 3d^4$ p SPECTRAL LINES IN HOT STAR SPECTRA

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Recently, the effect of Stark broadening on the shapes of Cr II spectral line observed in stellar atmospheres of the middle part of the main sequence was investigated in Dimitrijević et al. (2007) and it was found that Stark broadening mechanism is important and should be taken into account especially in the study of Cr abundance stratification. In this paper, Stark broadening parameters for Cr II spectral lines of seven multiplets belonging to 4s-4p transitions were calculated by the semiclassical perturbation approach (Sahal-Bréchot, 1969a,b), and obtained Stark broadening parameters were applied to the analysis of Cr II line profiles observed in the spectrum of Cr-rich star HD 133792.

Taking into account the importance of Stark broadening for different types of spectroscopic studies and the particular interest of resonance transitions, we performed here calculations of its Stark widths and shifts of nine Cr II $3d^5$ - $3d^4$4p multiplets.

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Poster paper

A SEARCH FOR NEW STRUCTURAL COMPONENTS IN SEYFERT GALAXIES

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We present results of isophotal analysis of a number of Seyfert galaxies. We examine the contour maps and the profiles of surface brightness, ellipticity, position angle and Fourier C4 coefficient and find new components for a part of the objects.

Poster paper

ACTIVE GALACTIC NUCLEI: RELATIONS BETWEEN NUCLEAR ACTIVITY, STAR FORMATION AND BULGE MASSES

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The evolution of massive black holes (BHs) in relation with their host galaxy is presently intensively debated. Massive black holes seem present in all galactic nuclei, independently of their level of activity. It is clear that the growth of the BH and the evolution of the host galaxy are related, so it is generally assumed that their co-evolution is mainly the result of merger events within the hierarchical scenario of large structure formation. However this scenario begins to be questioned seriously. It is indeed difficult to explain how smaller BHs grow at lower redshifts and more massive ones at higher redshifts.

Optical observations of a complete sample of X-rays selected galaxies, also detected in the far-IR, will be used to determine the mass of the black-hole (via the broad-line Hbeta characteristics) and the mass of the bulge via optical photometry and velocity dispersion, to derive the BH/bulge ratio.

The X-rays parameters will give access to the nuclear activity, while the far-IR will provide an estimate of the global star formation rate. This sample should help clarify the relations between nuclear activity and global star formation over a wide range of galaxy masses.

A regular optical photometric follow-up of some rapidly variable radio AGN's studied with VLBI would also be an essential contribution to determine the structure of the central engine (e.g. a binary black hole).

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Poster paper

EPHEMERIS CALCULATIONS CONCEPTS: CONVENTIONS AND PRACTICE IN THE PLANET'S PHYSICAL EPHEMERIDES CALCULATIONS

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In the age of intensive exploring the solar system, the many professionals and non-professionals becoming interested in calculating 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 last 20 years international conventions in this calculation practice is done. As an effective result you can find interactive program for practical calculation of the planet's physical ephemerides.

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Poster paper

GENERAL ALGORITHM FOR THE DATA PROCESSING: PHASE I: ACQUISITION, PREPROCESSING AND CORRELATION ANALYSYS PHASE II: STATISTICAL DEPENDENCES AND REGRESSION ANALYSYS

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We have considered some concepts of the expert's planning and constructing of the general algorithm for astronomical (or any other kind) data processing. The problem is solved in accordance with our knowledge that all calculations are task covered by fact of increasing number of powerful computers available to everyone. Many professionals and non-professionals becoming interested in the explicit, as possible, rules for data processing. In these articles we explain special scheme for that and follow it with some examples.

Poster paper

DIRECT DETERMINATION OF SOLAR PHYSICAL COORDINATES B_0, P FROM PHOTOHELIOGRAMS

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Sunspots observation by photoheliograms in only two weak can be used for direct determination of solar physical coordinates B_0, P if level is used for determination of horizontal line on the plate. Theory would be presented with an example.

