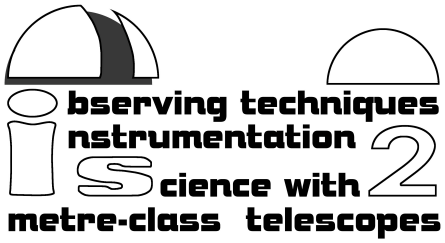
Conference

Observing techniques, instrumentation and science for metre-class telescopes II



ABSTRACT BOOK

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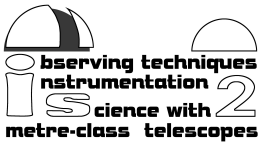

Observing techniques, instrumentation and science for metre-class telescopes II

Conference

Tatranská Lomnica, Slovakia

September 24 – 28, 2018

Organized by

Astronomical Institute, Slovak Academy of Sciences

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Session A: OBSERVING TECHNIQUES AND INSTRUMENTATION FOR METRE-CLASS TELESCOPES

A 01 Fast astronomical photometry for meter-class telescopes

L. Zampieri (for the AQUEYE+IQUEYE collaboration)

INAF-Astronomical Observatory of Padova, Padova, Italy

Our team at the INAF-Astronomical Observatory of Padova and the University of Padova is engaged in the design, construction and operations of instruments with very high time accuracy in the optical band for applications to High Time Resolution Astrophysics and Quantum Astronomy. Two instruments were built to perform photon counting with sub-nanosecond temporal accuracy, AQUEYE+ and IQUEYE. AQUEYE+ is regularly mounted at the 1.8m Copernicus telescope in Asiago, while IQUEYE was mounted at several 4m class telescopes around the world and is now attached through the IQUEYE Fiber Interface at the 1.2m Galileo telescope in Asiago. They are used to perform coordinated high time resolution optical observations and, for the first time ever, experiments of optical intensity interferometry on a baseline of a few kilometers. I will report on recent technological developments and scientific results obtained within the framework of this project.

A 02 Interferometry with Meter-Class Telescopes

R.M. Roettenbacher

Yale Center for Astronomy & Astrophysics, Yale University, New Haven, CT 06520, USA

Small telescopes have the potential to be connected into an interferometric array to effectively make a significantly larger telescope. Interferometric arrays utilizing small telescopes, particularly the Center for High-Angular Resolution Astronomy (CHARA) Array, are at the forefront of optical interferometry with observations leading to accurate stellar radii and even images of stellar surfaces. Here, the challenges and advantages of small-telescope, long-baseline optical interferometry will be discussed, alongside the current status and recent results from small-telescope interferometric arrays.

A 03 High precision ground-based photometry

M. Lendl

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In parallel to the the arrival of space-based photometric missions such as CoRoT and Kepler, also ground-based instrumentation and techniques have improved substantially in recent years. To date, a relative photometric precision above the millimagnitude level is reached by 1-m class facilities on a routine basis, opening up a wide range of scientific applications that were previously inaccessible. I will give an overview of the techniques and strategies that have shown to be optimal for maximizing photometric precision from the ground. Further, I will highlight a number of applications where ground-based photometry has proven to be at the forefront of scientific discoveries.

A 04 Precise photometry with the use of 60-cm Cassegrain reflector of Białków, Poland

P. Mikołajczyk

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In case of bright stars, ground-based photometry must be conducted with the use of small or middle class telescopes at the most. Investigations of physical properties of pulsating B–type stars have been underway in Białków Observatory, Poland, for over 35 years. Next year marks the fifteenth aniversary since the ANDOR DW432, high-end CCD camera has been mounted on top of the 60-cm Cassegrain reflector in the Astronomical Observatory of Wrocław University located in Białków, Poland.

In this presentation, I will briefly review the most important scientific results obtained with the aforementioned gear, including interesting open clusters like NGC 6910 and Stock 8 (and others), gravitational microlensing events and some other important phenomena regarding a variety of astronomical objects.

In my presentation, I will highlight the importance of the proper calibration of astronomical data. Furthermore, I will illustrate the functions of the semi-automatic software CCDPhot (Z. Kołaczkowski et. al), which can be used to reduce any kind of photometric data.

A 05 Astrophotonics for small telescopes

R.J. Harris, Th. Anagnos, P. Hottinger

Zentrum für Astronomie der Universität Heidelberg, Landessternwarte Königstuhl, Königstuhl 12, 69117 Heidelberg

Astrophotonics is a field combining astronomical instrumentation and photonics, with the aim of making instruments cheaper, smaller or increasing their functionality. As most astrophotonics technologies come from the telecommunications industry they generally work in the single mode (diffraction limited) or few mode (close to diffraction limited) regime, meaning that they are difficult to use efficiently with larger telescope without a complex adaptive optics systems.

As such small telescopes are perfectly placed to take advantage of these technologies. In our group at the Landessternwarte we are working on two experimental technologies that could greatly benefit spectrographs behind small telescopes.

The first is photonic reformatting, akin to image slicing, but using a photonic lantern to sample the telescope PSF. This photonic lantern splits the PSF into individual fibres, which can then be reformatted into a long slit to form the slit of a spectrograph. This helps for three reasons, firstly it is an efficient integrated image slicer, second, as with image slicing, this helps control the dimensions and hence size of the spectrograph, reducing costs and finally can reduce or remove modal noise in fibre fed spectrographs.

The second technology is a sensor at the focal plane of the telescope, allowing increased coupling efficiency. This sensor is composed of a 3D printed microlens array coupled to a fibre bundle. These fibres are coupled to a fast detector, which feeds the signal to a tip-tilt mirror, reducing coupling error. It is currently under development for testing with the near diffraction limited extreme adaptive optics system at the LBT, which makes it easily modifiable to allow it to work with much smaller telescopes.

I will describe both technologies and the work we are doing and what future developments I expect.

A 06 The Cambridge Photometric Calibration Server 2.0 – new automatic tool for time-domain astronomy

P. Zieliński[1], **Ł. Wyrzykowski**[1], **K. Rybicki**[1], **Z. Kołaczkowski**[2,3], **P. Bruś**[3], **P. Mikołajczyk**[3]

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Transient astrophysical events, e.g., supernovae, microlensing events, often require immediate follow-up observations soon after their discovery. In the era of large surveys, for example Gaia, PTF, ASASSN, OGLE, there are thousands of transient phenomena reported every year (about 4000 by Gaia alone, currently about 4 per day). Therefore, careful selection of those, which are of highest scientific interest or are rare examples of events, play a crucial role. It is essential to observe as many as possible of them in detail from the ground while they are still on-going, in order to understand their nature and discover new types of objects. Early multi-band photometry informs on how an event develops in brightness and colour, allowing for early characterisation and helping decide on further follow-up observations.

The Cambridge Photometric Calibration Server (CPCS) has been designed to respond to the need of automated rapid photometric data calibration and dissemination for transient events, primarily from Gaia space mission. CPCS is in operation since 2013 and has been used to calibrate around 50 000 observations of hundreds of transients. We present the status of the tool and demonstrate improvements made in the newest version, which is enhanced with build-in profile photometric measurement. After tests and implementation on dedicated website, new Server will be able to combine data from multiple telescopes and is intended to provide science-ready photometric data within minutes from observations.

A 07 Photometric data around us

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An investigator of any variable star needs photometric data. Their sources could be very varied, from our own observations to different photometric surveys or previously published papers. We present the system AMPER for archiving photometric data for periodically variable stars and the tool PDR for retrieving of photometric data from selected surveys.

A 08 Synergy of professional and amateur astronomers

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Since the CCD technique became financially reachable for amateur astronomers, they can do professional science. Mainly in the time-domain astronomy, such as variable star research, their help is invaluable. I will focus on a cooperation between amateur and professional astronomers in the Czech republic, will give some examples of successful projects and propose new programs using 2-m Perek telescope and 0.6-m telescope (mainly in connection with TESS) that could benefit from such cooperation and bring high-quality results.

A 09 The OPTICON Trans-National Access programme.

J. Davies

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The EU Horizon 2020 OPTICON project includes Networks, Trans-National Access and technology oriented Joint Research Activities. The Trans-National Access programme provides, via an international time allocation committee, free access to a suite of European telescopes ranging from classically scheduled 4m to 0.5m robotic telescopes. Increasing emphasis is being placed on quick reaction type time domain projects. This presentation will describe the operation of the Trans-National Access activity and the opportuniites it will provide until the end of the contract in 2020. Some conclusions and useage statistics after eight years of operation will be given.

A P01 Spectroscopic instrumentation of 1-m class telescopes for ground support of the space mission WSO-UV

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In 2018 the Scientific Committee of the project World Space Observatory- Ultraviolet makes a call for applications to be included into the project Core Program. Some of astrophysical studies require both Ultraviolet orbital observations with the WSO-UV as well as observations with ground based instrumentations in visual wavelengths. In this paper we will discuss spectroscopic instrumentations of 1-m class telescopes to be used as project ground support. We also discuss astrophysical studies that require both ground base and orbital observations.

