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XVI NATIONAL CONFERENCE OF ASTRONOMERS OF SERBIA
Belgrade, 10-12 October 2011

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Invited Review

MAGNETISM IN MASSIVE STARS

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Stars with mass more than 8 solar masses end their lives as neutron stars, which we mostly observe as highly magnetized objects. Where does this magnetic field come from? Such a field could be formed during the collapse, or is a (modified) remnant of a fossil field since the birth of the star, or otherwise generated by a dynamo during its lifetime in the pre-collapse stages. The answer is unknown, but traditionally magnetic massive stars should not exist since they don't have a convective layer such as the Sun. In the last decade, however, a number of magnetic massive stars have been found, which likely possess a stable field from their birth, and indirect evidence is accumulating that localized fields can indeed be generated during the main-sequence lifetime and beyond. These observational facts opened a new field of research, which is the topic of this review.

Among the indirect evidence is a large range of observational phenomena among O and B stars that cannot be explained without the presence of surface magnetic fields. These phenomena include photospheric turbulence, wind clumping, cyclic wind variability observed in UV lines, other types of wind variability in particular in H-alpha, specific pulsation behavior, anomalous X-ray emission, and non-thermal emission in the radio region. A summary of the properties of observed magnetic massive OB stars will be given. In the light of the above, the role of magnetic fields in massive stars will be discussed, including how to identify new magnetic candidates.

Invited Review

ASTROPHYSICAL SPECTROSCOPY AND INTERFEROMETRY

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Almost all the instruments currently installed or planned at large optical interferometers include a spectrograph and analyse the high angular information in different spectral channels. This presentation focusses in the situations in which cross analysis of the interferometric information recorded simultaneously in different spectral channels yields intrinsically more information than the simple sequential analysis in narrow bands. The field of application of these so-called differential measures is very broad. It is decisive in the study of circumstellar envelopes of any kinds, from young stars with protoplanetary disks to evolved stars with high mass loss rates, where the continuum source (the star) is used as a reference to analyse the structure in spectral lines. In multiple systems, it allows reaching dynamics wich cannot be achieved by interferometry alone and offers the perspective to detect and characterize exoplanets. For the study of stellar surfaces, it allows to obtain very high accuracy stellar parameters with interferometers which are intrinsically relatively poorly calibrated. The most extreme and exciting information is that it allows to go beyond the standard limits of angular or spectral resolution. It is expected to allow mapping images of spotted stars or non radial pulsations on targets far too small to be resolved by the interferometer in the classical way.

Invited Lecture

SEARCHING FOR WEAK SOLAR MAGNETIC FIELDS. WHAT CAN WE LEARN FROM THE HANLE EFFECT?

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The Hanle effect is detected as a modification of the linear polarization observed in solar lines formed by scattering of photons. It may be used as a diagnostic tool for the investigation of weak magnetic fields in the solar atmosphere, when the Zeeman effect is hardly observable. In particular, it gives access to weak mixed polarity fields in the quiet Sun and to chromospheric magnetic fields.

I will present how these investigations have changed our vision of the solar magnetism and discuss future research directions, in the context of solar polarimetry projects with ground based or space based intruments.

Talk

POLARIZATION IN EMISSION LINES OF MOVING PROMINENCES

Milić I.[1], Faurobert M.

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We compute polarization of radiation emitted by a moving prominence. Prominence is modeled as vertical 1D slab illuminated on the sides by polarized Solar radiation. Prominence has macroscopic velocity, causing Doppler shift of illuminating radiation in Prominence rest frame. We investigate sensitivity of outgoing polarization on that velocity and discuss diagnostic potential for determining macroscopic velocities of erupting prominence and similar structures in solar atmosphere.

Invited Lecture

THE CURIOUS CASE OF THE MN I 539.5 NM LINE IN THE SOLAR SPECTRUM: RECENT DEVELOPMENT

Vince I., Danilović S., Vitas N.

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Long-term synoptic observations in the line in the solar spectrum indicate that this line shows a significant temporal variability in correlation with solar activity. That variability, unusual for a weak photospheric line, is present both in the observations with the solar spectrograph at Belgrade Astronomical Observatory and with the McMath-Pierce telescope at Kitt Peak Observatory. The problem of MnI 539.5 nm kept challenging our understanding of the spectral line formation in the solar photosphere for nearly thirty years. However, two recent studies explained the physical background of the MnI 539.5 nm variability and demonstrated how this variability can be modeled to match the observations. Here we review these new results as well as their implications.

Talk

SPECTRAL LINE CHARACTERISTICS IN THE SN IV SPECTRUM

Burger M.[1], Skočić M., Gavrilov M., Bukvić S., Djeniže S.

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The prominent SN IV spectral lines characteristics (line width and shift) have been investigated in the pulsed helium discharge. The Stark broadening mechanism was found to be dominant at the electron density about 10^{23} m^{-3} and electron temperature around 20 000 K.

Talk

BEHAVIOR OF THE 398.4 NM HG II SPECTRAL LINE IN THE HELIUM AND ARGON PLASMAS

Skočić M.[1], Burger M., Gavrilov M., Bukvić S., Djeniže S.

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The astrophysically important 398.4 nm Hg II spectral line was investigated in the laboratory helium and argon plasmas. The mercury atoms were sputtered from the amalgamated gold cylindrical plates located in the homogenous part of the pulsed discharge. We have found that strong intensity of the 398.4 nm Hg II line is due to excessively high density of the helium metastable atoms.

Talk

ON THE USE OF ITERATION FACTORS TO SOLVE SELECTED RADIATIVE TRANSFER PROBLEMS

Kuzmanovska-Barandovska O., Atanacković O.[1]

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In this paper we summarize the principles of the use of iteration factors in the solution of some selected NLTE radiative problems. We also describe our recent progress concerning the solution of the NLTE line transfer problem.

Talk

RADIO-INTERFEROMETARSKI NIZ (SCMA)

Zeković V., Šegan S.[1]

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Predstavljeno je moguće rešenje realizacije radio-interferometarskog niza SCMA (Serbian Centimeter/Millimeter Array), kao dela projekta za unapredjenje visokog obrazovanja i naučno istraživačkog rada, finansiranog iz fondova Evropske unije (IPA - Instrumenti za predpristupnu pomoc), čiji je nosilac "Univerzitet u Beogradu".

SCMA predstavlja radio-interferometarski niz eksperimentalnog i istraživačkog tipa, sa specifičnim ciljem kontinuiranog praćenja generalisane (ciklične) aktivnosti Sunca, detekcije i lokalizacije visoko-energetskih procesa sa velikom uglovno-spektralno-vremenskom rezolucijom u opsegu centimetarskih i milimetarskih talasa (1-50 GHz), uz paralelni razvoj i primenu inženjerskih metoda zasnovanih na tehnologiji savremenih radio-komunikacionih i telemetrijskih sistema sa niskošumnom elektronikom, sistema akvizicije i digitalne obrade signala, optičkih komunikacija i mašinskih konstruktivnih elemenata antena i prijemnika po sistemu aktuatora i mikro-žiroskopa visoke preciznosti.
Predvidjene su dve konfiguracije niza, dugobazična (proširena) sa maksimalnom rezolucijom ~0.004" za posmatranja netermalnih izvora zračenja na kosmičkoj skali, i kompaktna konfiguracija visoke osetljivosti i niže rezolucije ~1" namenjena $(R^2)xR$ snimanju izvora radio zračenja termalnog i netermalnog porekla u kontinuumu, kao i detekciji linija.

Očekuje se da iniciranje ovakvog pionirskog projekta da ogroman doprinos razvoju kako posmatračke (direktno), tako i teorijske (indirektno) radio-astronomije u Srbiji. Poseban doprinos se ogleda u uključivanju studenata i mladih istrazivača u realizaciju samog projekta, čime se otvara mogućnost postizanja potpune koherencije nastavnog i istraživačkog rada.

Poster

WHAT IS WRONG WITH THE TELLURIC LINE P21 OF THE (1,0) B SPECTRAL BAND?

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The equivalent width of the telluric spectral line with rotational quantum number J=21 shows large discrepancy between observation and theory. The measured equivalent width both component of this spectral line is significantly larger in comparison to the theoretical prediction. We examined the spectral features in the vicinity of the profile of these components and concluded that the measured higher equivalent width of the blue component is due to a small, unidentified line (at 692.305 nm) in its far blue wing and to the blends of water vapor and oxygen molecular lines (formed from nuclei of minor oxygen isotope) situated under its profile. The major disturber of the red component is a relatively strong water vapor line in its red wing. Besides, the local continuum of the spectrum is crowded with spectral features that make the determination of continuum level imprecise.

Poster

COMPRESSED HYDROGEN ATOM UNDER DEBYE SCREENING IN STRONG MAGNETIC FILED

Stevanović Lj.[1], Milojević D.

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Effect of high pressure and magnetic field on H atom in the atmosphere of magnetic white dwarfs is important subject in astrophysical investigations for understanding the physics of stellar interiors and diagnostic determination of astrophysical plasmas. The model of compressed H atom, centrally confined by impenetrable spherical box with proton-electron interaction given by Debye-Huckel potential, is the subject of this work. Energy levels of the model are obtained numerically solving the Schroedinger equation by Lagrange-mesh method and their variations with radius of the confining spherical box, screening parameter and magnetic field strength are discussed.

Poster

NUMERICAL CODE FOR FITTING RADIAL EMISSION PROFILE OF A SHELL SUPERNOVA REMNANT

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Expressions for a surface brightness distribution and for a flux density have been theoretically derived in the case of two simple models of a shell supernova remnant. The models are: a homogenous optically thin emitting shell with constant emissivity and a synchrotron shell source with radial magnetic field. IDL codes for fitting a theoretically derived emission profiles assuming these two models to mean profiles of shell supernova remnants obtained from radio observations have been written.