Poster paper

A SEARCH FOR NOVAE IN M31 WITH THE TELESCOPES OF NAO ROZHEN

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We present a long-term optical search for novae in our neighbour galaxy M31, based on observations with the 2m-RCC telescope and 50/70cm Schmidt telescope at NAO Rozhen, Bulgaria. Our monitoring of the M31 central region yields ~20% of all newly discovered novae during the last 3 years. The images were inspected manually and the photometry of the candidates was carried out with IRAF. Here we report coordinates and R-band magnitudes for 14 Nova candidates. All available data from optical and spectroscopic observations during this period are also summarized.

Poster paper

YOUNG STELLAR GROUPS IN M33 GALAXY: DELINEATION AND MAIN PARAMETERS

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The problem of (non-)existence of a typical size of the stellar associations is revisited by use of deep UBV stellar photometry in M33 from the Local Group Survey (Massey et al. 2006). Main parameters of young stellar groups like size distribution and typical density are determined and the possible hierarchical structure of recent star formation sites is discussed.

Poster paper

TOWARD A MODEL OF THE STELLAR INITIAL MASS FUNCTION (IMF) FROM DENSITY DISTRIBUTION OF MOLECULAR CLOUD CLUMPS

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Some basic steps toward creating a model of IMF are proposed. The presented preliminary results include mass distributions of protostellar clumps, assuming a power relationship between their masses and densities (rho~m^{γ}), and an approach for combined consideration of fragmentation and competitive accretion on the collapsing cores

Poster paper

STABILITY AND EVOLUTION OF MAGNETIC ACCRETION DISK

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In this paper we consider the magneto-hydrodynamic of the hot advection accretion disk. We investigate the interaction between stream and magnetic field. Appear and activity on the instabilities in the stream is discussed. Here we will show our results for 2D radial structure of disk and local warm in disk. How the flow is develop in (r, φ)-plane on disk. We show the form of conditions for destroying of us disk to the inner edge.

POST DEAD-LINE PAPERS

Short talk

LATITUDE VARIATIONS FOR THE PERIOD 1987.5-2008.3 AT OBSERVATORY PLANA AND THEIR INTERPRETATION

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Latitude variations at Geodetic Observatory Plana, located near to Sofia, are determined permanently since July 1987 by means of zenith telescope Zeiss 135/1750. More than 18350 observations of 72 star pairs are available now for scientific investigations. Most essential results and interpretation of the latitude variations and oscillations of the vertical at observatory Plana for the period 1987.5-2008.3 are pointed out here. Some changes of the latitude and vertical at observatory Plana are explained by the earthquakes, long-period variations of the gravity and solar activity cycles.

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Short talk

NEW TREND IN ASTROMETRY: INTELLIGENT SYSTEMS INSTEAD AUTOMATIC MEASURING MACHINES

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Modern astrometry researches based on collection of plates have been slowed down by some troubles in measuring process. Scanners and automatic measuring machines are capable to make fast data processing but still have problems of measuring of photographic plate without human's control in real time. To overcome it the intelligent decision-taking system should be constructed.
Vital differences of the proposed system are:

1. Ability for decision agenda to work in non-stop mode under list of troubles or combination of it;
2. Self-tuning system to measuring plates and objects;
3. Real time diagnostic and storing of main parameters of measuring system;
4. Verification output for experimental data in real time to control measuring process;
5. Problem-solving technique to realize non-stop mode without the assistance of operator;
6. Keeping logs with failures detected and decisions made during measuring to use them in the other applications.

As example of such system, PARSEC and future perspectives of plate scanning will be discussed.

Short talk

THE GOLOSIIV PLATE ARCHIVE CREATION AS AN ELEMENT OF UKRAINIAN VIRTUAL OBSERVATORY. FIRST STEPS

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The preservation of the unique information kept on astronomical plates in digital form can't be achieved only by simple transformation to digital form and keeping on electronic data medium. There are several problems on this way: how to store large volume of digital archive data; how to select right method for plate digitization and criteria for data verification, to be sure original information stored on plate is preserved. The problem with linking of plate images and observation log-books data, considering different formats and errors for different instruments, should be resolved as well.