A P02 WSO-UV Field Camera Unit: Science Case and Ground Support with 1-m class telescopes

M. Sachkov, S. Sichevsky, E. Kanev, A. Kartashova

Institute of Astronomy of the RAS, 48 Pyatnitskaya str., 119017 Moscow, Russia

We present here the new imaging instrument onboard the WSO-UV (World Space Observatory - Ultraviolet) project for observations in the UV (115-310 nm) spectral range. We describe the key scientific drivers of the instrument and Ground based instrumentation of the 1-m class telescopes to support space UV observations. The World Space Observatory–Ultraviolet is a Russian-Spanish space mission born as a response to the growing up demand for UV facilities by the astronomical community. It is the only 2-meter class on-orbit telescope in the after–HST epoch fully devoted to UV observations.

A P03 Current status of the Milanković telescope

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Telescope Milanković is a 1.4m telescope installed at the Astronomical station Vidojevica on a mountain in south of Serbia. The telescope was procured through the FP7 REGPOT BELISSIMA project with the support of the Serbian Ministry of Education, Science and Technological Development which started in 2010. and finished in 2016. by setting up the telescope in the temporary pavilion. With ultimate goal to make the telescope robotic, we have built a new pavilion and provided several modern instruments. Here, we present our 1.4m telescope, its past/present status.

A P04 SKVO - Slovak Virtual Observatory

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We present basic structure of Slovak Virtual Observatory - SKVO. It was created to provide free access to mainly photometric (but also for spectroscopic and image) data obtained by instrument in Slovakia. Optimal database structure was designed for a fast data access. Because there is no standard VO protocol for photometry data, we adapted Simple Spectral Access Protocol (SSAP). We present also WEB based interface to data access and visualization.

A P05 CoLiTecVS - new tool for automated reduction of photometric observations

V. Savanevych[1], O. Briukhovetskyi[1], S. Khlamov[2], A. Pohorelov[3], V. Vlasenko[1], P. Dubovský[4], I. Kudzej[4], Š. Parimucha[5]

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CoLiTec application was originally developed for automated detection of objects with nonzero apparent motion. Recently we started the mayor update with the goal to use it in the variable stars research as the tool for automated reduction of CCD images. The new version is called CoLiTecVS. Nowadays the software is able to do the following: 1. Calibration of the images by bias-frame, dark-frame and flat-field. Optionally the calibration by flat-field can be improved or completely substituted by inverse median filtration; 2. Identification of stars on the frames, plate solution and cross identification with astrometry catalogues; 3. Ensemble differential photometry using artificial comparison star constructed from weighted contribution of several selected constant stars; 4. Light curve construction for one selected object 5. Archive the target data in the publicly available database ViViO. The process is fully automated and can be run online during the observations.

We have performed several tests to ensure the reliability of produced data. We have analyzed archival images taken at the Astronomical Observatory on Kolonica Saddle with several instruments. First we have investigated the possible influence of non-linearity of median filtering on the photometry results. We didn't find measurable influence. Contrary – the background brightness equalization by inverse median filter usually provides better results as classical flat-field calibration. The photometry of constant stars obtained by CoLiTecVS was compared with the values obtained by conventional reduction process i.e. calibration and photometry performed with Muniwin software and subsequently the ensemble photometry with MCV software. The result was satisfactory and now CoLiTecVS is regularly used in data reduction at the Astronomical Observatory on Kolonica Saddle.

A P06 Slovak-Bavarian collaboration on the development of telescope instrumentation

T. Döhring[1], T. Pribulla[2], R. Komžík[2], M. Mann[1], P. Sivanič[2], M. Stollenwerk[1]

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Within the project SLOBATCO (Slovak-Bavarian Telescope Collaboration) the Astronomical Institute of the Slovak Academy of Sciences and Aschaffenburg University of Applied Sciences collaborate in the development and commissioning of scientific instrumentation for the new 1.3m astronomical telescope at the Skalnaté Pleso observatory (Slovakia). The joint project is funded by the Bavarian Academic Center for Central, Eastern and Southeastern Europe (BAYHOST). Planned technical work packages are targeting the filter wheel software for the VIS camera, additional IR filters, and an upgrade of the mirror coating facility by additional sputtering equipment.

Session B: SCIENCE WITH SMALL TELESCOPES

B 01 The study of novae with small telescopes

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The outbursts of novae are thermonuclear runaways (TNR) events developing in the electron-degenerate envelope accumulated on the surface of a white dwarf as consequence of mass transfer from a companion. The latter can be anything from the lighest and smallest star up to a gigantic, long-period Mira variable. Depending (primarely) on the nature of the companion, the orbital inclination and the mass of the white dwarf, the outbursts of novae can take many different forms along very different time scales. The quiescence the novae experience between outbursts, either affected by hybernation or not, is equally reach in catching phenomena, many of which common to cataclysmic variables.

A great boost and a new perspective to the study of novae have been recently added by a more regular access to both ends of the electromagnetic spectrum, in particular to γ-rays (Fermi), X-rays (Swift, Chandra, XMM-Newton) and radio (VLA, Merlin). Still, it is the optical that provide the context and the dense monitoring weave required to properly interpret and inter-connect them. Thanks to their intrinsic high luminosity (up to $M_V \approx -10$ mag), the outbursts of novae can be followed photometrically and spectroscopically for long time intervals and through most of the Galaxy with $\leq$1 meter optical telescopes. The quiescence of novae with giant companions and those trapped in prolonged phases of stable burning are also within reach over several kpc distances.

We will review the state of optical observations of novae either in outburst and in quiescence, highlighting new trends and perspectives specific to $\leq$1 meter instruments.

B 02 Optical photometry and spectroscopy of V612 Sct: slow classical nova with rebrightenings.

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We present the results of multicolour photometry and optical spectroscopy of the slow classical nova V612 Sct, discovered during its outburst on 2017 June 19.41 UT. Our $UBVR_CI_C$ CCD photometric observations were obtained with the 0.18m and 0.6m telescopes of the AISAS observatory in Stará Lesná and 0.5m telescope at the Crimea Station of the Moscow State University. Our optical echelle spectra were obtained with the 0.6m and 1.3m telescopes at Stará Lesná and Skalnaté Pleso observatories, respectively. Our data were completed by the AAVSO International Database photometry and the Astronomical Ring for Access to Spectroscopy (ARAS) data. The nova V612 Sct reached its brightness maximum $V_{max} = 8.42$ mag and $B_{max} = 9.53$ mag on 2017 July 29.99 UT. The light curve allow to classify it as a slow nova of J-class with multiple peaks on the decline, similar to V723 Cas, HR Del, V4745 Sgr or V5558 Sgr. We used the V and B light curves to find the rates of decline $t_{3,V} = 105$ d and $t_{3,B} = 224$ d. We estimated by applying MMRD relations the absolute magnitudes of the nova at maximum $MV_{max} = -6.66$ and $MB_{max} = -6.43$. The latter value yields a mass of 0.65 $M_\odot$ for the white dwarf component. The value of the colour excess $E_{B-V} = 0.755$ allows to calculate the distance 3.5 kpc to the nova. The study of radial velocities of Hα and Hβ P Cyg absorptions revealed the structure of an expanding shell consisting of inner and outer envelopes, accelerated by the wind. The P Cyg absorptions were most enhanced during rebrightenings.

B 03 Multicolor Photometry of unusual Nova KT Eri

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The nova KT Eri was discovered by K. Itagaki during the outburst in November 2009 at $V = 8^m.1$. We carry out multicolor $UBVRI$ CCD – photometry of fast He/N nova KT Eri at the period from the end of 2009 until 2017. We also added the $BVRI$ observations from AAVSO. We were successful in catching the decline of the outburst. The amplitude of the outburst was $\sim 9^m$, which is more common for recurrent novae, than for the most powerful outbursts of classical novae with an usual amplitude of $\sim 10 - 19^m$, and no previous outbursts were found. Different authors found different values of period in quiescence (737, 376, 752, 203, 472 days), which can be connected to the orbital rotation of the system. Because of this reason, we decided to obtain new time series observations to find the real value of orbital period. Also we have studied the colour indices variations during the decline and quiescence stages. Our observations and the observations of the other authors show that the periodicity can be expalined by the orbital rotation of the system, and supposed, that the donor star appears to be a RGB star. Note, that after the outburst KT Eri was also detected as soft X-ray source (SSS) and at radio wavelengths. As a result, we calculated the main physical and geometric parameters of KT Eri, based on the new value of orbital period.

B 04 Selected new results on pulsating variable stars

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Recent progress in the studies of pulsating variable stars is summarized from an observational point of view. The emphasis will be laid on classical pulsators (Cepheids of all kind, RR Lyrae and delta Scuti type variables). A number of unexpected phenomena have been revealed in the case of pulsators in the classical instability strip. These discoveries – lacking theoretical explanation yet – make pulsating stars even more valuable objects for astrophysics than before.

B 05 ASAS-SN a as stellar variability survey

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ASAS-SN is a photometric survey covering the the whole sky up to 17 mag in V band. The observations are carried out with a network of five 14-cm quadruple telescopes locates in Chile, South Africa, Hawaii and Texas. The original goal of the project was to look for supernovae and other transient phenomenons. However, the huge amount of collected photometric date, also allows for identification of different types of variable stars.

The first catalog of ASAS-SN variable stars, containing over 57 000 objects has already been published. Current work is focused on exploring the cross-matched date of the ASAS-SN and APOGEE surveys, to produce a sample of variables for which both photometric and spectroscopic. The ultimate goal of the project is to provide a complete, all-sky catalog of variable stars up to 17 mag.