II INSTRUMENT ROBOTIZATION AND ASTROINFORMATICS

Talk

THE BELISSIMA PROJECT

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In my short talk I will present work of the BELISSIMA (BELgrade Initiative for Space Science, Instrumentation and Modelling in Astrophysics) project.

Talk

THE ASTRONOMICAL STATION VIDOJEVICA: THE 60CM TELESCOPE

Vince O., Jurković M.

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We present the 60cm telescope at the Astronomical Station Vidojevica. The telescope was mounted in November 2010 and has been in function since March 2011. The telescope is currently in a testing phase. The main instrumental characteristics and problems that we have encountered during this phase will be discussed in detail. Various observations were performed and will be described in the presentation.

Talk

ON A STELLAR SPECTROGRAPH FOR ASTRONOMICAL STATION AT VIDOJEVICA

Vince I., Vince O.

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Here we present the technical and optical characteristics of the SpectraPro-750 spectrograph made by Princeton Instruments focusing on its convenience for stellar radial velocity measurements with the current 60 cm telescope and with the planed 1.5 m class telescope at Astronomical Station at Vidojevica. We will describe how the optical link between the spectrograph and telescope has been solved. Finally we will discuss what we have learnt about practical spectral resolution from comparison our observed spectra with high resolution spectra.

Talk

ASTRONOMICAL STATION VIDOJEVICA: ASTRO-CLIMATE

Jovanović M., Stojanović M., Martinović N.

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Astronomical Station Vidojevica is located on Mt. Vidojevica near Prokuplje, Serbia. The equipment for measuring astro-meteorological conditions was installed in November 2010. The main characteristics of All-sky Camera, Weather Station and Seeing Monitor will be presented. Also, some preliminary results obtained using the instruments will be discussed. Our goal is to present the astro-meteorological characteristics of the site which will also be useful for the observations with the planned robotic telescope "Milankovic".

Talk

HARTMAN AND SHACK-HART METHODS FOR CONTROL OF OPTICAL SYSTEMS

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Many of the methods for control of optical instruments can yield good results if the problems of focusing are taken into account, and the limitations and idiosyncrasies of each method are understood.

The Hartmann Mask is a simple device consisting of a set of holes in an opaque lens cover. The out of focus images generated by each hole merge when the telescope is in focus. We can get away with a lot if our optical system has a slow focal ratio. On the other hand, fast optical systems and high-resolution digital sensors demand critical methods for good results.

In that case to most accurate method is Shack - Hartmann. It is dedicated to metrological control of optical parts, by measuring and computing the input wavefront. Nowadays, this method is used in the field of adaptive optics to measure in real time the wavefront distortions induced by the seeing (turbulence). Compared to the Hartmann method, this is a much more accurate method. Moreover, it can use fainter stars, because the Shack-Hartmann system uses the whole pupil, which is not the case using the Hartmann test, where the amount of holes is limited to some along one axis.

Talk

COSMIC NAVIGATION AND THE MOVEMENT OF A BODY OF VARIABLE MASS

Samardžija B.[1], Šegan S.

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We derived an equation of motion of bodies with variable mass in general case and by the example of rocket motion. Basic and some specific equations are given to describe such movement. To enable following such motion, we expose general performance of navigation, compared and opposed to astrodynamics and marine navigation, observing methods for determining the orbit and operating in the Universe and on the Earth and, also, pre-satellite and post-satellite cosmic navigation.

Talk

DUEL OR DUALITY: THE ASTRONOMICAL DATA MINING OR THE ASTRONOMICAL DATA PROCESSING? S. ŽIVOTIĆ VERSUS S. ŠEGAN

Životić S.[1], Šegan S.

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LEFT(Sanja): I have explored the application of data mining algorithms in the selected field of astronomy. Data mining, perhaps in a not so formal way, has always been important in astronomical research. With the help of modern software tools such as WEKA (Waikato Environment for Knowledge Analysis), I am able to put new techniques originating in computer science to test with the large amount of data available through astronomical observations. I aim to prove applicability of data mining techniques in solving real astronomical problems, and working with real astronomical data at the same level as it is done by ordinary or specialized astronomical tools and data processing.

RIGHT(Stevo): To investigate meanings of the real astronomical data and perform any important conclusion and improvement, mathematical and physical knowledge and tools are necessary. The rules for exploring them (data processing) are strictly defined in the frame of numerical and statistical analyses. This approach has proven possibilities and power.
Then, these will be considered against data mining in the presented case.
Results are compared.

Talk

NTP SERVERS: ASTRONOMICAL VERSUS CIVILIAN TIME AND TIMES SCALES

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It is well-known that accurate time has the profound importance for astronomical practice. The modern age demands the consistent time almost for all our technical gear. The mobility, the easy implementation and the relatively low cost of the Network Time Protocol (NTP) systems make an 'alternative' to atomic clocks in the past two decades. In this article we have explained some aspects of timekeeping and distribution of time in the modern INTERNET environment. As an effective example we have demonstrated a flexible C++ program module for the distance time sinchronization via INTERNET with a limited but achievable accuracy. The module is very usefull for amateurs and professionals, too.

Talk

AMBIENT TEMPERATURE CHANGES AND THE IMPACT TO TIME MEASUREMENT ERROR

Ogrizović V.[1], Gučević J., Delčev S.

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Measurements in Geodetic Astronomy are mainly outdoors and performed during a night, when the temperature often decreases very quickly. The time-keeping during a measuring session is provided by collecting UTC time ticks from a GPS receiver and transferring them to a laptop computer. An interrupt handler routine processes received UTC impulses in real-time and calculates the clock parameters. The characteristics of the computer quartz clock are influenced by temperature changes of the environment. We exposed the laptop to different environmental temperature conditions, and calculate the clock parameters for each environmental model. The results show that the laptop used for time-keeping in outdoor measurements should be kept in a stable temperature environment, at temperatures near 20°C.

Talk

NEW ASTRONOMICAL EQUIPMENT AND FACILITIES AT PETNICA SCIENCE CENTER

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New Astronomical Equipment and Facilities at Petnica Science Center are presented.

III STELLAR PHYSICS AND PHYSICS OF INTERSTELLAR MEDIUM

Invited Lecture

VARIABLE STARS IN THE MOA DATABASE

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The Microlensing Observations in Astrophysics (MOA), as a collaboration between astronomers and physicist in New Zealand and Japan, has generated a large volume of photometric data during its routine microlensing observations. Tens of millions of stars are monitored simultaneously every clear night and total amount of about 10 TB of new data per year have been accumulated. This paper shows review of the MOA project, including algorithm for the fast reduction procedure and search for new and unusual type of variable stars.

Talk

AN INTEGRAL VIEW OF SHOCKS

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Supernova remnants are laboratories for studying optical shocks. Shocks with velocities of a few hundred km/s (or more) produce two-component Ha lines: a narrow spike atop a broad base. The widths of these lines serve as thermometers for the pre- and post-shock ambient interstellar medium, the ratio of the line strengths is a diagnostic for plasma conditions in the shock, and the offset between the centroids of the lines indicate the geometry of the shocks away from edge-on viewing. Moreover, investigating in detail the shape of the Ha-line has the potential to provide observational constrains on cosmic ray (CR) acceleration.

Observing the north-western rim in the super nova remnant of SN1006 with the VIMOS-IFU spectrograph on the VLT, we show that such spectroscopic imaging techniques allow us to trace and distinguish multiple, projected shocks, and at the same time provide us in detail the Ha line profile at each position. By fitting these profiles, we extract maps of the broad and narrow line width, the broad-to-narrow line ratio, as well as velocity offsets between broad and narrow line centroids. We find that all four quantities vary as function of position along and perpendicular to the shock fronts, indicating changing geometry and plasma conditions, as well as presence of CRs. The detection of significant deviations from a (double) Gaussian Ha line profile further supports the presence and acceleration of CRs in SN1006.

Talk

ESTIMATION OF BRIGHTNESSES AND SPECTRAL INDICES OF RADIO LOOPS

Borka Jovanović V.

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We present a method for determination of brightnesses and spectral indices of radio-continuum loops which was developed for large Galactic radio loops and tested if it is also applicable for small supernova remnants (SNRs). In this method, we use contours and profiles of the brightness temperatures for each loop. The measurements at more frequencies are used. We calculated the mean brightness temperatures and surface brightnesses of the six main Galactic radio-continuum loops I-VI at the four frequencies: 1420, 820, 408 and 22 MHz. For small SNRs Monoceros, Cygnus and HB 21 we used some of these frequencies: 2720, 1420, 820, 408, 34.5 and 22 MHz. For calculating radio spectral indices, we used the spectra (mean brightness temperature versus frequency) between several frequencies, or *T-T* graphs method. For all radio-continuum loops the results confirm their non-thermal origin. Besides, the obtained results also show that our method which was developed for large radio loops is applicable to the small SNRs.

Talk

THE SEARCH FOR GALACTIC SUPERNOVA REMNANTS WITH FERMI-LAT

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The observations with Fermi LAT have unveiled the presence of the gamma-ray emission associated with supernova remnants interacting with molecular clouds. The search for supernova remnants 3C391, Kes 79, HB21, Kes27, CTB104a as well as an inspection of the region centered on the object OA 184 using the Fermi LAT observations were done.

Talk

INFINITY: A NEW PROGRAM FOR MODELING BINARY SYSTEMS

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INFINITY is a new program for modeling binary systems. The model is based on Roche geometry with asynchronous rotation, including an assortment of effects like gravity and limb darkening, mutual irradiation, bright and dark spots and so on. However, INFINITY brings innovations in the modeling of accretion disks, and introduces the modeling of radial and non-radial oscillations on one or both components of the system.