The main goal of digital archive creation, as element of virtual observatory, is to provide such information easily accessible for researchers in digital format.

We present the main methods and criteria of digital Golosiiv Plate Archive creation and scientific problems that may be resolved on it base.

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Short talk

OPTICAL OBSERVATIONS OF THE GALACTIC SUPERNOVA REMNANTS: G59.5+0.1, G84.9+0.5 AND G67.7+1.8

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In this work, the optical CCD observations and long slit spectra of the galactic supernova remnants G59.5+0.1, G84.9+0.5 and G67.7+1.8 are presented. The observations are carried out with the RTT 50 1.5 m -Russian-Turkish joint Telescope, at TUBİTAK National Observatory (TUG) in Antalya, Turkey . The optical observations of G59.5+0.1 and G84.9+0.5 are reported here as the first observations of these supernova remnants. The images are taken with Hα , [SII] and their continuum filters. After subtracting the continuum from Hα. and [SII], [SII]/Hα ratio is obtained. This average ratio is found to be 0.41 and 0.44 for G59.5+0.1 G84.9+0.5,respectively which is in a very good agrement with the ratio obtained from the optical spectra of our observations, i.e. 0.46 and 0.40, respectively, indicating that these remnants are close to, or interacting with, HII regions. G59.5+0.1 and G84.9+0.5 remnants are found to show diffuse-shell morphology while G67.7+1.8 showed arc-shell morphology. From the emission lines of the spectra, the electron density Ne, pre-shock density nc, explosion energy E, interstellar extinction E(B-V) and neutral hydrogen column density N(HI) are calculated and presented here while the shock velocity Vs is also estimated from our observations.

Poster paper

PROCESSING AND MEASURING OF OPEN CLUSTERS PHOTO IMAGES WITH PULKOVO AUTOMATIC MACHINE "FANTASY"

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The observations of open clusters are conducted in Pulkovo from the end of the XIX century. At the present time the collection of plates contains several hundred photographs. Each plate archive is represented by series from 6 to 20-30 plates. These photographs are digitized on flatbed scanners Umax-1200 and Umax-2400 with permission 600-1200 dpi and in the measuring machine "FANTASY" (resolution 7250-8820 dpi, the position accuracy of 0.1 microns). This observational material, is used for obtaining the list of the preliminary coordinates of stars, on which then connect the systems of coordinates of plate and machine. "FANTASY" scans by the windows of 6.0x4.5 mm^2 with the overlap of sides to 10%. The complete image of the section of the celestial hemisphere with the accumulation is assembled from the separate windows, the operations of contrasting are performed. Then will recognize the images of stars on the plates of a series, plate they identify between themselves, their images are summarized. The images of stars will recognize on the summary image of accumulation, their coordinate they identify with the catalog. Then positions and photometry of stars on each plate are measured and are calculated star drifts, are separated the members of accumulation from the stars of background. All operations of working, recognition, and identification are performed automatically.

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Poster paper

ARCHIVAL PHOTOGRAPHIC OBSERVATIONS IN THE PLEIADES FIELD: AN ON-LINE ACCESS TO THE PLEIADES PLATE DATABASE AND ANALYSIS OF THE PLATE DATA

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Pleiades open cluster, one of the favorite for astronomical observations, gives a rare challenge to obtain one of the longest photometric datasets. Photographic plates in the field are taken in about one century time period, from 1885 to 2000. Using the resources of the Wide Field Plate Data Base (WFPDB), plate data and the astronomical plate archives information, we analyze the information for more than 3000 photographic plates with magnitude limit greater than 12. Time distribution as well as the magnitude limit of the plates in the observational period is presented. Pleiades Plate Database is organized and an on-line access, through the WFPDB web-page is provided.