B 06 Optical observations of bright Supernovae

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The program of CCD UBVRI photometric monitoring of bright supernovae (SNe) is carried out at 0.2 – 1.0 meter telescopes of Sternberg Astronomical Institute, Crimean Astrophysical Observatory and Stará Lesná Observatory since 1998. We have observed more than 300 SNe of different types. We present the light curves and spectra of SN Ia 2014J, light curves of type II SNe 2009af, 2009ay, 2010jl, 2017eaw, type Ibn SN 2015U, SLSN 2017egm and peculiar object SN 2018cow. We discuss the physical parameters of the explosions and latest developments of SN classification.

B 07 Studying symbiotic stars and classical nova outbursts with small telescopes

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Symbiotic stars (SSs) are the widest interacting binaries, whose orbital periods are in the order of years, while cataclysmic variables (CVs) are interacting binaries with periods of a few hours. Both systems comprise a white dwarf (WD) as the accretor. In the former the WD accretes from the wind of the evolved red giant, while in the latter from the evolved main sequence star via the Roche-lobe overflow. Both systems undergo unpredictable outbursts. Violent explosions by a CV in the form of classical nova increases the optical brightness by 7–15 mag, while outbursts of SSs cause a brightening by 1–3 mag. Using the multicolour photometry and optical spectroscopy obtained with small telescopes, I will present examples of the outburst by the classical nova V339 Del (Nova Del 2013) and by the symbiotic star AG Peg in 2015.

B 08 The current active stage of the symbiotic system AG Draconis

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AG Dra is one of the best studied symbiotic systems. Its cool component is a metal-poor cool giant of spectral type K3 and higher luminosity than that of standard class III. The hot component of AG Dra is considered to be a white dwarf sustaining a high temperature of $(1\text{-}1.5) \times 10^5$ K and luminosity of $(1 - 5) \times 10^3\,L_\odot$ due to the thermonuclear burning of accreted matter on its surface. The giant is underfilling its Roche lobe and the accretion most likely takes place by the stellar wind from the cool giant. Both components are in a circumbinary nebula, partially ionised by the white dwarf.

The period analysis of long-term photometric as well as spectroscopic observations confirmed the presence of the two periods in AG Dra. The longer one (≈ 550 d) is related to the orbital motion and the shorter one (≈ 355 d) could be due to pulsation of the cool component of this symbiotic system.

AG Dra regularly undergoes quiescent and active stages which consist of several outbursts repeating with about 360 d interval. UV and X-ray observations showed that there are two types of outbursts: *cool* and *hot* ones. In the previous work we demonstrated that the outbursts of AG Dra can be clearly distinguished also according to the behaviour of the prominent emission lines in optical spectra.

After seven years of flat quiescence following the 2006 - 08 major outbursts, in the late spring of 2015, the symbiotic system AG Dra started to become brighter again toward what appeared to be a new minor outburst. The current outburst activity of AG Dra was definitely confirmed by the following three outbursts in April 2016, May 2017 and April 2018. The photometric and spectroscopic observations suggest that all of these outbursts are of the *hot* type. Such behaviour is quite unusual, because the major outbursts at the beginning of active stages are typically *cool*. In the presented work, the current activity of the symbiotic binary AG Dra is presented in detail.

B 09 Recent progress of research on evolution of dwarf novae by using time-series photometry

K. Isogai, T. Kato and VSNET collaborations

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Cataclysmic variables (CVs) are composed of a primary star which is a white dwarf and a secondary one which is typically a late-type main sequence star. Because the secondaries fill the Roche lobes and transfer their mass, CVs have accretion disks around the primaries. Dwarf novae (DNe) are a subclass of CVs and are characterized by outburst phenomenon which is a sudden increase in brightness of the disk.

According to the evolutionary theory of CVs, mass ratios (=secondary /primary mass) of CVs gradually decrease because of mass transfer as they evolve. Basically orbital periods also decrease due to angular momentum loss from binary systems. However, when the secondaries lose enough mass, the secondaries begin to be degenerate and the mass-radius relation of the secondary is reversed. Then the orbital periods become longer as they evolve. Such objects are called "period bouncers". Although Kolb (1993) proposed that about 70% of CVs are period bouncers on the basis of the theory, the discovery number is too small.

In order to reveal the evolutionary path of CVs, we need to study more objects statistically. Especially, SU UMa-type DNe and the subclass WZ Sge-type DNe are one of the best targets. They represent the terminal phase of a typical CVs evolution, thus part of them are period bouncers. Moreover, they show some characteristic phenomena which give us much information about their evolution stages: superoutburst, superhump, early superhump, and rebrightening. We have studied a large number of DNe by using small telescopes and international observation network VSNET. In recent years, we have established a method to estimate a mass ratio, which is one of the most important parameter of the CV evolution, by using an orbital period and a growing (stage A) superhump period. We are also revealing some correlations between mass ratio and period derivatives of superhumps ($P_{\rm dot}$), or evolution stages and rebrightening types. They are also a potentially powerful tool for the research on the CV evolution.

B 10 An evolution of superhumps of a WZ Sge-type system in Leonis OT J104411.4+211307

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We present our $UBV(RI_C$ observations of a WZ Sge-type dwarf nova in Leonis (OT J104411.4+211307) during its superoutburst in 2010 and 2016 – 17 in quiescence. The outburst light curve showed one rebrightening. The evolution of nightly outburst light curves of early, ordinary and late superhumps was traced. The mean superhumps period 0.06053 days was determined and period changes were detected. We carried out our observations at 3 observatories – in Stará Lesná (Slovakia), in Nauchny (Crimea) and on Mt. Terskol (Russia) from February 17, 2010 till the end of superoutburst and obtained 4700 observational frames. Most of them were in V- and R_C-bands (3600 and 670 frames, respectively).

In quiescence we observe the system with 2.5-m telescope of SAI (the Caucasus mountain observatory) and did not find clear variability at this stage.

B 11 ASASSN-18fk: a new WZ Sge-type dwarf nova with multiple rebrightenings and a new candidate for superhumping intermediate polars

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We present the result of a multi-longitude campaign on the photometric study of the dwarf nova ASASSN-18fk. It was observed with 18 telescopes at 15 sites during $\sim$ 70 nights within a three-month interval. Observations covered the main 2018 outburst, six rebrightenings and 50-d decline to a near-quiescent state. We identify ASASSN-18fk as a WZ Sge-type dwarf nova with multiple rebrightenings and show the evolution of the 0.06-d superhump period over all stages of the outburst. A strong 22-min brightness modulation that superimposes on superhumps is found during rebrightenings and decline. Some evidence of this modulation are detected during the very beginning of the outburst. We interpret the 22-min modulation as a spin period of the white dwarf and suggest that ASASSN-18fk is a good candidate for superhumping intermediate polars.

B 12 Spectroscopic Monitoring of Eruptive Stars and the ARAS database

F. Teyssier

ARAS (Astronomical Ring for Amateur Spectroscopy)

Spectroscopic monitoring of eruptive stars (e.g. symbiotic binaries, classical novae) by amateurs around the world, in both the northern and southern hemispheres, is a fundamental activity of ARAS (Astronomical Ring for Amateur Spectroscopy) initiative. The group of volunteers demonstrates what can be accomplished with a network of independent, very small telescopes (from 20 to 60 cm), furnished with spectrographs of different resolution, from ∼500 to ∼15000, and covering the range from 3600 to nearly 8000 Å. Acquisition, reduction and analysis of the spectra will be described.

The observing program concentrates on bright symbiotic stars (52, to date) and novae (34, to date). The main features of the ARAS activity are rapid response to alerts, long term monitoring and high cadence. A part of the program involves collaborations based on requests from professional teams (e.g. CH Cyg, AG Dra, R Aqr, SU Lyn, V339 Del) for long time monitoring or specific events. Some examples of the evolution of basic observational parameters along outbursts and/or as a function of the orbital phase (e.g. radial velocities, equivalent widths or lines profiles) are presented. The spectra are gathered in the open access Eruptive Stars Database that has been used for several publications by professional teams.

(*http : //www.astrosurf.com/aras/Aras_DataBase/DataBase_EruptiveStars.htm*).

B 13 Study of long-term spectroscopic variability of symbiotic stars based on observations of the ARAS Group

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Symbiotic stars are strongly interacting systems, in which physical mechanisms related to transfer and accretion of matter cause observable activity by manifesting increases of brightness (about 2 – 5 mag) and significant changes in their spectra. These binaries are consisting of a cool giant of spectral type K - M and hot compact star, mostly a white dwarf. The mass transfer most likely takes place by the stellar wind of the cool giant, which is also the source of a dense circumbinary envelope of these systems.

Symbiotic systems are open binaries with orbital periods of hundreds to thousands of days and their stages of activity may last from a few days to decades. Therefore, the long-term photometric as well as spectroscopic observations of these interacting systems is needed to study the physical mechanism responsible for their observed activity. Both amateur and professional astronomers utilizing small telescopes play important role in such monitoring.

In the presented work, the importance of small-telescope observations is demonstrated by investigation of long-term outburst activity of symbiotic systems AG Dra, Z And and AG Peg based on spectroscopic measurements obtained by amateur astronomers grouped in the Astronomical Ring for Amateur Spectroscopy (ARAS). Preliminary results of our ongoing spectroscopic campaign focused on AG Dra are presented. The temperature of the white dwarf in AG Dra is studied based on behavior of the prominent emission lines which are well detectable even in low-resolution spectra. Moreover, the activity and overall behavior of AG Dra are compared to that of two other symbiotic systems - Z And and AG Peg, which have shown outbursts recently. Z And is the prototype of the classical symbiotic stars and manifested the outburst at the turn of the years 2017 and 2018. AG Peg is the slowest symbiotic nova, which showed Z And-type outburst in 2015, 165 years after its nova-like flare-up.