At this stage of development, INFINITY can produce light curves, spectra and radial velocity curves; solving the inverse problem is still a work in progress. In terms of programming, INFINITY is being developed in the object-oriented language C#, and great care is taken to produce readable, easily extensible and verifiable code. INFINITY is fully optimized to take advantage of modern multi-core CPUs, and the code is thoroughly covered with unit-tests. We expect to make a public release during 2012.

Invited Lecture

PERPECTIVE OF THE INTERFEROMETRIC MATISSE INSTRUMENT AT THE VLTI

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MATISSE is a mid-infrared interferometric instrument that will operate at the VLTI in 2015 as one of the second generation instruments. One of the science case is to contribute to a better understanding of the conditions under which the planets form and evolve. Our approach consists in investigating through observation, theory and modeling the physics of proto-planetary disks by taking advantage of this new scheduled observing tool : MATISSE, that we are developing and have optimized for this scientific objective. Despite the recent advances in the observations of protoplanetary disks and in their interpretation, open questions remain in relation with the physical initial conditions giving birth to planets. The current infrared interferometers MIDI and AMBER are already used for such observations, and soon the improved spectral and imaging capabilities of the future MATISSE instrument will provide a new insight on the disc inner regions, revealing information and details about for instance the fine structures predicted by models in disks and in their inner regions (shape and size of the inner rim, curvature of the inner rim, truncature of the disk). I will present, the principle, the expected performances and the status of the MATISSE project and will give some illustrations of what kind of astrophysics is expected to be achieved.

Talk

BEHAVIOR OF GRAVITO-MHD WAVES AT SOLAR PHOTOSPHERE-CORONA BOUNDARY

Čadež V.[1], Jovanović G.

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We study the effect of the boundary separating the solar interior from the corona on transmission of wave energy with possible application to the coronal heating.

Talk

FUTURE STAR FORMATION DYNAMICS REVISITED

Ćirković M.

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The duration of the current stelliferous era is re-examined in the context of our improved understanding of global star formation in disk galaxies. Important constraints come from the controversial existence of star-formation thresholds, recycling, so-called Schmidt's law, and the past star formation history. The question to what extent global infall could influence the duration of the stelliferous era is addressed. Additional mechanisms of non-conventional star formation, such as constructive brown dwarf collisions and cumulative brown dwarf accretion are briefly considered.

Talk

NEW Σ-D RELATION FOR GALACTIC SUPERNOVA REMNANTS

Pavlović M.[1], Urošević D., Vukotić B.

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In this paper we obtained new empirical Σ-D relation for supernova remnants in our Galaxy. New calibration sample was created using Green's catalog of Galactic supernova remnants, version from 2009. with updated distances. Orthogonal fitting procedure was applied for determination of the empirical Σ-D relation. Using the orthogonal fitting procedure, the Σ-D slope $\beta \approx 5.0$ was obtained for the sample of 50 Galactic SNRs. New relation was used for estimating SNRs distances in Galaxy. Distance scale for Galactic SNRs was significantly changed.

IV STELLAR AND GALACTIC SYSTEMS

HIGHLIGHTS OF THE R.M.ALLER ASTRONOMICAL OBSERVATORY RESEARCH ON DOUBLE AND MULTIPLE STARS

Docobo J.A.

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Ramon Maria Aller, the founder of the Astronomical Observatory of the University of Santiago de Compostela (Galicia, Spain) was the first to introduce the study of double stars in Spain. Since then, this topic is the main line of investigation in this academic center.

In this talk, I will illustrate the more important results in the last decades working in the field of double and multiple stars: Docobo's method for calculating double stars orbits, the analytic study of perturbations in triple systems, the two-body problem with low mass-loss, a methodology to study binaries with spectroscopic subcomponents, the possible discovery of a giant exoplanet in the Gliese 22 triple system of red dwarfs, the dynamics of exoplanets and exosatellites as guests in double stars, etc.

The modern instrumentation, especially the EMCCD camera for speckle interferometry will also be discussed.

ON THE KINEMATICS OF STARS FROM THE SOLAR NEIGHBOURHOOD – HALO CASE

Ninković S.[1], Cvetković Z., Stojanović M.

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The kinematics of stars from the Solar neighbourhood which belong to the halo is modelled following a particular Gaussian distribution of their random velocities. As the mean motion of the halo a weak rotation is admitted. Assuming a given value for the galactocentric speed of Local Standard of Rest (LSR) it is possible to model the same halo sample in its motion with respect to LSR. Here one has five parameters: three velocity dispersions, rotation speed and LSR speed. Varying these parameters the authors find the fraction of halo stars occupying a given volume in the velocity subspace centerd on the LSR. Given volumes in the velocity subspace are organized in the following way: a sphere of a sufficiently small radius around LSR, an internal envelope with finite outer radius and an outer envelope with infinitely large outer radius. Small volumes are of special interest since halo stars are usually thought to move around the Milky Way centre in a way quite different from the circular motion. We find that the fraction of halo stars inside a small sphere surrounding LSR in the velocity subspace is generally under 5%. Here the velocity dispersions in different directions are the most influential parameters. However, their ratios and the value of, say, the largest one are subject to rather strong constraints which are due to some well-known facts of Galactic astronomy.

FIRST VISUAL MEASUREMENTS OF DOUBLE STAR AT VIDOJEVICA

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On the basis of the first frames obtained by using CCD camera SBIG ST10ME attached on the 60 cm telescope at Vidojevica, we communicate the measurements and the parameters of the limiting possibilities of the telescope and conditions.

Poster

THE JEANS MODELING OF THE MILKY WAY GALAXY

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We use the measurements of the radial velocities of the blue horizontal branch (BHB) halo stars in the Milky Way to test the predictions of Newtonian gravity and to also extend our study to different MOND models, taking orbital anisotropies that we calculate into account. We use the halo stars of the Galaxy as a tracer of the Galaxy's gravitational potential. The Jeans equation was calculated for both the Newtonian and the MOND approaches assuming spherical symmetry.

We solved the Jeans equation in spherical approximation and confirm that the Newtonian model without dark matter cannot fit the observed velocity dispersion profile and that the truncated flat model with dark matter can provide a good fit to the observed velocity dispersion. For the MOND models, from the Jeans modeling and the models of the circular velocity curves, we found that the "simple" (Famaey & Binney, 2005, MNRAS, 363, 603) and Zhao (2007, ApJ, 671, L1) models can provide a fit without significant anisotropies, whereas two other tested models, the "standard" (Sanders & McGaugh, 2002, ARAA, 40, 263) and "toy" (Bekenstein, 2002, Phys. Rev. D., 70, 083509) models, need various anisotropies to obtain a fit to the data.

V   ASTROMETRY, DYNAMICAL ASTRONOMY AND PLANETOLOGY

Invited Lecture

VERITAS ASTEROID FAMILY STILL HOLDS SECRETS?

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Veritas asteroid family has been studied for about two decades. These studies have revealed many secrets, and a respectable knowledge about this family had been collected. Here I will present many of these results and review the current knowledge about the family. However, despite being extensively studied, Veritas family is still a mystery. This will be illustrated through the presentation of the most interesting open problems. Was there a secondary collision within this family? Does asteroid (490) Veritas belong to the family named after it? How large was the parent body of the family? Finally, some possible directions for future studies that aims to address these questions will be discussed.

Talk

ATTRIBUTION OF SURVEY OBSERVATIONS TO KNOWN SOLAR SYSTEM OBJECTS

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Already known solar system bodies, mostly asteroids, are unavoidably observed when a survey collects data from a large portion of the sky. It is thus essential to separate the observations belonging to these bodies from the rest. The *attribution problem* is a special case of the more general class of *identification problems*, pertaining to the situation in which a set of observations have been assigned to an object resulting in a least squares orbit, while the others are not enough for this purpose, but still need to be assigned if possible. The present paper deals with a strongly asymmetric case when an asteroid has a well constrained orbit, while the additional data to be attributed are just a few, typically a single *tracklet*, that is a very short arc of astrometric observations assembled by the observer.

We will first briefly describe the attribution algorithm consisting in three filters and introduce the quality control metrics. Next, we discuss the tuning of the control parameters in such an asymmetric attribution in view of the presence of strong biases in the astrometric residuals. Main biases arise from the stellar catalogs used in reduction of asteroid observations, and a simple debiasing with a measured regional biases of the catalogs can significantly improve the results.

A recursive attribution procedure proposed in this paper has been extensively tested with historic and with state of the art survey data (Pan-STARRS 1, PS1). Although the 2MASS star catalog, considered to be least biased of the currently available large star catalogs, was used for the data reduction, significant biases were still found in the data. The most significant turned out to be the dependence of Right Ascension residual bias upon Right Ascension. Still, the biases are in general small (up to 0.1 arcsec) and become relevant only when the observations reach the level of accuracy made possible by instruments like PS1.

Talk

ASTROMETRIC POSITIONS OF ICRF2 RADIO SOURCES WITH DIFFERENT REFERENCE CATALOGUES

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The fundamental celestial reference frame (the International Celestial Reference Frame - ICRF) was adopted by the IAU in 1997, with its original list of radio objects and two extensions (ICRF-ext1 and ICRF-ext2). All in all, there were 717 sources: 212 defining ones, 109 new ones, 294 candidate ones, and 102 additional sources. The second realization of the ICRF (the ICRF2 with 3414 compact radio astronomical sources) was presented at the 27th General Assembly of IAU in 2009 by using nearly 30 years of Very Long Baseline Interferometry (VLBI) observations. We made the observations of some extragalactic radio sources (from the ICRF2 list) by using the 2m RCC telescope (with the focal length of 16m) of Rozhen National Astronomical Observatory (Bulgarian Academy of Sciences). About 30 frames were observed by using CCD camera VersArray 1300B (1340x1300 pixels, the pixel size is 20x20 micrometers, one pixel is 0.258 arcsec) at the end of March 2011. The goal is to make comparison between the measured optical positions and the radio positions of sources from the current ICRF2 list. Some results are presented here.