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VI Serbian-Bulgarian Astronomical Conference (VI SBAC): 7-11 May 2008, Belgrade, Serbia

Conference will be held in the building of Mathematical faculty in Jagićeva 5

PROGRAM OF THE CONFERENCE

07. May Wednesday

18:00-19:00 **Astronomy, Poetry and Art (Milcho Tsvetkov, Milan S. Dimitrijević, Zoran Simić, Andjelka Kovačević)**
(Library of the Astronomical Observatory, Volgina 7)

19:00 Welcome cocktail
(Library of the Astronomical Observatory, Volgina 7)

08. May Thursday

09:00-09:30 Opening ceremony

Chairman Milan S. Dimitrijević

09:30-10:00 **Milcho Tsvetkov,** Wayne Osborn: Incorporation the world wide-field plate archives in the VO initiatives

10:00-10:30 **Predrag Jovanović**, Luka Č. Popović: Variations in an accretion disk emissivity – repercussions to the Fe Kα line profile

10:30-11:00 **Georgi Ivanov**: Cepheid complexes of the Milky Way

11:00-11:30 Coffee break

Chairman Milcho Tsvetkov

11:30-12:00 **Ljubinko Ignjatović**, Anatolij A. Mihajlov, Milan S. Dimitrijević, Vladimir Srećković: The n-n' mixing in stellar atmospheres

12:00-12:30 **Darko Jevremović,** Peter Hauschildt, Eddie Baron, France Allard, Anatolij A. Mihajlov, Ljubinko Ignjatović, Milan S. Dimitrijević: On the modelling of astrophysical spectra using PHOENIX

12:30-12:45 Mina Koleva, Philippe Prugniel, D. Michielsen, S. de Rijcke et al.: Stellar populations in dwarf elliptical galaixes

12:45-13:00 Petya Pavlova, Kostadinka Koleva: Technique for tracking and visualization of motion in sequence of images of the Sun's crown

13:00-13:15 Nataša Stanić: Preparations for the International Astronomical Year (2009) in Serbia

13:15—15:00 Break for the lunch

Chairman Žarko Mijajlović

15:00-15:15 Dragana Ilić, Alla I. Shapovalova, Luka Č. Popović, Alexander N. Burenkov, Vahram Chavushian: Variability of the emission line shapes of NGC 4151

15:15-15:30 Svetlana Boeva, Aleksandr Antov, Rumen Bachev, Tsvetan Georgiev: On the distance of KR Aurigae

15:30-15:45 Peter Duchlev, Joanna Kokotanekova, Kostadinka Koleva, Momchil Dechev, Pawel Rudawy, Bogdan Rompolt: Kinematics of the post-eruptive phase of an eruptive prominence on 8 May 1979

15:45-16:00 Kostadinka Koleva, Peter Duchlev, Momchil Dechev: H-alpha brightness evolution during the eruption of promonences of 7 May 1979 and 8 June 1980

16:00-16:15 Stojan Obradović, Slobodan Ninković: Metaphysical ideas in physical and astronomical theories

16:15-16:30 Milan S. Dimitrijević, Magdalena Christova, Zoran Simić, Sylvie Sahal-Bréchot : On the regularities of Stark broadening parameters within spectral series: Ar I lines

16:30-16:45 Žarko Mijajlović, Nadežda Pejović, Goran Damljanović, Dušan Ćirić: Envelopes of comet trajectories

09. May Friday

09:30 Excursion to the rests of the roman town Viminacium

10. May Saturday

Chairman Luka Č. Popović

9:30-10:00 **Jan Vondrak:** Geophysical contributions in precession-nutation

10:00-10:30 **Andjelka Kovačević:** Some aspects of asteroid mass determination

10:30-11:00 **Georgi Petrov**, Momchil Dechev, Lyuba Slavcheva, Peter Duchlev, Boyko Mihov, V. Kopchev, Rumen Bachev: Astronomical virtual observatory; Bulgarian virtual observatory - place and role.