B 14 UX Ori type stars in the young cluster IC 348. Results of the 15-year photometric monitoring.

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UX Ori type stars are known as irregular variables demonstrating Algol-like minima. This type of variability is usually observed in Ae/Be Herbig stars, but sometimes T Tauri stars demonstrate it, too. Today, it is commonly accepted that the main reason of variability of UX Ori type stars is small inclination of their circumstellar disks to the line of sight. Due to the motion of matter in the disk the column density of dust continuously varies along the line of sight, which causes the variations of circumstellar extinction and, hence, stellar brightness. Among all T Tauri stars primarily classical T Tauri stars have circumstellar disks. Thus, until recently the UX Ori type photometric activity had been usually observed in these stars. However, during the last years a few of weak-lined T Tauri stars (WTTS) have been discovered which one could attribute to the UX Ori type by considering the entire set of their photometric characteristics. This is, in a sense, an unexpected result since the UX Ori type variability is associated with actively accreting young stellar objects surrounded by young circumstellar disks, while WTTS' disks - if they do exist - are very rarefied and accretion in these objects has almost terminated. In this talk we present the results of our 15-year observations of T Tau type stars in the young cluster IC 348 showing the photometric activity of UX Ori type stars and discuss a possible nature of their variability.

B 15 Digging Out Twin-Binary Star Systems from the ASAS Catalogue and Determining Their Physical Parameters

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Binary star systems have always been a popular topic in astronomy beacuse of determining their stellar parameters are quite accurate and precise which helps us to understand stellar evolution. Twin-binary star systems are quite interesting topic which still holds questions about their origin and formation.

First of all, we have studied ASAS catalogue for binary systems with light curves that have similar depths and shapes. After the selection was done, we have measured the selected systems's colour temperatures via photometry which gave us an idea about their spectral classes. In a further step, we have measured radial velocity of these systems with medium resolution spectrograph. By referencing photometric temperatures we have measured, we have made model atmoshpheres and synthetic spectra of these systems. By using radial velocity values we have convolved synthethic spectra to fit our observational spectra and we have determined the systems parameters.

B 16 Results of monitoring hot Algols showing long photometric cycles

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A group of hot Algols showing long photometric cycles lasting in average 33 times the orbital period constitutes a fascinating enigma in the field of close binaries and general stellar variability. These objects were dubbed Double Periodic Variables (DPVs) by Mennickent et al. (2003) and the most famous example is β Lyrae. These semi-detached systems have a B-type star surrounded by an accretion disc feed by a later-type giant star filling its Roche lobe. Although β Lyr shows a measurable orbital period change (19 s/yr, Harmanec and Scholz 1993), most of the DPVs do not. Interestingly, a large coronal loop was observed in multi-epoch radio imaging in the Algol system by Peterson et al. (2010), suggesting an asymmetrical magnetic field structure between the two stars. More recently, a magnetic dynamo has been suggested as driver for the long DPV cycles (Schleicher & Mennickent 2017, Mennickent et al. 2018).

We show results of our recent investigation of DPVs based on models of I-band light curves of Magellanic Clouds systems obtained from the OGLE database. The data are analyzed after disentangling the orbital and long cycle light curves. While the orbital periods are usually of a few or tens of days, the long cycle lasts tens or hundreds of days, with I-band full amplitude up to 0.8 magnitude. Changes in the shape of the orbital light curve are sometimes observed, along with variable timings of eclipses. Some cases can be interpreted in terms of changes of radial extension, temperature and vertical thickness of the circumprimary accretion disc or variable hotspots, and these changes are sometimes linked to the long-cycle phase (e.g. Garcés L. J. et al. 2018). The analysis of the OGLE database reveals the importance of continuous photometric monitoring of this emergent subclass of interacting binaries and the need of well organized campaigns for the Galactic counterparts with small and medium-size telescopes.

B 17 Double eclipsing systems

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Up to now it was not clear whether the candidate double eclipsing systems really constitute quadruple stellar systems, or whether these are two independent eclipsing binaries at different distances projected into the same direction by a pure chance. We did for the first time a thorough analysis of 24 such systems, among which 10 were proved to orbit around a barycenter of each other, hence being real bound systems (i.e. more than 40% of our sample are proved quadruples). Hence, we believe that almost all of the known doubly eclipsing systems really constitute the rare quadruple stellar systems.

B 18 KOREL disentangling of the LMC eclpising Algol OGLE-LMC-DPV-065

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The spectroscopy of binary stars is often not an easy task. This is because the spectral lines of the components of our systems are overlapping. Even more, if we want to study in detail the composition or physical/orbital parameters of each component, it is convenient to study each spectrum separately.

Thus, one of the ways to visualize each spectrum is to apply the method of spectra disentangling which has been developed by several authors. In this work, specifically, we will show the Fourier disentangling code KOREL (Hadrava 1995).

The KOREL code provides an efficient way to obtain the orbits and decomposed component spectra in multiple systems (for the moment only five components including telluric lines). With KOREL code it is possible not only to separate the spectra, but also at the same time, we can fit of the orbital parameters.

Therefore, a brief introduction to the use of the code will be given. We will show the results obtained of the OGLE-LC-DPV-065 system with other examples, as well we show how to prepare the input data to execute the code and interpret the results.

B 19 Tracking Massive Pairs

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Analysis of eclipsing binaries with massive components enables not only to test stellar evolution models, but also to track several aspects of early type stars structure. For instance, pairs with B-type components serve as a perfect tool to find tighter constraints on the mechanisms of the convective core overshooting or determine masses of β-Cephei stars. Results of the analysis of several eclipsing binaries observed by a wide range of small ground-based telescopes, and supported by BRITE-Constellation data, will be presented

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B 20 Observations of Slightly Studied CBS with period variations

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Period variations in close binary systems connected with mass loss or/and mass transfer in the system or presence of third body are observed as different types of O-C diagrams. Taking into consideration the parameters of using telescope ZTS-702 ($D = 702$ mm, $F = 2806$ mm, CCD ST7 equipped VRI filters, field $5' \times 8'$) we selected about 150 slightly studied binary systems in Aquila, Auriga, Andromeda, Cassiopeja, Pegasus, Cygnus, Cepheus etc. All selected stars has no full light curves and a small number of observed minima. We improved the situation, viz: we obtained more than 40 new time minima for some objects; we estimated mass transfer for 6 systems; we first calculated the parameters of components for 4 systems; we also replaced of primary and secondary minima for V859 Cyg.

The details of study and results are discussed.

B 21 A relation between the brightness maxima separation and mass ratio in contact binaries

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We present a study of the fine effects in the light curves of contact binary stars. We focused this work on the location of brightness maxima, which turned out to hardly ever lie at the exact orbital phases $\phi = 0.25$ and $\phi = 0.75$, i.e. during the best exposition of the binary' components toward the observer. We have discovered a connection between the maxima separation (S) and the mass ratio (q) of the system. The relation ensures the maxima separation $S > 0.5\,\phi$ for $q < 1$. This effect was studied within the UBVRI light curves taken with small telescopes and high-precision Kepler data for a total of 88 binaries. We performed an extensive numerical modeling to study the effect theoretically.

We propose the use of the maxima separation for a proper phasing of light curves. The criterion of $S > 0.5\,\phi$ ensures that the primary minimum correspond to the position of the less massive component in front of the more massive primary. Interestingly, the numerical simulations predict that the separation grows with smaller inclinations, making the method even more useful for the low-inclination, non-eclipsing binaries. We show that our method is viable for light curves experiencing large ellipsoidal effect with minima of similar depths, which makes it adaptable also to detached, near-contact binaries.

In the course of our study, we started to analyze the influence of starspots on the maxima separation for contact and near-contact binaries. We expect it is possible to locate the latitude of the migrating starspot using the information hidden in maxima separation evolution. We present some of the newest results of our ongoing observational program of multicolor study of the starspot migration. We invite to participation in the program, which consists of about 200 neglected binaries. The catalog of the binaries with the EW-type light curves with a suspected ongoing starspot migration, suitable for observations with small (0.3 - 1.0 meter) telescopes, is available on-line.

B 22 Using wide sdB+MS binaries to constrain RLOF models

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Hot subdwarf B (sdB) stars are evolved core helium burning stars that have lost most of their hydrogen envelope due to binary interaction on the red giant branch. As sdB stars in wide binary systems can only be created by stable Roche lobe overflow, they are a great test sample to constrain the theoretical models for stable mass loss on the red giant branch. We have setup a long term monitoring program using high resolution spectrographs on the 1.2m Mercator, 1.5m SMARTS and 2.2m MPG telescope to create a sample of long period sdB binaries with accurately determined orbital parameters.

An important advantage of using wide sdB binaries in these studies is that all of them are double lined binaries, and the GAIA data shows that it is a uniform population of canonical sdB stars. This way the sdB+MS binaries provide much stronger constraints on theoretical models than many other systems.