Talk

SOME HEURISTICS IN DETERMINATION OF PROXIMITIES OF CONFOCAL ELLIPTICAL ORBITS

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We describe several methods for determination of proximities of confocal elliptical orbits and their application on analysis of proximities between orbits in asteroid belt. Also, we apply these methods on simulated pairs of orbits in order to emphasize advantages and disadvantages of each method and to determine the magnitude and type of influence of different orbital elements on the distant function and number of proximities between these orbits.

Talk

FAMILIES AMONG HIGH-INCLINATION ASTEROIDS

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We present a new classification of families identified among the population of high-inclination asteroids. We computed synthetic proper elements for a sample of 18,560 numbered and multi-opposition objects having sine of proper inclination greater than 0.295. We considered three zones at different heliocentric distances (inner, intermediate and outer region) and used the standard approach based on the Hierarchical Clustering Method (HCM) to identify families in each zone. In doing so, we used slightly different approach with respect to previously published methodologies, to achieve a more reliable and robust classification. We also used available SDSS color data to improve membership and identify likely family interlopers. We found a total of 38 families, as well as a significant number of clumps and clusters deserving further investigation.

Talk

REALISATION OF ETRF2000 AS A NEW TERRESTRIAL REFERENCE FRAME IN REPUBLIC OF SERBIA

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The International Earth Rotation and Reference Systems Service (IERS) is a joint service of the International Association of Geodesy (IAG) and the International Astronomical Union (IAU), which provides the scientific community with the means for computing the transformation from the International Celestial Reference System (ICRS) to the International Terrestrial Reference System (ITRS). It further maintains the realization of these systems by appropriate coordinate sets called "frames". The densification of terrestrial frame usually serves as official frame for positioning and navigation tasks within the territory of particular country. One of these densifications was recently performed in order to establish new reference frame for Republic of Serbia. The paper describes related activities resulting in ETRF2000 as a new Serbian terrestrial reference frame.

DYNAMICS OF A 4-D STEEP SYMPLECTIC MAP

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Providing effective stability estimates in the solar system has been an intriguing task since many years, decades and even centuries. Significant progress on this issue enabled the Hamiltonian perturbation theory with its two theorems: KAM and the Nekhoroshev theorem. The Nekhoroshev theorem (1977) refers to nearly integrable Hamiltonian systems whose integrable approximation satisfies a mathematical condition called steepness. The main source of the instabilities in the system is usually generated by the perturbing parameter. Nekhoroshev conjectured that besides the perturbation, steepness also affects the stability of the system in the sense that stronger steepness should imply longer stability times.

Using numerical tools developed in the last decade, we observe the dynamics in a 4-D steep symplectic map that contains two parameters: the perturbation parameter ε and the parameter of steepness m. We observe the changes in the dynamics for different values of the steepness parameter m. The goal of this research is to confirm numerically the theoretical expectations on the stabilizing effect of steepness, in accordance with the Nekhoroshev theorem.

Poster

KOREKCIJA DINAMICKI GENERISANIH KOORDINATA SUNCA PRIMENOM HARMONIJSKE ANALIZE

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Unapredjenje tehničkih mogućnosti astronomskih instrumenata u smislu poboljšanja njihove preciznosti, koherentno sa razvojem tehnologije izrade samih detektora iziskuje efikasnija i jednostavnija rešenja samog sistema pozicioniranja instrumenta. Predstavljena je popravka vremenski zavisne greške programski generisanih koordinata Sunca u odnosu na referentne koordinate JPL-a (Jet Propulsion Laboratory), razvoj i primena programa za dinamičko generisanje koordinata Sunca (u realnom vremenu) bez potrebe za komunikacijom sa bazom podataka, u cilju postizanja visokog stepena integracije redukcijom hardvera i softvera.

Osnovu analize čini Furijeova transformacija vremenski zavisne funkcije greške. U cilju preciznog odredjivanja i interpretacije spektralnih komponenti korišćene su tehnike filtriranja i korelacije (digitalna obrada signala), wavelet analiza, kao i metode numeričke i statisticke obrade podataka.

Kao rezultat, razvijen je program (SOLAR APS) za brzo i precizno generisanje koordinata Sunca bez potrebe eksterne komunikacije. Uspostavljena je potpuna kontrola greške koordinata u smislu ispunjenja zahteva za unapred zadatom preciznošću.

Primena celokupne analize ogleda se u dizajnu sistema pozicioniranja instrumenta (radio teleskopa) na bazi mikrokontrolera serije PIC18Fxxx, čime je postignuta potpuna autonomnost sistema i u okvirima samo jednog čipa integrisan niz hardverskih i softverskih komponenti.

Poster

LAUNCHING SATELLITE, ORBITAL TRANSFERS AND SATELLITE ORBIT CHANGING

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This work contains parameters for launching ZVS and interplanetary stations with particular reference to Hofmann transfers and conditions for orbit changing, no matter whether it is performed on purpose within the system of Earth-satellite, or as a preparation to abandon that system. Specific nomograms for orbit changing and equations to generate them are given.

Poster

SOME ASPECTS OF ARTIFICIAL BODIES ORIENTATION AND STABILIZATION

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To increase energy resources, and thus the overall possibility of modern cosmic aircrafts, power supply was expanded by adding the (moving) wing area and antenna with complex orientation and design. It is evident that, when there is a need to conduct a very accurate account of orbital elements of satellites, all this is a nightmare for experts and scientists. In this paper we give special attention to the system of stabilization and orientation of satellites, as well as to the importance of gyroscopic effects and the navigation systems of artificial celestial bodies. Development of modified practical solutions based on knowledge and experience with gyroscopic effects is immeasurable.

Poster

PROXIMITY CALCULATION AND STATISTICS OF ORBITS ELEMENTS

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The paper discusses the analytical expression for the number and type of proximities of asteroids and statistics for correlation values of individual elements and number of critical points of elliptical orbits of all possible pairs of the selected set of asteroids. Shows that the extreme values of critical points cannot be found in such groups.

Poster

KEPLER'S EQUATION AND CHAOS THEORY

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It is possible to solve Kepler's equation by iterative method, for eccentricity within interval of (0,1).However, when eccentricity is out of these boundaries the iterative process doesn't converge. This poster will present the behavior of Kepler's equation in real and complex plane.

Poster

MASSES OF (4) VESTA AND (11) PARTHENOPE SIMULTANEOUSLY DERIVED FROM OBSERVATIONS OF (17) THETIS

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Using close encounters of (17) Thetis with (4) Vesta (on 1996 June 16) and (11) Parthenope (on 1997 January 3), the masses of (4) Vesta and (11) Parthenope are determined. This determination is performed simultaneously, by means of a postencounter orbit of (17) Thetis and fitting its preencounter observations, having in mind gravitational influences of perturbers (4) Vesta and (11) Parthenope. Obtained values are: $(1.302 \pm 0.002)\cdot 10^{-10} M_{sun}$ for the mass of (4) Vesta and $(2.30 \pm 0.07)\cdot 10^{-12} M_{sun}$ for the mass of (11) Parthenope.

Poster

OBSERVATIONS OF STARS WITH HIGH-PROPER MOTIONS AT THE AXIAL MERIDIAN CIRCLE OF THE NIKOLAEV OBSERVATORY

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The Axial Meridian Circle (AMC) of the Nikolaev observatory carry out regular CCD-observations of the stars in ecliptical zone in drift scan mode since 2003 year. AMC (diameter D=180 mm, focal length F=2480 mm) is equipped by CCD-camera with matrix of size 1040 x 1160 pixels. The motivations for this project was investigations of high proper motion stars. All observational data over a period of time 2008- 2009 years were cross – matched with catalogues 2MASS, CMC14 and USNOA2.0 to find early epoch positions for our data. The cross-matching was on a 1 x 1 arcsec window and gave 98 % identifications. There is no enlargement of windows size whereas no photometric criteria used. Catalogues LSPM and compiled catalogue of stars with high proper motions by Ivanov G.A. (GAO NAS, Goloseevo) were used for search and identifications stars with high proper motions. There was about 500 stars with proper motions more than 150 mas/year. The cross-matching our samples of high proper motion stars with LSPM and PPMX catalogues shows no significant differences of the proper motions. Catalogues TYCHO2 and PPMX were used for estimating external accuracy our data. Cross-identification with PPMX gave about 55.4% identifications. Cross- matching with TYCHO2 catalogue gave about 10,000 common stars. The external accuracy obtained in result of intercomparison is 5 to 10 mas/year.

VI INTERDISCIPLINARY STUDIES (ASTROBIOLOGY, ASTROCHEMISTRY, GEOPHYSICS, ATMOSPHERIC PHYSICS, ASTRONAUTICS AND SPACE SCIENCE)

RETRIEVAL OF PHYSICAL PARAMETERS FROM HIGH-RESOLUTION SPECTROSCOPIC OBSERVATIONS OF THE SOLAR AND TERRESTRIAL ATMOSPHERE

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The atmospheres of the Earth and the Sun, of a planet and a star, show numerous differences. In the terrestrial atmosphere common temperatures are ~ 250 K, atoms are bound in molecules, different types of clouds are present. Contrary to that, at the temperatures of the solar photosphere (~ 6000 K), atoms are mainly free and many of them ionized. In addition to that, the overall dynamics is largely affected by local magnetic fields. However, space-borne instruments are used for global observations of both atmospheres and many problems of the remote sensing are strikingly similar. That is not surprising as the coupling of the atmospheric parameters and the emergent radiation observed by satellites is in both cases through the detailed radiative transfer phenomena that can be described using similar mathematical tools. I will first discuss some general aspects of the remote sensing and then show examples of the retrieval algorithms and their validation. I will particularly focus on the algorithms used with the solar satellite Hinode and those planned for the forthcoming Precursor Sentinel 5 mission.