11:00-11:15 Katya Tsvetkova: Wide-field plate database and present exploitation of the archival plates

11:15-11:30 Katya Tsvetkova, Milcho Tsvetkov, Vojislava Protić-Benišek, Milan S. Dimitrijević: Bulgarian-Serbian collaboration in the astronomical wide-field plate archiving

11:30-12:00 Coffee break

Chairwoman Katya Tsvetkova

12:00-12:30 **Vlado Milićević**: Milankovic's "the end of the world"

12:30-13:00 **Valeri Golev**, Nadia Kaltcheva, Evgeni Ovcharov, M. Kontizas: Massive cluster candidates in M33: a multitelescope view

13:00-13:15 Žarko Mijajlović, Aleksandar Valjarević, Nadežda Pejović, Aleksandar Simonović: Astroclimatic conditions on the mountain Vidojevica

13:15-13:30 Veljko A. Vujičić: The contribution to the theory of celestial mechanics - on the problems of two and three bodies.

13:30—15:00 Break for the lunch

Chairman Jan Vondrak

15 :00-15 :15 Luka Č. Popović: Spectroscopical investigations of extragalactic objects at Astronomical Observatory (period 2006-2008).

15:15-15:30 Milan S. Dimitrijević: Investigations on Belgrade Observatory of the influence of collisional processes on astrophysical plasma spectra in 2006-2008.

15:30-15:45 Aytap Sezer: Optical imaging and spectroscopic observation of some galactic supernova remnants

15:45-16:00 Yavor Chapanov, Tsvetan Darakchiev: Latitude variations for the period 1987.5-2008.3 at observatory Plana and their interpretation

16:00-16:15 Jelena Kovačević, Luka Č. Popović, Milan S. Dimitrijević: The role of optical Fe II transitions from 4f, 6s and 4g energy levels in AGN spectra

16:15-16:30 Orlin Stanchev: Fundamental plane for dwarf and normal spiral galaxies"

16:30-16:45 Coffee break

16:45-18:00 Poster session

20:00 CONFERENCE DINNER

11. May Sunday

Chairman Georgi Ivanov

11:00-11:30 **Philippe Prugniel**, Luka Č. Popović et al.: Stellar populations in active galaxies

11:30-12:00 **Andrey N. Klyucharev,** Mikhail Yu Zakharov, A. A. Matveev, Anatolij A. Mihajlov, Ljubinko Ignjatović, Milan S. Dimitrijević : Chemiionization – Experiment, Theory, Cosmical perspective

12:00-12:30 **Dušan Ćirić**: Foundation of physics on topological spaces

12:30-12:45 Aleksandr Sergeev, Tatyana Sergeeva: The Golosiiv plate archive creation as an element of Ukrainian virtual observatory. First steps

12:45-13:00 Aleksandr Sergeev: New trends in Astrometry: Inteligent systems instead automatic measuring machines

13:00 Closing ceremony

POSTER PAPERS

Yu. K. Anan'evskaya, V. N. Frolov, Evgeni V. Polyakov, Milcho L. Tsvetkov: Processing and measuring of open cluster photo images with Pulkovo automatic machine „Fantasy"

Vladimir Benišek: CCD photometry of asteroids from Belgrade Astronomical Observatory

Rumen Bogdanovski, Renada Konstantinova-Antova: Photoelectric study of the flare activity of AD Leo

Edi Bon, Nataša Gavrilović, Luka Č. Popović, Dragana Ilić: Modeling of AGN broad emission lines

Edi Bon, Milan Ćirković: Coherent catastrophism through myth

Ani Borisova, Damyan Kalaglarski, Milcho Tsvetkov: Archival photographic observations in the Pleiades Field: An on-line access to the Pleiades Plate Database and analysis of the plate data

Zorica Cvetković, Rade Pavlović, A. Strigachev, Bojan Novaković: CCD measurements of double and multiple stars at NAO Rozhen

Goran Damljanović, Nadežda Pejović: Classical observations of latitude and the improved reference frame