The first results of our observing program are now available. We found two main features in the orbital parameters. The majority of the systems have eccentric orbits with systems on longer orbital period having a higher eccentricity. As these systems have undergone mass loss near the tip of the RGB, tidal circularisation theory predicts them to be circularized. Our observations suggest that efficient eccentricity pumping mechanisms are active during the mass loss phase. Secondly we find a strong correlation between the mass ratio and the orbital period. Using binary evolution models, this relation is used to derive both an upper and lower limit on the initial mass ratio at which RLOF will be stable. These limits depend on the core mass of the sdB progenitor. The limits found for wide sdB binaries can be extrapolated to other systems, and will help to improve binary evolution models.

B 23 Parameters of 2MASS J16211735+4412541 in the quiescent state

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2MASS J16211735+4412541 is a short period eclipsing binary that was classified as a contact system based on its light curve gathered by large surveys. In June 2018 it unexpectedly brightened by about 2 magnitudes and stayed in this high state cose to 2 weeks. The shape of the light curve changed in the outburst but within a week the system returned to its pre-outburst state. This behavior suggest the system is of a cataclysmic type.

We report here a follow-up, multifilter observations taken in BVRI colors in 2017 and 2018. We will present evolution of the system light curve shape as well as preliminary system modeling. Based on those we infer that the system still contains an accretion disk and not a bare white dwarf.

B 24 Surface Inhomogeneities of the Eclipsing Binary ER Vul

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We performed Doppler imaging of the eclipsing binary ER Vul with the help of the code DoTS, using time-series mid-resolution (R 13500) spectra of the system. The spectra were acquired via the echelle spectrograph attached to the 0.4m Kreiken Telescope at the Ankara University Kreiken Observatory. We applied Least-Squares Deconvolution (LSD) technique in order to enhance the SNR of spectra to better resolve the spot signatures. We compared the resultant surface maps of the system with the available maps in the literature to investigate the activity behaviour of ER Vul. In addition to the Doppler imaging, we also obtained the radial velocity data of the system and determined the current spectroscopic mass ratio of the system as 0.98±0.06.

B 25 Deriving photospheric parameters and elemental abundances for a sample of stars showing the FIP effect

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One puzzling question in solar physics is the difference between elemental abundances in the photosphere and the corona. Elements with low first ionization potential (FIP) can be overabundant in the corona compared to the photosphere under certain circumstances. The same phenomenon has been observed on a handful of stars, while a few of them show the inverse effect. But not all the stars in the original sample had precise photospheric abundances derived from optical spectra, so for some the solar values were used. In this work we make homogeneous abundance measurements from optical spectroscopy. We collected spectra of 17 stars showing the FIP effect with the 1-m RCC telescope of Konkoly Observatory, with resolution of $\lambda/\Delta\lambda = 21\,000$. We determine the fundamental astrophysical parameters ($T_{\rm eff}$, $\log g$, $[M/H]$, $\xi_{\rm mic}$, $v \sin i$) and individual elemental abundances with the SME spectral synthesis code using MARCS2012 model atmosphere and spectral line parameters from the Vienna Atomic Line Database (VALD).

B 26 INASAN NEO finder (INF) project

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After the Chelyabinsk event it is evident that not only large asteroids but also 10 m size meteoroids pose a substantial hazard. The number of near-Earth objects has been growing rapidly due to special surveys such as Spacewatch, ATLAS, Catalina Sky Survey, Pan-STARRS, space-based NEOWISE and others. But we have no system for massive detection of small (10 m) bodies.

INASAN propose to build a dedicated network of robotic telescopes to detect 10 m asteroids coming in the near Earth Space. The project is named INF (INASAN NEO Finder).

The INF project main features are short cadence time (1 h) of all-sky survey and moderate limiting magnitude (19^m) without filters, possibility of carrying out the additional scientific program.

The INF multiaperture telescope consists of 8 VT-78d telescopes on fast mount. The VT-78d telescope provides unique combination of parameters: aperture (250 mm), fast focal ratio f/1.58, field of view (10 deg diameter, 78.5 sq. deg) and image quality (5 arcsec). The INF total field of view is 574 sq. deg (298 Mpixels) with 5.2 arcsec/pixel scale.

INF project will be capable to get all-sky (20000 sq. deg) survey in 1h down to 19^m. The INF survey performance (8 visit of every point on the sky per night) gives us a possibility not only to detect NEOs but also to calculate their orbit and to sent an alert for follow-up observation with more powerful telescopes. According to our estimates the INF will discover 7330 NEOs of 10 m size in 5 years in case of every day operation (8 hour per night).

INASAN today is close to finish the construction of INF telescope prototype. The INF prototype consists of 2 identical wide-field telescopes VT-78d equipped with 4k x 4k CCD cameras on fast-track mount. First light is expected at the end of 2018.

B 27 Spectral observations and photometry of near Earth object (NEO) 2001CP44-s1

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We present the spectral and photometrical quasi-simultaneous observations of 2001CP44-s1=25916 NEO asteroid which were conducted with the help of 2-m Zeiss Terscol(Caucasus) and 1-m Zeiss mt. Koshka(Crimea) telescopes. We obtained the new value of the period of the optical variations, colour indexes, the taxonometric class and some other characteristics of the object. We present the methods and the results of data processing, the comparison analysis of light curves in different pass-bands. Taxonometric class is obtained from the spectral observations and from the mean colour indexes analysis. Some recommendations on the methods of simultaneous spectral and photometric observations are given.

B 28 Small telescopes and their application in space debris research and space surveillance tracking

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Space debris is an essential treat to the satellite infrastructure. Possible collision with even small particles, e.g. 1 cm of size, can cause a catastrophic event when the parent body, a spacecraft or upper stage, will break up into hundreds of small fragments. The space debris research and space surveillance tracking (SST) help to discover, monitor and characterize these objects, identify their origins and support their active removal.

Two major observations strategies are recognized for optical observations. The optical surveys aim to discover new objects for cataloguing or statistical purposes. The tracking observations are performed for catalogued objects to improve their orbits or to investigate their physical characteristics. Majority of the systems are focused on the high orbital regions when objects' orbits have mean motion less than ~ 10 revolutions per day. For lower altitudes, so-called Low Earth Orbits (LEO), more complex tracking capabilities of the system are needed.

In our work we will present applications of small telescopes in space debris area, they usage for surveys, tracking and cataloguing. We will discuss the world largest optical SST networks, individual space debris research telescopes, as well the space debris research program at the domestic 70cm telescope installed at the Astronomical and Geophysical Observatory in Modra (AGO), Slovakia which belongs and is operated by the Faculty of Mathematics, Physics and Informatics of Comenius University in Bratislava, Slovakia. Presented will be products provided by these systems.

B 29 Galactic astronomy and small telescopes

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Year 2018 marks a revolution in Galactic astronomy. With the second public data release of ESA's Gaia mission we now know distances, proper motions, colours, and in many cases radial velocities for stars throughout the Galaxy. Large ground-based spectroscopic surveys, like Galah, RAVE, Gaia-ESO, and Apogee are adding chemistry and even more precise radial velocities. The promise of revealing the structure, evolution and origin of our Galaxy, as one of the typical galaxies in the Universe, is being fulfilled with new discoveries of coherent structures which echo its violent past.

Does this leave any room for contribution from small telescopes? The answer is a resounding yes. For a start, one can go cherry-picking and engage in additional observations of objects of special interest, because they are outliers of their class or because additional observations can be used to measure crucial stellar parameters, like mass, radius, or degree of stellar multiplicity, with unprecedented detail. In time, observations of single objects can evolve into little surveys, which can make a valuable contribution, if the objects for observation are selected in a transparent way and share a common physics background.

To fullfill these goals we all need to get familiar with data provided by the large surveys, get to know their limitations, understand how the data files were generated in an automated way and especially, what are the limitations of this process. So new surveys do not take work from the small telescopes, in fact they provide orders of magnitude more of interesting targets than known a year ago.

B 30 Planets across the HR diagram

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The properties of planets are intimately linked to their host stars. One of the fundamental properties influencing the architecture of a planetary system is the mass of the host star. The observational paucity of planets around intermediate mass main sequence stars is a hurdle to understanding the effects of stellar mass on the resulting planet system properties.I will introduce our ongoing program with the TRES facility on the 1.5m telescope at Whipple observatory to uncover new planets in the relatively unexplored environment around A stars. To date, we have been responsible for six of the nine planets discovered around stars hotter than 7000K. Our work on TRES has revealed that these planets are all likely scattered inward in a dynamically hot environment, different to those found around cooler stars.

In the era of TESS, with planets abound across bright stars, the works of 1-m class telescopes with instruments like TRES is ever more important. We expect some 1000 planets around A stars, some as small as super Earths, to be discovered by TESS over its primary mission around bright stars. Facilities on small telescopes will be essential in understanding the properties of planets across the HR diagram, and across the entire sky.

B 31 The Next Generation Transit Survey (NGTS)

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The Next Generation Transit Survey (NGTS) is an array of twelve independently mounted telescopes housed in a purpose-built facility at ESO's Paranal Observatory in Chile. Each telescope is a 20cm f/2.8 Newtonian telescopes fitted with a back-illuminated deep- depletion CCD camera. The telescopes operate in an robotic and automated manner, observing selected 8 square degree fields using the DONUTS autoguiding system for high stability photometry. NGTS provides very high cadence (10s), high precise (mmag) time-series photometry. The primary science goal is the discovery of Neptune-sized transiting exoplanets, and I will present some of the discoveries to-date including NGTS-4b (a sub-Neptune planet) and NGTS-1b (a hot Jupiter transiting an M-dwarf). I will also present other science from the NGTS project, including monitoring flaring stars and low-mass binaries. NGTS data is being made publicly available via the ESO data archive, with DR1 expected very soon.