ASTRONOMICAL RADIATION SOURCES AND THE ORIGIN OF ATMOSPHERIC OXYGEN OF THE EARLY EARTH: A SHORT REVIEW

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In this preliminary report, I explore a few astronomical radiation sources related to the origin of O_2 in the early Earth's atmosphere which have been overlooked in the previous studies.

The early Earth was probably subject to intense ionizing radiation accompanied the solar winds and flares and possibly from nearby nova (?)/supernova and events associated Gamma Ray Burst (GBR). Overall (direct or indirect) effect of this ionizing radiation on the atmospheric water (H_2O) vapour and/or carbon dioxide (CO_2), ocean water and water ice of the early Earth is shown in the following reactions

$$2H_2O \text{ (g)} + \text{ionizing radiation} \rightarrow H_2 \text{ (g)} + O_2 \text{ (g)}$$
$$2CO_2 \text{ (g)} + \text{ionizing radiation} \rightarrow 2CO\text{(g)} + O_2 \text{ (g)}$$
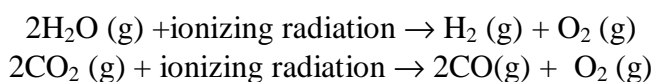
I suggest that each of the above sources of ionizing radiation and processes may have contributed (more or less) to the origin of O_2 in the atmosphere on the early Earth.

Talk

GALACTIC HABITABLE ZONE AND ASTROBIOLOGICAL COMPLEXITY

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In this thesis we study the astrobiological history of the Galactic habitable zone through the means of numerical modeling. First group of simulations are unidimensional (time-axis) toy modeling to examine the influence of global regulation mechanisms (gamma-ray bursts and supernovae) on temporal evolution of Galactic astrobiological complexity. It is shown that under the assumption of global regulation classical anti SETI arguments can be undermined. Second group simulations are more complex bidimensional probabilistic cellular automata models of the Galactic thin disk. They confirm the findings of the toy models and give some insights into the spatial clustering of astrobiological complexity. As a new emerging multidisciplinary science the basic concepts of astrobiology are poorly understood and although all the simulations present here do not include some basic physics (such as Galactic kinematics and dynamics), the input parameters are somewhat arbitrary and could use a future refinement (such as the boundaries of the Galactic habitable zone). This is the cause for low weight and high uncertainty in the output results of the simulations. However, the probabilistic cellular automata has shown as a highly adaptable modeling platform that can simulate various class of astrobiological models with great ease.

Talk

MODELOVANJE RASPODELE ORBITALNOG (SVEMIRSKOG) OTPADA

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U radu se daje detaljna slika nastanka svemirskog otpada, izdvaja segment koji ce biti razmatran i daju osnovne konvencije i jednacine. Preko pojednostavljene odredbe pojma orbitalnog otpada dolazi se do postupka i uslova modelovanja njegove raspodele i akumulacije kako na osnovi teorijskih razmatranja, tako i na osnovi nazemnih optickih i radarskih posmatranja. Dobijeno je opšte stanje svemirskog otpada u zoni niskoorbitnih satelita (visina manja od 2000 km) i ocenjen njegov znacaj za covekovo osvajanje kosmosa. Na kraju se daje klasifikacija satelitskog otpada sa stanovišta neposrednog porekla sa posebnim osvrtom na performanse i prakticne uslove njegovog uklanjanja.

Talk

HEXAGONAL LATTICE PCA OF THE MILKY WAY ASTROBIOLOGICAL COMPLEXITY

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In this short talk we compare the results of our previous rectagonal lattice 2D PCA simulations with the new results obtained from the same model on the hexagonal 2D PCA lattice. Bidimensional hexagonal lattice is more indicative of omnidirectional real world phenomena. However, its implementation requires more computational steps at the basic level of a PCA kernel resulting in more time-consuming computation. The resulting execution times are compared with the ones required in the rectangular lattice case. We discuss whether the hexagonal lattice can become a standard in our forthcoming code implementations.

Talk

STATISTICAL ANALYSIS OF D-REGION ELECTRON DENSITY DURING SOLAR FLARES FROM VLF RADIO MEASUREMENTS

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We analyze major effects in the Earth's upper atmosphere caused by the X-ray flux, during solar flares. VLF (Very Low Frequency) radio waves (3–30 kHz) typically propagate in the Earth-ionosphere waveguide, bounded above by the D region and below by the Earth's surface. By day, the propagation paths are largely stable in quiet conditions from dawn and dusk. VLF radio monitoring of the D-region has the advantage that it can be done continuously. However, when a solar flare occurs (on a sunlit path), the extra ionization generated by the X rays lowers the effective reflection height of the ionosphere and that depends on the intensity of the X-ray flux.

Observations of field strengths of signals from a number of VLF transmitters in Europe, after propagation over paths in the Earth-ionosphere waveguide, have been used to examine changes in the daytime electron density increase in course of solar flares. Few tens of Solar X rays flare events (class C, class M and two flares class X) from the beginning of Solar cycle 24 have been registered at the Belgrade VLF observatory (44.85 N, 20.38 E), by monitoring characteristic phase and amplitude disturbances of VLF signals. The analyzed paths range in length over about 1- 2 Mm, they included signals from transmitters: GQD (England), DHO (Germany), HWU (France) and ICV (Italy) to Belgrade.

Daytime D region electron densities can be well described as increasing exponentially with height using the two traditional (Wait) parameters, H', a measure of the D-region height, in km, and Ƅ, a measure of the sharpness of the lower edge, in km-1. These parameters have been successfully used with VLF measurements to describe the normal daytime variations in the D-region electron densities. The Ƅ and H' characterization has also been used in determining the (greatly) enhanced D-region electron densities during solar flares from VLF amplitude and phase measurements. This ability to reconstruct the electron density enhancement as function of time and height N(t, h) throughout flare duration, presents an opportunity to quantify the relation between intensity of X – rays and additional ionization. This procedure has been applied to a series of flares from class C to class X each giving rise to a different time development of signal perturbation and additional electron density.

Poster

A SHORT REMARK ON TERRESTRIAL MAGNETISM AND CLIMATE

Pecker J.C.

Collège de France, Paris

Poster

AN ESTIMATION OF NUMBER OF EXOPLANETS WITH THE CHANCE OF DETECTION OF EXISTENCE OF LIFE IN THE MILKY WAY

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At the very beginning of the search for extraterrestrial intelligence, more than half a century ago, Frank Drake made his famous equation to assess the number of civilizations currently present in the Milky Way. At the beginning of the new millennium, Peter Ward and Donald Brownlee put forward the hypothesis of the uniqueness of the Earth (Rare Earth hypothesis) and developed their own version of the equation for the number of planets with complex life in our galaxy.

In this contribution, we consider the number of possible exoplanets in the Milky Way with the chance of reliable detection of existence of life, in the light of recent theoretical modeling, observations and measurements that reduce the arbitrariness of numerical values of factors in these two equations, and the potential development of detections' techniques and methods in the next few decades.

Poster

STUDY OF THE X-RAY FLARE INDUCED LOWER IONOSPHERE CHANGES BY SIMULTANEOUS MONITORING OF GQD AND NAA VLF SIGNALS

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A simultaneous analysis of solar flare M2.5 class X-ray irradiance effects on VLF signal amplitude and phase delay variations on the GQD/22.1 kHz and NAA/24.0 kHz signals was carried out. Solar flare data were taken from GOES12 satellite one-minute listings. For VLF data recordings at the Institute of Physics, Belgrade, Serbia, the AbsPAL system was used. It was found that solar flare event affected VLF wave propagation in the Earth-ionosphere waveguide in way that lower ionosphere electron density height profile changes, according to variation of estimated parameters, sharpness and reflection height, being different for two analyzed traces.

Poster

SOME NEW ASTRONOMICAL ALIGNMENTS OF THE MEGALITHIC OBSERVATORY KOKINO

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The mountain sanctuary "Taticev Kamen" (Tatic Rock) is located in the northeast part of Macedonia, near the village of Kokino..Archaeoastronomical analyses have confirmed that it has many characteristics of a megalithic observatory. During the Bronze Age the periodic movements of the Sun were followed and its position marked by notches on the nearby stone blocks for the purpose of performing religious rituals. We present our findings of new alignments on the recently discovered platform on the north part of the locality indicating that some other celestial objects were also observed on the site.

VII EXTRAGALACTIC ASTRONOMY AND COSMOLOGY

Invited Lecture

SIGNATURES OF SUPERMASSIVE BLACK HOLE COALESCENCE

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In anticipation of the future gravitational wave (GW) detections a lot of effort has been directed towards study and characterization of supermassive black hole binaries (SBHBs), which are one of the prime GW targets. However, it may be many years before a GW interferometer capable of such detections is launched and in the mean time we will continue to rely on the observations of light to study the SBHBs in the universe. In order to make progress in this direction it is essential to gain better understanding of these observationally elusive systems. One way to achieve this is through theoretical modeling of SBHBs. I will describe some recent work in modeling of coincident electromagnetic and GW signatures associated with the late inspiral and merger of supermassive black holes.

Talk

THE CONTRIBUTION OF STELLAR POPULATIONS IN AGN SPECTRA

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We investigated the influence of the stellar population (SP) on the composite AGN spectra of Seyfert 2 (Sy2) galaxies, as well as characteristics of it's gaseous and stellar component.

We have used the ULySS algorithm (Koleva et al. 2009) that we have modified and adjusted for fitting AGN integrated spectra. In order to validate the method for the analyzes of the narrow emission line component in AGN spectra together with the AGN continuum and stellar population component from the host galaxy, we have simulated over7000 line-of-sight integrated spectra of low luminosity AGNs. Spectra have different characteristics of featureless AGN continuum,signal-to-noise ratio, spectral range, and properties of emission lines. We fitted simulated spectra with the full spectrum fitting procedure, in order to evaluate our ability to recover characteristics of the model (age, metallicity, fraction and kinematical properties of stellar population, spectral index and fraction of AGN featureless continuum, and widths and intensities of emission lines). We succeed in determining the limits within which we can expect to achieve high accurate results with our method. We find that degeneracies between AGN and SP parameters increase with increasing AGN fraction. This shows that nebular continuum and SP spectra should be fitted at the same time. Analysis revealed that the method is not able to recover SP characteristics when the SP contribution to the total observed spectrum is less then 25%.