Milan S. Dimitrijević, Zoran Simić, Andjelka Kovačević, Miodrag Dačić, Sylvie Sahal-Bréchot: Stark broadening of neutral Tellurium spectral lines in white dwarf atmospheres

Gojko Djurašević, Ištvan Vince, Olga Atanacković: Photometric study of RY Scuti

Nataša Gavrilović: Modelling the stellar population in active galaxies

Dragana Ilić, Dejan Urošević, Bojan Arbutina, Branislav Vukotić, Konstantin Stavrev: Observations of M81 galaxy group in narrow band SII and Hα filters

A Knebe, N. Draganova, C. Power, G. Yepes, Y. Hoffman, S. Gottlober, B. Gibson: On the relation between radial alignment of dark matter subhalos and host mass in cosmological simulations

N. Koleva, Todor Veltchev, Petko Nedialkov, Blue-to-red stars ratio in stellar complexes and associations in M33 galaxy

M. Kontizas, Grigor Nikolov, A. Dapergolas, E. Kontizas, Valery Golev, I. Bellas-Velidis: The distortions in density profiles of star clusters of the Magellanic Clouds and their relation to their structural parameters.

Vladimir V. Mikhalchuk: Influence of the phase of the spherical planet on the position of its photocenter"

Slobodan Ninković, Aleksandar Valjarević: Treating surface brightness profiles in the fields of globular clusters

Evgeni Ovcharov, Antonia Valcheva, V. Ivanov, Petko Nedialkov, Tsvetan Georgiev, Ivaylo Stanev: Long-term optical monitoring of the quasar FBQSJ0754+3033

Nadežda Pejović, Aleksandar Valjarević, Žarko Mijajlović, Dušan Ćirić: Astronomy in the Toplica region

D. Petkova, Petko Nedialkov, Vladimir Shkodrov: The physical characteristics of stars harboring planets

Georgi Petrov: Bulgarian virtual observatory. Multicolor observations of Box /Peanut galaxies

Georgi Petrov, V. Kopchev: Bulgarian virtual observatory; Multicolor observations of open clusters in our Galaxy

Georgi Petrov, IvankaYankulova, Valery Golev: Unabsorbed Sy2 Galaxies with and without hidden AGN source

Saša Simić, Luka Č. Popović: Influence of barrier form on the shape of the GRB light curve pulses

Zoran Simić, Milan S. Dimitrijević, Andjelka Kovačević, Miodrag Dačić: On the Stark broadening of Cr II $3d^5 - 3d^4$ p spectral lines in hot star spectra

Luba Slavcheva-Mihova, Boyko Mihov: A search for new structural components in Seyfert galaxies

Luba Slavcheva-Mihova, Bojko Mihov, Georgi Petrov, Michel Dennefeld: Active galactic nuclei: relations between nuclear activity, star formation and bulge masses.

Stevo Šegan, Dušan Marčeta: Ephemeris calculations concepts: Conventions and practice in the planet's physical ephemerides calculations

Stevo Šegan, Sonja Vidojević: General algoritm for the data processing: Phase I: Acquisition, preprocessing and correlation analysis; Phase II: Statistical dependences and regression analysis

Aleksandar S. Tomić: Direct determination of Solar physical coordinates B_0, P from photoheliograms

Katya Tsvetkova, Milcho Tsvetkov, Tatyana Sergeeva, Alexandr Sergeev: Wide-Field Plate Database: Included Ukrainian Plate Catalogues

Antonia Valcheva, Evgeni Ovcharov, Petko Nedialkov, Tsvetan Georgiev, A. Kostov, Y. Nikolov: A Search for Novae in M31 with the telescopes of NAO Rozhen

Luba Vassileva, Petko Nedialkov, Todor Veltchev: Young stellar groups in M33 galaxy: delineation and main parameters

Todor Veltchev, R. S. Klessen, P. Clark: Toward a model of the stellar initial mass function (IMF) from density distribution of molecular cloud clumps.

Krasimira Yankova: Stability and evolution of magnetic accretion disk

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