B 32 YETI - The Young Exoplanet Transit Initiative

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The Young Exoplanet Transit Initiative (YETI) is a world-wide collaboration of up to 2 m-class telescopes to continuously monitor the photometry of stars, which are members of young (age < 100 Myr) nearby ($d < 1$ kpc) open star clusters.

Although the telescopes of the YETI network exhibit only small diameters, a photometric precision on the few milli-mag level is reached, which allows the detection of young transiting exoplanets and the precise measurement of their transit light curves, which is the primary goal of YETI. In addition, as secondary science of this initiative, for all stars, located in the observed fields of view, their photometric variability of any kind is investigated within a range of time between minutes up to years.

So far, several open star clusters could already be monitored in many photometric campaigns, successfully carried out over up to three subsequent years. Each of these YETI campaigns typically lasts for about two weeks, sufficiently long to detected all transit events of young exoplanets, which revolve on close-in orbits around the observed target stars. For detected transiting planet-candidates their radii are derived from the obtained transit light curves and follow-up observations are carried out to rule out false positive scenarios and eventually to determine the masses of these companions. The radius and mass determination of detected young exoplanets allows to probe their internal structure, and eventually will constrain planet formation and evolutionary models and their time-scales.

In my talk I will give an overview of YETI and present first results obtained during the last years in the course of this initiative, among them the young transiting exoplanet CVSO 30 b in the open star cluster 25 Ori. Finally, I will report on upcoming follow-up observations, proposed and scheduled for detected planet-candidates at 10 m class telescopes.

B 33 Exoplanet science with the robotic 1.2m STELLA observatory

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STELLA is a robotic 1.2m twin telescope located at the island Tenerife. One telescope hosts the wide field imager WiFSIP, the other the echelle spectrograph SES. The observatory is in operation for about 11 years. In this talk, I will review the science that has been done with WiFSIP in the field of extrasolar planets. Over the course of the past years, we successfully observed photometric transit light curves for transit timing analyses, planetary atmosphere characterization, and measurements of the spin-orbit alignment of the star-planet system. WiFSIP observed secondary eclipses, and we were enganged in projects to find planets with exotic methods. Finally, I will present a large program for multi-color monitoring of planet host stars to determine the effects of star spots on the planet characterization.

B 34 Timing precision in defocused observations of exoplanet transits with a meter-size telescope

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Telescope defocusing is a well-established technique (Southworth et al. 2009) in photometric observations of bright targets to achieve high precision by mitigating the effects of the photon noise, introduced by the obligation to use short cadences against detector saturation. When a telescope is defocused, the point spread function (PSF) of a stellar source is distributed over many pixels, making it possible to expose the detector for longer durations. Atmospheric scintillation and imperfect tracking also bring noise, leading to changes in the position of a source on the detector; which can not be corrected satisfactorily by flat fielding in most cases. Although making use of longer exposure times decreased the number of images acquired during an observing run, high photometric precision compensates for the loss in timing resolution. Furthermore, in a defocused photometric observation, most of the observing session is employed for obtaining photons from sources rather than reading out the images. Although the background noise also increases, the increase in the signal from the source dominates; resulting in a higher Signal-to-Noise Ratio (SNR). Follow-up observations of bright targets of all-sky-surveys such TESS are going to take some significant time of meter-size telescopes in the near future. We show that timing precision is improved and suggest observers to make use of the defocusing technique in the observations of such bright targets with this contribution. We also illustrate emprically, the efficiency of the technique by giving examples from the transit observations that we perfomed with the 1 meter Turkish telescope T100, located in TUBITAK National Observatory of Turkey (TUG). Finally, we analyze the transit timing variations (TTVs) observed in these systems, based on the light curves accumulated in the literature and open databases as well as our own data.

B 35 Planet-star tidal interactions with precise transit timing

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Theoretical calculation and some indirect observations show that massive exoplanets on the tightest orbits – so called hot Jupiters – must undergo orbital decay due to tidal dissipation within their host stars. This orbital evolution could be observationally accessible through precise transit timing over a course of decades. Meter-class telescopes are recognised as excellent instruments for such follow-up observations. They usually provide photometric time series of millimagnitude or even sub-millimagnitude precision for stars brighter than ∼12 mag. Such observations allow one to determine individual mid-transit times with errors between 20 and 40 s, and when they are combined together, the averaged timing precision down to or even below 10 s can be achieved in time scales of months. The rate of planetary in-spiralling may not only help us to understand some aspects of evolution of planetary systems, but also can be used as a probe of the stellar internal structure. Since 2017 we have run a regular observing campaign aimed at transit timing for a sample of best candidates for in-falling planets. Among them there is WASP-12 b, transits of which exhibit pronounced departure from a linear ephemeris. New observations allow us to confirm the rapid decay rate for that planet and to place constraints on the tidal dissipation efficiency in other systems.

B 36 Mysterious eclipses in the light curve of Boyajian star: a possible explanation

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Apart from thousands of "regular" exoplanet candidates, Kepler satellite has discovered a small number of stars exhibiting peculiar eclipse-like events. They are most probably caused by disintegrating bodies transiting in front of the star. However, the nature of the bodies and obscuration events, such as those observed in KIC 8462852, remain mysterious. We explore the possibility that such eclipses are caused by the dust clouds associated with massive parent bodies orbiting the host star. We assumed a massive object and a simple model of the dust cloud surrounding the object. Then, we used the numerical integration to simulate the evolution of the cloud, its parent body, and resulting light-curves as they orbit and transit the star. We found that it is possible to reproduce the basic features in the Kepler light-curve of KIC 8462852 with only four objects enshrouded in dust clouds. The fact that they are all on similar orbits and that such models require only a handful of free parameters provides additional support for this hypothesis.

B 37 Researches of Exoplanets Influence on Host Star Chromospheric Activity

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Our researches apply to possible interactions between extrasolar giant planets and their parent stars, resulting in activity enhancement in the stellar outer atmospheres. Possibility of their significant influence on stellar chromospheres is suggested. So, stars with nearby giant planets having short orbital periods may show evidences of chromospheric activity. To detect the stellar chromospheric activity and find out the possible connection between chromospheric activity and resonance gravitational influence of extrasolar giant planets we carry out the photometric and spectroscopic observations. One of features of chromospheric activity for sun-like stars in such systems, perhaps, is periodical variability of the most strong chromospheric lines H CaII, K CaII and H-alpha. It can be registered by measurements of chromospheric line intensities using spectral data. With reference to photometry it is possible to expect the variability in B and R bands containing these lines, respectively. We realize detection of chromospheric activity in such types of star-planet systems as Sun-like stars having planets with small rotational periods and stars with transiting planets. Presented work are based on the results of photometric observations for some star systems containing extrasolar planets with short orbital periods from 1.5 to 6.5 days. Analysis of variability of chromospheric lines H CaII, K CaII, H-alpha and periodogram Fourier analysis of observational data was done. Detected light curve variations and amplitudes of variations for different filters are presented.

B 38 Complex asteroid systems and their observations with meter-size telescopes

P. Pravec

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I will overview our project of studies of complex asteroid systems with meter-sized telescopes. We study small asteroids in excited rotational states (Non-Principal-Axis rotation), binary asteroid systems, asteroid pairs where the secondary was ejected from the system, and young asteroid clusters that consist of a primary and a few secondary asteroids that separated between 10^5 to 2×10^6 yr ago. I will also briefly mention how we contribute to the NASA DART mission to change the orbit of the secondary of binary near-Earth asteroid (65803) Didymos. For these studies, our primary instrument is the 1.54-m Danish telescope at La Silla that we use remotely on 82 nights/year (the net time 71 nights/year; 10% and 3% of time is lost on average for unfavorable weather and technical problems, respectively). I will briefly overview its set up and our remote observing system.

B 39 Stellar occultation by asteroids and Trans-Neptunian bodies

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Only about 140 Trans-Neptunian and Centaurs have diameter and albedo determinations, based in most cases on the radiometric technique applied to Spitzer and Herschel observations (e.g., Stansberry et al. 2008; Lellouch et al. 2013). These values are typically accurate at best to 10% in diameter and 20% in albedo, significantly restricting our detailed understanding of the intrinsic variability in the surface properties and sizes of these objects. The occultation technique is far more powerful because under optimal circumstances it can provide sizes and shapes to an accuracy of about 0.1%

Historically, occultation observations have also resulted in significant serendipitous discoveries, such as the presence of rings around small bodies (Braga-Ribas et al. 2014; Duffard et al. 2014; Ortiz et al. 2017), or even the presence of an atmosphere (Elliot et al. 1989; Elliot & Young 1992; Sicardy et al. 2011; Ortiz et al. 2012).

In this presentation we will describe the capabilities of small telescopes with a normal CCD or EMCCD in the better case, to observe this kind of events. We will describe the technique and give clues for the observers.