We applied our method on 3D observations of Seyfert 2 galaxy Mrk 533.The galaxy was observed with the integral-field spectrograph MPFS of the SAO RAS 6-m telescope. The gas kinematics show non-circular motions in the wide range of galactocentric distances from 500 pc up to 15 kpc. The study showed that in the region close to the nucleous, the outflow velocity is maximal, and corresponds to the position of the radio structure, which is assumed to be created in an approaching jet. We suggested that these ionized gas outflows are triggered by the radio jet intruding into an ambient medium. We also found that the gas and stars show similar motion, but the velocity of the gas is around six times higher then the mean stellar velocity in the same region of the galaxy. Stellar populations represent a significant constituent in the optical continuum (between 47 and95%) and, as it is expected, it is higher in the outer parts of the galaxy. Metallicity map reveal a positive stellar metallicity gradient which may be expected if the central region is fueled from fresh gas (caused by merging or accretion).

Talk

ON SOLVABLE MODELS FOR TACHYONIC INFLATION

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We discuss relation between inflation in a local and non-local scenario. The main task of quantum cosmology is to describe the evolution of the universe in a very early stage. Since quantum cosmology is related to the Planck scale phenomena it is logical to consider various geometries and parametrization of the space-time coordinates.

Cosmological inflation has become an integral part of the standard model of the universe, and it is a ``bridge`` between classical and quantum in early Universe. Gibbons has emphasized the cosmological implication of tachyonic condensate rolling towards its ground state.

In order to generate enough inflation, it is necessary for the inflation field to roll slowly enough. Some recent results on gives rise to the hopes that nonlocal inflation can succeed where the real string theory fails. We consider several tachyonic potentials which leads to the solvable classical models and dynamics. as well as their quantization.

Talk

RADIATIVE TRANSFER MODELING OF AGN DUSTY TORI AS A CLUMPY TWO-PHASE MEDIUM

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We investigated the infrared emission of active galactic nuclei dusty tori. Following theoretical predictions coming from hydrodynamical simulations, we modeled the dusty torus as a two-phase medium with high-density clumps and a low-density medium filling the space between the clumps. To obtain spectral energy distributions (SED) and images of the tori at different wavelengths we employed a 3D Monte Carlo radiative transfer code SKIRT. A corresponding set of a clumps-only models and models with a smooth dust distribution is calculated for comparison. We found that dust distribution, optical depth, clump size and their actual arrangement in the innermost region, all have an impact on the shape of the near- and mid-infrared SED. The 10 micron silicate feature can be suppressed for some parameters, but models with a smooth dust distribution are also able to produce a wide range of the silicate feature strength. Finally, we find that having the dust distributed in a two-phase medium, might offer a natural solution to the lack of emission in the near-infrared, compared to the observed data, which affects clumpy models currently available in the literature.

Talk

MICROLENSING OF INFRARED RADIATION FROM AGN DUSTY TORI

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We investigated the influence of gravitational microlensing on the infrared radiation from active galactic nuclei dusty tori. We modeled the dusty torus using the 3D Monte Carlo radiative transfer code called SKIRT. We considered microlensing events for gravitationally lensed quasars with multiple images. For generating microlensing magnification pattern we used ray-shooting method. To take into account the facts that (a) the size of torus is wavelength dependent and (b) the size of torus is larger than the Einstein ring radius projection in the source plane, images of torus at different wavelength are convolved with magnification maps. In order to estimate magnification and time scales of microlensing events, light curves were calculated for different wavelengths and for different torus parameters. We found that the magnification is the highest at the shorter wavelengths, with microlensing time scales on the order of events of several decades. We also found that both magnification and time scales of microlensing events strongly depend on the dust distribution parameters of the torus and the size of the torus compared to Einstein ring radius projection in the source plane.

Talk

STAR FORMATION RATE IN HOLMBERG IX DWARF GALAXY

Andjelić M.[1], Arbutina B., Stavrev K., Urošević D.

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In this paper we derived star formation rate for irregular dwarf galaxy Holmberg IX, member of M81 galaxy group. Star formation rate is calculated using Ha fluxes of HII regions in this galaxy, observed in March 2008 from National astronomical observatory Rozhen, Bulgaria.

Talk

HIDDEN EMISSION OF ACCRETION DISK IN BROAD LINE REGION OF ACTIVE GALAXIES

Bon E.

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The disk emission in the single peaked Broad Emission Lines (BELs) of Active Galactic Nuclei (AGN) is hard to detect. In order to ?nd the disk traces in BELs the line pro?les were simulated with simplified model consisted of two components: accretion disk and surrounding spherical region with isotropic velocities of clouds.The measurements of simulated pro?les were compared with the measurements of observed single-peaked H? and H? pro?les of two samples (one containing 90 AGN from SDSS and another with 14 AGN, observed especially for this study). The analysis is mainly based on the measurements of the widths and asymmetries of the wings of the emission line (the parts of the profile where that the disk emission flux could be expected). Comparing the parameters of the simulated and observed H? broad lines, we found that the hidden disc emission may be present in BELs even if the characteristic of two-peaked-line profiles is absent. For both samples of objects (Seyfert 1 galaxies with single-peaked BELs), our study indicates that, in the case of the hidden disc emission in single-peaked BEL profiles, the disc inclination tends to be small (mostly $i < 25°$) and that the contribution of the disc emission to the total flux should be smaller than the contribution of the surrounding region.

Talk

SGR A* GROWTH THROUGH HUBBLE TIME

Mićić M.

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I will present a working model for the formation and evolution of supermassive black hole in Milky Way galaxy. In this new hybrid approach, semi-analytic and empirical recipes for subgrid physics are "painted" on highest resolution N-body simulation in existence (via lactea II). I will discuss reasons for introduction of this model and consequences of its implementation.

Talk

NORMAL GALAXIES: A KEY COMPONENT OF THE GAMMA-RAY BACKGROUND

Prodanović T.[1], Fields B., Pavlidou V.

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Observations of the gamma-ray sky have revealed a non-zero emission diffuse emission high above the Galactic plane, even in the direction of the Galactic poles. This emission is known as the Extragalactic Gamma Ray Background (EGRB). Even though it has been detected, its origin has remained a mystery. Some sources are guaranteed to contribute to this background – unresolved normal galaxies, active galaxies, blazars, but which component represents the dominant contribution was unknown. Recent, new measurements of the EGRB with the Fermi Gama-Ray Space Telescope, are significantly different from the previous measurements, both in intensity and in spectrum. Here we present a new, observationally-calibrated prediction of the normal, star-forming galaxy contribution to the EGRB. We find that normal galaxies dominate over the active galaxies, and account for most of the observed EGRB. Some implications such as possibility of identifying and constraining other contribution components etc., will be discussed.

Talk

COSMOLOGICAL COSMIC-RAY CONTRIBUTION TO THE EXTRAGALACTIC GAMMA-RAY BACKGROUND

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The extragalactic gamma-ray background measured by The Fermi Gamma-Ray Space Telescope is substantially different from previous measurements. Fermi has clarified that the dominant emission mechanism comes from cosmic ray interactions with interstellar gas in normal galaxies. We present a prediction of cosmological cosmic-ray contribution to the extragalactic gamma-ray background. Even though normal galaxies seem to be dominant component, they still fall short to explain measured gamma ray background for highest energies, thus another source has to be taken into consideration. Using models of evolution of cosmic accretion shock, we calculate pionic gamma-ray source-function for cosmological cosmic-rays independent of redshift. This way, it is no longer needed to use approximation that all cosmological cosmic rays originate at single redshift. We show that cosmological cosmic-rays could even dominate the extragalactic gamma-ray background at highest energies. We also show that measured background can well be explained by these two cosmic-ray components - normal star-forming galaxies and cosmological cosmic-rays.

Talk

SPECTRAL INDEX DISTRIBUTION OF RADIO AGNS: CASE STUDY OF 3C 349

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We studied the spectral index distribution of radio Active Galactic Nuclei (AGNs) in the case of 3C 349. In our investigation, we used measurements of FR II radio galaxy 3C 349 at the two frequencies: 8415 and 1502 MHz, observed by Very Large Array of National Radio Astronomy Observatory. We estimated flux density profiles and spectral index map of 3C 349 and used them to discuss the structure of this extended radio source. We focused on the distribution of spectral indices over the jets and the lobes, as well as in their hotspots. We also estimated polarization in these regions, and calculated the mean value of flux density and compared them with earlier estimations.

Talk

LONG-TERM SPECTRAL MONITORING OF A SAMPLE OF AGN WITH BROAD LINES

Ilić D.[1], Popović L., Shapovalova A., Kovačević A., Kovačević J., Burenkov N.,Chavushyan V.

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In spite of many papers being devoted to the physical properties (physics and geometry) of the broad line region (BLR) in active galactic nuclei (AGN), the true nature of the BLR is not well known. The BLR is close to the central supermassive black hole and may hold basic information about the formation and fueling of AGN.

The signature of the BLR are the broad emission lines (BEL). Their fluxes, shapes and intensities can provide much information about the BLR geometry and physics. Moreover, AGN often exhibit variability in the BEL, that is often assumed to be caused by the dynamic evolution of the BLR gas on long timescales. Therefore, an investigation of the BEL flux and shape variability in a long period is very useful for mapping the geometrical and dynamical structure of the BLR.