B P01 Photometric study of the asynchronous polar V1432 Aql in 2017-2018 at the Crimean astrophysical observatory

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We present the results of our research of the eclipsing asynchronous polar V1432 Aql. Photometric observations were obtained during 21 nights in 2017-2018 using 38-cm telescope of the Crimean astrophysical observatory. We obtained 22 moments of dips associated with the orbital variability of the binary system and 40 minima associated with self-eclipsing of accretion columns in the binary system. We found out that accretion in the system occurs at least on to three accreting areas. According to our observations, the spin period of the white dwarf is 0.1405429(102) days in 2017 and 0.1404547(29) days in 2018. The improving orbital period is 0.140234676(9) days.

B P02 Modelling of stellar surfaces in single and binary star systems

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Precise and time effective method for generating stellar surfaces is crucial step in creating light curves of single and binary star systems. In case of rotationally deformed components of single star systems and tidally deformed components of close binaries, spherical symmetry is no longer usable for generating stellar surfaces, which increases complexity of the task. However, exploitation of axial and planar symmetries of such stellar components proved to be a powerful tool in reducing overall computational time necessary to generate a stellar surface. We present one of the possible approaches to this issue that includes usage of symmetry vectors that enabled us to effectively perform surface discretization and calculation of surface parameters such as the local effective temperature or gravity acceleration.

B P03 Analysis of exoplanetary system WASP-118

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We present a new study of recently discovered exoplanetary system WASP-118. The system consists of F-type star and close-in giant planet (an inflated hot Jupiter). Using Kepler-K2 observations, we redetermined the orbital and physical parameters of the system. Our results are in good agreement with the values published in literature. The precise times of all transits were determined, however, no significant transit timing variations were detected. Our analysis of an upper mass limit allows us to include additional Earth-mass planet(s) near to mean-motion resonance(s).

B P04 Analysis of KOI 2700b: the second exoplanet with a comet-like dusty tail

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Close-in exoplanets are subjected to the greatest star-planet interactions. This interaction may have various forms. In certain cases it may cause formation of a comet-like dusty tail. The Kepler object KOI 2700b was discovered recently as the second exoplanet with such a comet-like tail. It exhibits a distinctly asymmetric transit profile, likely indicative of the emission of dusty effluents and reminiscent of KIC 12557548b, the first exoplanet with a comet-like dusty tail. Our scientific goal is to verify the disintegrating-planet scenario of KOI 2700b by modeling its light curve and to put constraints on various tail and planet properties, as was done in the case of KIC 12557548b. We would like to understand better how the disintegration works at this uninhabitable planet, especially what is the typical particle size in the dusty tail, how big is the planet solid body and how fast is the mass loss from the planet. We obtained the phase-folded and binned transit light curve of KOI 2700b, which we subsequently iteratively modeled using the radiative-transfer code SHELLSPEC. We modeled the comet-like tail as part of a ring around the parent star and we also included the solid body of the planet in the model. During the modeling we applied selected species and dust particle sizes. We also analyzed the systematic evolution of the light curve and searched for possible long-term orbital period changes of KOI 2700b. We confirmed the disintegrating-planet scenario of KOI 2700b. Furthermore, via modeling, we derived some interesting features of KOI 2700b and its comet-like tail.

B P05 Study of the long cycle in DPVs

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Double periodic variables (DPVs) are an enigmatic sub-class of Algol binary systems. One of the most important characteristics is that they exhibit two photometric cycles: an orbital period, typical of eclipsing binaries, and a long cycle of unknown origin. Studies indicate that a B-type star surrounded by an accretion disk with a late-type giant star filling its Roche lobe are the components in DPVs systems. Previous research shows that the donor is a potentially magnetic active star. Possibly the accretion flow is modulated as a result of a magnetic dynamo cycle, where the radius of the donor is changes, as shown in Applegate models.

Recently we notice changes in the shape of their light curves related directly with the stage of the long cycle. The sinusoidal nature of some light curves with long period allow us to divide in maximum, descending, minimum, and ascendig branches the light curve with short period. We present a pioneer study, showing theoretical light curve models in different stages of the long cycle of two DPVs. Our models indicate that the changes in the shape of the orbital light curve is due to morphological change in the disk structure, as well as the size, ubication and temperature of the hot spot. For our analisys we used data form the OGLE data base, which covers 12 years of good photometric observations, obtaining about 2000 observation per object. The importance of this project is that it allows us to investigate for the first time this type of phenomena in DPVs.

B P06 Follow-up studies of variable stars and Gaia transients at the Terskol Observatory

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We report the results of observational studies of stellar objects (SNe, YSOs, Be stars, etc.) which have been conducted at the Terskol Observatory. The available small and medium-sized telescopes provide good enough opportunities for long-term monitoring of stellar variability. Systematic, integrated use of these instruments has a great potential for uncovering the objects' nature.

In 2016, we started to observe Gaia transients discovered by ESA Gaia, DPAC and the Photometric Science Alerts Team (http://gsaweb.ast.cam.ac.uk/alert) as well. Ground-based observations contribute significantly to achieving advances in studies of the newly detected objects, especially in their classifying. Follow-up photometry has yielded new data and findings which allowed us to reveal physical characteristics of a good few of transients.

In this paper, recent results from a study of supernova ASASSN-15rw, nova Gaia18aen, YSO Gaia16blg, as well as of variable stars Gaia18avw, Gaia18akt, etc. will be presented; the different aspects of monitoring of transients will be discussed.

B P07 Long-term spectroscopic survey of T Tauri stars in the Taurus-Auriga star-forming region

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Long-term spectroscopic monitoring of 22 T Tauri stars located in the Taurus-Auriga star-forming region (SFR) is presented. The medium and high-dispersion échelle spectroscopy obtained at the Stará Lesná, Skalnaté Pleso and Tautenburg observatory was obtained from 2015 till 2018. The broadening-function technique was used to determine the radial and projected rotational velocities and to study multiplicity of the objects. The analysis was also focused on the determination of atmospheric parameters such as $\log g$, $T_{\rm eff}$ and metallicity. The nature of the objects was assesed by measuring the equivalent with of the H_α and Li I 6708 lines. Their membership was checked using the Gaia DR2 parallaxes and estimated model distances.

B P08 The photometric observations of 3200 Phaeton at the small and middle telescopes

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In December 2017, the asteroid (3200) Phaethon approached to the Earth at a distance of 0.069 AU. Since its discovery in 1983 and until 2009, the asteroid has shown no activity, although its search was conducted. In 2009, observations from the NASA STEREO space observatory made it possible to record a short-term (about two days) activity in perihelion. This phenomenon was also observed in 2012 and 2016. The analysis of photometry observations of 3200 Phaethon taken in search of low-level cometary activity (i.e., coma or dust trail) in pre-perihelion passage are presented. We performed different observing runs with telescopes, ranging from 0.61 m to 2 m in imaging mode in the optical range. The long series of photometric observations aimed to infer the light curve of Phaethon were got. The color index and radius of the asteroid are measured.

AK and EB are supported, in part, by the Program No. 28 of the fundamental research of the Presidium of RAS. AK is supported, in part, by the RFBR grant X 16-02-00805-a. OI is supported, in part, by the project 16BF023-02 of the Taras Shevchenko National University of Kyiv, the SASPRO Program, REA grant agreement No. 609427, and the Slovak Academy of Sciences (grant Vega 2/32/14).

B P09 Chemical abundance analysis of late-B type single and binary stars using sub-meter class telescopes: HR 342, HR 769, HR 1284, and HR 8750

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We test the capabilities of 0.4 m mirror sized telescopes concerning the chemical abundance analysis of late-B type stars. We also introduce a new modification of the SYNSPEC/SYNPLOT spectrum synthesis code, which lets us to synthesize the composite spectrum of the binary stars. These observations and analyses are a part of a medium resolution survey of late-B type stars to reveal the chemically peculiar candidates. We have analyzed the spectrum of HR 342, HR 769, HR 1284, and HR 8750 to derive its chemical abundances. We have also used theoretical surface gravity - effective temperature diagram to clarify their evolutionary status and estimate their mass and age. The medium resolution (R$\sim$ 14 000) spectra covering the wavelength range of 4380-7350 Å of the four targets have been obtained from the Shelyak eShel Spectrograph attached to the 40 cm telescope in Ankara University Kreiken Observatory (AUKR), Turkey. The atmospheric parameters of the stars have been derived by using the photometric measurements in Johnson filters and the Balmer line profiles in the spectra. The abundances of the 14 elements have been derived by iteratively adjusting the parameters of synthetic spectra and modeling the selected unblended lines of the elements. We have also attempted to model the spectrum of the binary star HR 1284 to reveal the physical and chemical properties of its components. We have found that the target stars do not show remarkable discrepancies from the solar abundances, except for HR 8750 and the cooler component of HR 1284, which exhibit slight underabundances of many elements, such as O, Mg, Al, Si, and Fe. We have discussed the uncertainty limits of the abundances derived using sub-meter class telescopes. We have also discussed the difficulties and possible solutions to model the spectrum of the binary stars (HR 1284 in our case) where the spectral disentangling method is not suitable.

B P10 Hydrodynamics of supernova remnants: interaction with interstellar medium

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We study the large scale interaction of the supernova remnants with clouds of interstellar gas. Optical proper motion measurements and Hα emission in supernova remnants are discussed, especially for 1.4m telescope "Milanković" and astroclimate conditions at Astronomical station Vidojevica near Prokuplje, Serbia. We present our hidrodynamical simulation that is used to estimate the observables. The simulation implements a fractal density structure of interstellar clouds. We analyse how such clouds influence the expansion of the remnants and shock properties in order to estimate the distance to the remnants. From distributions of density and temperature behind the shock we calculate the resulting Hα emission and discuss how such emission can be used to probe the interstellar medium properties.