Here we will discuss the advantages of the long-term spectral monitoring of the AGN in the optical band, and present the results for couple of cases exhibiting unusual broad emission-line profiles.

Talk

SOME COSMOLOGICAL ASPECTS OF NONLOCAL GRAVITY

Grujić J.

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Nonlocal gravity is a modification of Einstein general relativity in such way that Einstein-Hilbert action contains a function f(d'Alambertian, R) instead of Ricci scalar R. This research is motivated by investigation of accelerating expansion of the universe within a modification of Einstein theory of gravity. We present a brief review and our results. Joint work with I. Dimitrijevic, B. Dragovich and Z. Rakic.

Talk

SOME COSMOLOGICAL SOLUTIONS WITH $F(R)$ MODIFIED GRAVITY

Dimitrijević I.

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Accelerated expansion of the universe still has not satisfactory explanation. This phenomenon is mainly related to the negative pressure of hypothetical dark energy. However, there has been recently increased interest in the modified gravity at large scale distances as a possible alternative mechanism for cosmic acceleration. As a simple approach it is usually considered modification of the Einstein-Hilbert action taking a function $f(R)$ instead of the Ricci scalar R. In this talk we will present basic characteristics of $f(R)$ modified gravity and general cosmological properties of some promising approaches. In particular, we will discuss various aspects of $f(R)$ modification, when $f(R)$ contains linear fractional function of R. Joint work with B. Dragovich, J. Grujic and Z. Rakic.

Talk

NONLOCAL COSMOLOGY WITH P-ADIC MATTER

Dragovich B.

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Nonlocal cosmology is an approach to investigate the accelerating universe. The corresponding Lagrangian in the matter sector contains an infinite number of space-time derivatives in the form of d'Alambertian. This approach has its origin in string theory and has been intensively investigated in the recent years. In this contribution, nonlocal cosmology with p-adic string matter will be presented.

VIII HISTORY, PHILOSOPHY AND TEACHING OF ASTRONOMY - DEDICATETED TO PROF. J. MILOGRADOV-TURIN

IN MEMORIAM TO PROF. J. MILOGRADOV-TURIN

Urošević D.

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The brief review of the professional activity of prof. dr Jelena Milogradov-Turin is presented.

GALILEO TEACHER'S TRAINING PROGRAME

Stanić N.[1], Otašević A., Jevtović M., Simonović B., Djukić S.

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First started as a part of IYA2009 cornerstone project in 2009, this workshop for teachers has become a part of accredited programs by Ministry of Education and Science for 2010/11 and 2011/12. Centers for professional developments of teachers in Nis and Leskovac were interested in the program and two days workshops (16 accredited hours) were realized in excellent cooperation with both organizers and participants. This program offers a material (video presentations, experimental worksheet and useful websites) that teachers could use in the classroom in the frame of their subjects (geography, physics, mathematics, history, biology). This kind of teacher's education in astronomy is very important concerning the fact that astronomy doesn't exists as a regular subject in primary and most of secondary schools in Serbia.

COMMUNICATING ASTRONOMY WITH SCHOOLS - METHODOLOGICAL APPROACH

Stanić N.

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Balloon, glass of water and cell phone is a triple/simple demonstration of the expansion, composition and size of the Universe. Blowing the balloon and, at certain moment, drawing a small fuzzy things on it to introduce the galaxies is the beginning. Story-telling about the Big Bang (BB) and history of the Universe continues with a glass of water introducing one part of the water molecule, hydrogen atom, as the most abundant element in the Universe created shortly after the BB. But where the other part, oxygen, came from? Stars shine, but much more important is that they produce the chemical elements that we are all made of. Hydrogen 'burns' in central part of a star and gives the helium, then helium 'burns' into carbon, and so on. The distance to the Sun, particular star or galaxy or any other celestial body we define by time we need to receive cell phone call from there. This is a science performance that combines science, art, acting and interactive activities with schoolchildren and could be performed, both primary and secondary schools, in the frame of any subject related to natural sciences – The World Around Us, Geography, Physics, Mathematics, Chemistry and Biology. Methodological and pedagogical approach in teaching astronomy should provide higher level of universe awareness for all children, not only super talents.

HOMAGE TO MILORAD B. PROTITCH (1911 - 2011)

Protitch-Benishek V.

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The presentation is dedicated to the memory of Milorad B. Protitch on behalf of hundred years of his birth and 75 years of discovery of minor planet 1564 Srbija as the first one from Belgrade Astronomical Observatory.

INTERNATIONAL YEAR OF ASTRONOMY 2009 IN SERBIA

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The overview of all activities organized during IYA2009 in Serbia and its achievements are presented.

TOWARD THE VENUS TRANSIT 2012

Šegan S., Marčeta D.

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We present interesting historical review of observations of the transit of Venus across the Sun and possibilities of using this phenomenon for teaching purposes. The transit of Venus across the Sun gives the opportunity for getting our own measurements of astronomical unit and parallax of the Sun which has distinct methodological and didactic significance. Also, observation of this phenomenon enables elaboration of observational methods and processing of results for different instrumental and positional conditions. In addition, it enables effective demonstration of determination of coordinates of the Solar system bodies, especially Venus, elements of equatorial and ecliptic coordinate systems and utilization of different time scales and units.

ASTRONOMICAL BOOKS IN VIRTUAL LIBRARY OF FACULTY OF MATHEMATICS IN BELGRADE

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The Virtual Library of the Faculty of Mathematics, http://elibrary.matf.bg.ac.rs, contains about 100 digitized books related to astronomy. These books are written mostly by Serbian scientists but there are also translations into Serbian by foreign authors. This article presents a list of books written by the following authors: Rudjer Bošković, Zaharije Orfelin, Atanasije Stojković, Đorde Stanojević, Milan Andonović, Kosta Stojanović, Nikolai Tsinger, Milutin Milanković, Milan Nedeljković, Pavle Vujević, Vojislav Mišković, Zaharije Brkić, Branislav Ševarlić, Jovan Simovljević and Sergei Blazko. Some of these books had the great influence on the development of astronomy, geodesy and mathematical geography in Serbia. The full list of these books is given and a selection of them is presented and commented.

ASTRONOMY EDUCATION IN SERBIA 2008-2011

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The paper is a review of triennial activities in astronomy education in Serbia at all levels (primary schools, secondary schools, university education, public education).

STUDENT PAPERS IN ASTRONOMY AT PETNICA SCIENCE CENTER 2008 - 2010

Božić N.

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Student Papers in Astronomy at Petnica Science Center 2008 - 2010 are presented.

DIGITIZED WORKS OF B. ŠEVARLIC IN VIRTUAL LIBRARY OF FACULTY OF MATHEMATICS

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In the Virtual Library of the Faculty of Mathematics, http://elibrary.matf.bg.ac.rs, there are eleven digitized works of Branislav Ševarlic, professor of the Belgrade University. These works include his doctoral dissertation, four university text-books on astronomy, three translations of books written by Russian authors, two text-books for high-schools, and the last one is the Astronomical Atlas. Particularly important work is his book General Astronomy (1971) as it was used for generations for teaching of astronomy at the University of Belgrade. The aim of this paper is to present all these works as well as the short biography of professor Branislav Ševarlic.

PUBLISHING ACTIVITY OF ASTRONOMICAL SOCIETY SARAJEVO

Muminović M.[1], Mujić N.

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Astronomical society from Sarajevo was the biggest publisher of astronomical literature, maps and posters in former Yugoslavia. Everything started in the 1972 when the first book under title "ASTRONOMY" written by Muhamed Muminovic has been published. That book was first ever printed text on general astronomy in Bosnia-Herzegovina. After that, 20 books and 6 posters has been published up to now. In the period from 1974 to 1976 Astronomical society Sarajevo has been publisher of the magazine „ASTRO AMATER".

Some of those books where during long period a basic literature for generations of amateur astronomers and students of astronomy and astrophysics in the region. A significant percentage of our readers continue their careers in the field of astronomy.

NASLEDJE PRIRODNIH NAUKA SA POSEBNIM OSVRTOM NA ASTRONOMIJU

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Prirodne nauke, iako egzaktne, nisu sasvim nezavisne od kulture u kojima naučnici žive i stvaraju. Na ovaj način, i dostignuća prirodnih nauka mogu se smatrati kulturno specifičnim i nasleđem neke kulture. Međutim, proces u kome naučna dostignuća postaju shvaćena kao nasleđe određene kulture nije jednostavan, niti se odvija automatski. On je proizvod različitih istorijskih i društvenih okolnosti, a često i vladajuće ideologije. U radu smo pokušali da, na primeru astronomije, ukažemo na okolnosti koje su mogle da dovedu da se neki naučni model može smatrati nasleđem određene kulture.

ON THE "COSMIC ENERGY AND MODERN PHYSICS" BY DJ. M. STANOJEVIĆ (1858-1921)

Trajkovska V.[1], Protitch-Benishek V.

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The authors give the analysis of Stanojević's introductory lecture "Cosmic Energy and Modern Physics" exposed on September 22, 1887, on behalf his appointment at the Departement of Physics of Belgrade Military Academy. The review of other Stanojević's papers is given also.

CHARACTERISTICS OF SOME NON-CLASSICAL PROJECTS OF CALENDAR REFORM

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The characteristics of some calendars based on schematic rules are given. Such calendars have been above all proposed for economical reasons. Their advantages and disadvantages are discussed.

ОПИС ЗЕМЉЕ У ДЕЛИМА АРАПСКИХ ПУТОПИСАЦА (9 - 12. ВЕК)

Цвијановић И.

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У делима арапских путописаца дати су подаци о облику, положају и величини земље, планетама, зодијачким знацима. Сачуване су мапе света Ал-Масудија, Ибн Хаукала и Ал-Идрисија. Ал Масуди (871-956/7) је направио мапу света и писао да је земља округла, пре него што су хришћани у Европи били спремни да прихвате ту идеју. Познати географ и картограф Ал-Идриси (1099/1100-1164/5/6) живео је на двору норманског краља Руђера II на Сицилији, а после његове смрти код сина Виљема I. На Сицилији је добијао податке од европских и арапских географа на основу којих је написао дело познато под називом Руђерова књига. Поред овог значајног дела, за свог покровитеља конструисао је небески глобус и карту света у облику диска од сребра. На диску су биле урезане линије које су обележавале границе седам области насељеног света. Арапи су познавали дела грчких астронома и прихватили њихову поделу света на седам климатских зона.

IX AMATEUR ASTRONOMY, SOCIOLOGY OF ASTRONOMY, ASTRONOMY IN ARTS AND CULTURE

Talk

ASTRONOMY OLYMPIADS IN RUSSIA AND THEIR POSITION IN ASTRONOMY EDUCATION

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Astronomy olympiads started to be organised in Russia more than 60 years ago (then it was still USSR). In 1994, on the basis of several regional astronomy olympiads, appeared the All-Russian Astronomy Olympiad (Vserossijskaya astronomicheskaya olimpiada) or ARAO. It has been organised under the auspices of the Ministry of Education and pupils attending older forms have taken part in it. The main objective of ARAO is to find and support talented pupils.

Leading universities of the country (Russia) have also organised their own astronomy olympiads. In this way there are Astronomy Olympiads of Saint Petersburg, Moscow and Kazan. Among them the largest is that of Saint Petersburg. The main characteristic of these olympiads is that they have also included pupils of younger forms and have prepared their own tasks. The main objective of these olympiads is to find and support future students of astronomy classes at those universities.

All astronomy Olympiads have played an important role in preparing future astronomers.

Talk

AMATEUR ASTRONOMERS ASSOCIATION OF SERBIA - ACTIVITIES AND IMPORTANCE OF ASSOCIATION IN AMATEUR ASTRONOMY IN SERBIA

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In this paper, the Amateur Astronomers Association of Serbia is presented and its importance for popularization of astronomy. The activities of the Association in founding new societies, promotion, assistance in work and cooperation are listed. Particular review is made on visiting territories in Serbia where organized astronomical activities in the form of amateur societies do not exist, as well as founding new societies.

Talk

AMATEUR ASTRONOMERS ASSOCIATION OF SERBIA - INTERNATIONAL COOPERATION OF ASTRONOMICAL SOCIETIES

Radmilović D., Aleksić J.[1]

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International cooperation is a common work and knowledge and experience exchange among astronomical societies from different countries. In this paper, the activities of Association in cooperation with different subjects in the region are presented.

Talk

RECENT ACTIVITIES OF ASTRONOMICAL SOCIETY MAGELLANIC CLOUDS

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Activities of the astronomical society Magellanic Clouds from the town of Prokuplje are presented. The Society obtained last year new equipment, including an apochromatic refractor of the aperture of 12 cm, Sky-Watcher NEQ6 PRO SynScan computerized equatorial mount, guiding system and additional accessories. Many astronomical events were observed since then, including the transition of the extrasolar planet of the star HD 189733 in Vulpecula. Also, the members of the Society made a lot of fine photos of various cosmic objects and events.

Talk

"ASTRONOMY FROM THE CHAIR" - A NEW WAY OF DOING ASTRONOMY OVER THE INTERNET

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Astronomy is a science characterized by the fact that amateurs can make significant contributions to its further development. Astronomy is hobby of many people around the world. This paper describes how the emergence of the Internet enabled astronomy to become more prevalent as a hobby and contribute to the further development of the new concept of amateur astronomy, „Astronomy from the Chair" (example: Astronomy Live and Virtual Astronomy Telescope Project Group). In this paper we also present the observatories that make it possible to take direct control over their equipment and to conduct observation and photography (example: MyTelescope and Virtual Telescope Project Group), and virtual observatories which can be accessed huge databases and carry out its processing directly through the Internet (example: Galaxy Zoo, Planet Hunters and citizensky).

Talk

ORIJENTACIJA UZDUŽNIH OSA CRKAVA MANASTIRA STUDENICE

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Manastir Studenica ima četiri srednjovekovne crkve čije uzdužne ose nisu paralelne. Polazeći od crkvenog pravila u kome stoji da te ose trebaju biti usmerene „prema istoku" ili „prema izlasku sunca", u radu su, astronomsko-geogrsfskom metodom, odredjeni datumi kada Sunce izlazi nad stvarnim horizontom manastira, u produžetku crkvenih osa. Na osnovu njih arheolozi mogu dalje odredjivati kada su crkve prvobitno utemeljene i kom svetitelju su prvobitno bile posvećene.

Rezultati su provereni neposrednim posmatranjima, tako da izložena metoda može biti primenjena pri analizi orijentacije bilo koje srednjovekovne crkve (sakralne gradjevine).

ASTRONOMICAL OBSERVATORY SARAJEVO: PAST, PRESENT, FUTURE

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Not having a single serious astronomical instrument, Bosnia and Herzegovina is currently a dark spot of Europe. The presence of astronomy, especially practical astronomy in educational system is insufficient. In the period between 1963 and 1992, astronomy in Bosnia and Herzegovina has been quite developed, although there hadn't been any tradition in that field. Astronomical observatory Sarajevo has been a beacon of new times in entire former country. Echo of those astronomical activities is still present nowadays, through oral and written memories of many.

The start of modern astronomy in Bosnia and Herzegovina is connected with a foundation of the first astronomical organization, back in 1963. The most important results of multi-decade functioning of Astronomical Society in Sarajevo were construction and activity of the first astronomical observatory in Bosnia and Herzegovina. This observatory locally operated under the name Astronomical Observatory "Čolina Kapa", but internationally, the name Astronomical Observatory Sarajevo was used. It was a place of wide-ranging popularization of astronomy, amateur, professional and scientific work in this field. It had a great regional importance within entire former country, and results of its activities still exist. During war in Bosnia, the entire complex of observatory, with all domes and instruments was devastated.

Astronomical the Society Orion is a legal successor of former University Astronomical Society that operated from 1963 to 1992. At the beginning of 2008, Astronomical Society Orion restores work and tradition of its predecessor and starts the first activities of restoration of observatory and practical astronomy in Bosnia and Herzegovina. Initial project for reconstruction of older part of the observatory, Austro-Hungarian fortress is already prepared. According to our plans that will be a multimedia space with digital planetarium and telescope 30/40 cm. Second phase of project include reconstruction of new building with 8 meter dome who will be equipped with 60 cm robotic telescope for education and scientific work.

Poster

PROMOTION AND POPULARIZATION OF ASTRONOMY IN KRUŠEVAC 2008 - 2011

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This paper is an overview of activities related to promotion and popularization of astronomy in Kruševac from 2008th to 2011th year. Special attention is paid to activities in 2009th during the celebration of International Year of Astronomy and results achieved during this period on the National and International level in promotion of Astronomy.

Poster

ASTRONOMY AND ART - STORYTELLING

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Series of short stories have been broadcasted on Radio Belgrade, Youth Programme, during November of 2010. Each story is related to particular astronomical phenomenon. Professional actors, producers and playwrighters were included to produce an inspiring audio which could be played at schools as an example of art and science connection. In this presentation, six stories will be presented. They are related to the Structure and evolution of the Universe ("Pirouette and Milky Way" and "The Begining of Everything"), Black Holes ("Black Holes output"), Solar System ("Sun's playground"), Planetarium ("Star Detectives and telescopes (The Castle Above the Clouds").

Poster

AMATEUR ASTRONOMERS ASSOCIATION OF SERBIA - ACTIVITIES AND IMPORTANCE OF ASSOCIATION AND POSSIBLE COOPERATION WITH PROFESSIONAL ASTRONOMICAL SUBJECTS

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In this paper, the Amateur Astronomers Association of Serbia is presented and its importance for popularization of astronomy. The activities of the Association in founding new societies, promotion, assistance in work and cooperation are listed. Particular review is made on visiting territories in Serbia where organized astronomical activities in the form of amateur societies do not exist, as well as founding new societies.

Poster

O LINGVISTIČKOJ NEMOGUĆNOSTI PODELE NA PLANETE I MALE PLANETE

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Filologija, dakle nauka o jeziku i književnosti, mora sada priskočiti u pomoć astronomskoj nauci, po jednom terminološkom ali i logičkom pitanju. Naime, ako nešto pripada jednoj kategoriji, onda pripada toj kategoriji bez obzira da li je malen ili veliki član. Ne možemo čovečanstvo podeliti na ljude i visoke ljude (preko 190 cm, na primer), jer, i visoki ljudi su ljudi. Dakle ne može jedna kategorija biti podeljena na samu sebe (celu, bez ostatka) i na ipak neki ostatak, po nečemu izdvojen. Dakle, bilo je lingvistički neispravno, pa i nemoguće, proglasiti da Pluton nije planeta nego je patuljasta planeta. Nauka o jeziku, ali, i logika, nas uči: i male i velike planete, a i one osrednje, itd, sve su – planete. Zato načinjenu grešku, koju je svetska javnost itekako primetila, treba hitno ispraviti.

AMONG THE STARS

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After excellent experience on Conference of Development of Astronomy among Serbs VI (2010), I've decided that it would be good thing to participate on National Conference of Astronomers of Serbia. I am science fiction and fantasy writer, translator, editor and journalist. I write short stories, aphorisms, haiku, book reviews etc. Among other things I write about universe and stars (how they became and why) and hence the title of my work: Among the stars. I try to give answers which we all ask ourselves when universe is in question, from writers point of view, of cause. On my Internet page belegbg.wordpress.com I publish my works and works of others concerning stars, galaxies and universe. I've recently organized competition on fantasy aphorisms on subject "Stars and we". Some of that work will be represented in my Paper.

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