B P11 Search for extrasolar planets around White Dwarfs

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We present a project aimed at detection of exoplanets orbiting around white dwarfs using the method of transits. If a white dwarf has a transiting exoplanet, we will definitely register significant brightness decrease of the central star, even if the eclipse is not total, since the size of giant planet is comparable with the size of the white dwarf.

According to our estimates the transit phenomena for close systems range from minutes to tens of minutes. For our research we have already selected 5 objects based on an indication of the presence of extrasolar giant planets around them. We have already started the long-term photometric observations using the telescopes of the Main Astronomical Observatory NAS of Ukraine, Terskol peak observatory in Northern Caucasus and the telescopes of the Astronomical Institute of the Slovak Academy of Sciences. In the near future we also plan to use the data from astronomical catalogues.

B P12 A search for additional bodies in short period eclipsing binary stars

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We describe here the formulation of our search for additional bodies in fifteen short period eclipsing binary stars and some results obtained by now. We intended to use two methods: transits across the surface of one or both stars (in order to detect planets) in the binary and a timing of eclipses of central binary stars (that can indicate the presence of a stellar mass body in the system). Observations were carried out using ground based photometry with 50-60 cm telescopes in 2013-2017. Until now we did not detect any transits in our data. At the same time we found several candidates for additional bodies in four systems. Further data processing will be performed.

B P13 The Dwarf project: extrasolar planets candidates

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An observational campaign, project Dwarf, was established as a reaction on growing research on extrasolar planets. It is aimed at detection of circumbinary extrasolar planets using the timing of the minima. For this purpose, short period eclipsing binaries with dwarf components were chosen. Photometric observations of eclipses were made with an extensive network of 1-metre class telescopes on many collaborating observatories. We collected observed light curves, analyzed them and determined precise times of eclipses. Campaign's data, together with published data, gave us the possibility to study the differences of observed and predicted times of minima, changes in O-C diagrams of these eclipsing binaries. Here we present the methods and steps used on the path from raw light curves to the results of modeling of possible 3rd components in some of these binaries.

B P14 Eclipse timing variation of candidate long-period triple systems

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The continuous photometric monitoring within the original Kepler mission allowed for the identification of a number of eclipsing binaries that display considerable eclipse timing variations (ETV). In their work on candidate triple systems in the Kepler field Conroy et al. (2014, AJ, 147, 45) drew a selection of 31 systems with ETV curves, whose shapes within the 1400-day monitoring period are seemingly parabolic. There are several possible explanations: mass transfer, the Applegate effect, and a third component with a period considerably longer than 1400 days. We tried to determine the cause of the parabolic ETV curves by timing minima of 9 systems from this selection in 2017 and 2018, thus checking whether the ETV curves preserve their parabolic shapes or show signs of periodicity a further 2000 days after the original Kepler data. Results from the 30 cm IRIDA-South and the 50/70 cm Schmidt telescopes at the Rozhen observatory (Bulgaria) are presented.

B P15 Study of polarization variability of Algol-type binary stars using polarization-holographic imaging Stokes polarimeter

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The Algol-type binaries are the semidetached interacting binary systems in which the cool secondary star have expanded to fill its Roche lobe and is transferring material through a gas stream onto the hot primary star. The Algol-type binaries should show polarization variability due to scattering in mass transfer streams and circumstellar discs, as well as Thomson scattering in the photospheres of their hot stars and Rayleigh scattering due to irradiation of their cooler stars. Although the measurement of polarization variability for Algol-type binaries are neglected even for a present time, which poses instrumental, observational and data processing challenges.

In this paper we present the first results of the polarimetric observations of some bright Algol-type variable stars using the innovative Polarization-Holographic Imaging Stokes Polarimeter (PHISP).

The PHISP is developed based on an integral polarization-holographic diffraction element, which enables an instant analysis of polarization state of an incoming light. An element, recorded in a laboratory by a special holographic schema using circularly and linearly polarized beams, decomposes an incoming light into diffraction orders the intensities of which vary depending on the polarization state of a light source. The measurements of the corresponding points or areas in the diffraction orders and further data reduction through the calibration parameters we get the instant Stokes images of a light source which allows to determine full polarization state of a point or extended space object in narrow or wide spectral range. The operating spectral range of the polarimeter is 500-1600 nm. The laboratory tests and first astronomical polarimetric observations show that the resulting errors are near of 0.001 order and are not limited by the method itself. The polarimeter is compact, light weight and could be used both on small ground-based or space telescopes.

B P16 Spectropolarimetry of the solar spicules in Hα and D3 spectral lines using the 53-cm coronagraph of the Abastumani Astrophysical Observatory at Ilia State university, Georgia

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The solar spicules are thin and very dynamic needle-shaped plasma jet structures, the best seen at the solar limb, whose magnetic properties are not well constrained to date. The magnetic field in spicules has been determined using direct analyses of spectral lines in polarized light, mostly using the He I spectral multiplets. The polarization signals in these multiplets are generated by the joint action of the transversal Zeeman effect and scattering polarization modified by the Hanle effect.

Up to now, there are only few attempts to study the variations of magnetic field strength along the spicules axis for different chromospheric heights.

In this paper we present the test results of the spectropolarimetry of the spicules in the Hα and He I D3 multiplet for different high chromospheric altitudes from 5000 km to 7000 kms using the innovative Polarization-Holographic Imaging Stokes Polarimeter (PHISP) mounted on the 53-cm coronagraph of the Abastumani Astrophysical Observatory (Ilia State university, Georgia).

The PHISP is developed based on an integral polarization-holographic diffraction element, which enables an instant analysis of polarization state of an incoming light. An element, recorded in a laboratory by a special holographic schema using circularly and linearly polarized beams, decomposes an incoming light into diffraction orders the intensities of which vary depending on the polarization state of a light source. With measurement of corresponding points in the diffraction orders and further data reduction through the calibration parameters we get the instant Stokes profiles of a source spectral line. The operating spectral range of the polarimeter is 500-1600 nm. The laboratory tests and first astronomical polarimetric observations show that the resulting errors are near of 0.001 order and are not limited by the method itself.

B P17 Variability analysis of δ Scuti candidate stars

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The Hipparcos catalogue contains stars suspected to be δ Scuti variables for which extensive ground-based observations and characterisation of variability are necessary. We obtained 24 215 CCD images with the 35/51 cm Maksutov-type robotic telescope at the Molėtai Astronomical Observatory (Lithuania) of thirteen δ Scuti candidates selected from the Hipparcos catalogue in order to characterize their variability. We confirm that twelve of them are variables and pulsate with frequencies typical to δ Scutti-type stars. Five of them may be hybrid δ Scuti-γ Doradus pulsators. One more candidate is a variable star with longer periods of pulsations which are intrinsic to γ Doradus-type pulsators.

B P18 Search for new variable stars towards the north ecliptic pole

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In order to prepare optimal input catalogues for space missions, extensive ground-based observations and characterisation of possible target objects are necessary. We obtained 24 470 CCD images in 13 fields of 0.4 square degrees with the 35/51 cm Maksutov-type robotic telescope at the Molėtai Astronomical Observatory (Lithuania). Our aim was to search for new variable stars in selected fields of the northern sky wich will be observed by the NASA TESS and ESA PLATO space missions. We analysed light curves of 3604 stars and found 85 new variable stars (four eclipsing binaries, five δ Scuti candidates, six other variables with periods varying between 35 minutes and 20 days, and 70 slowly varying stars with so far undefined periodicity).

B P19 Multicolour long-term photometry of selected symbiotic stars

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Symbiotic stars are interacting binaries with orbital periods from hundreds of days up to several decades. They consist of a hot and luminous white dwarf, which accretes from the wind of its cool giant companion, and ionizes a part of the circumstellar matter. Physical processes running in these systems produce variations of spectrophotometric parameters on different time-scales (from minutes to decades) with different changes of brightness (from a fraction of magnitude to several magnitudes). In their light curves we can identify light variations, which are periodic, semiregular and those, which occur abruptly. We use small 0.6 m telescope for gathering the long-term multicolour $UBVR_cI_c$ CCD photometry of selected symbiotic stars. Monitoring of their light variations helps us in determining physical parameters of individual sources of radiation in the system, but can also alert a sudden change in the star's brightness or any interesting event for observing by using other telescopes. Multicolour $UBVR_cI_c$ magnitudes are also important to calibrate a simultaneously obtained spectrum to absolute fluxes.

B P20 $H\alpha$ orbital variations of the symbiotic star EG And from optical spectroscopy

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EG And is a quiet symbiotic system consisting of a white dwarf accretor that ionizes a fraction of the neutral wind from a red giant donor. The presence of the ionized and neutral region in the binary and its high orbital inclination ($\approx 80°$) causes the observed orbitally-related variations in the Hα line profile.

We use the optical spectra obtained by 60 cm and 1.3 m telescopes at the Stará Lesná and Skalnaté Pleso observatories, complemented with those available at the Astronomical Ring for Access to Spectroscopy Data Base to fit the Hα line profile by three Gaussians corresponding to the core emission, broad wings emission and the central absorption.

The resulting equivalent width of the core emission is highest at the orbital phase $\varphi \approx 0.4$ and smallest at $\varphi \approx 0.2$. This probably reflects the asymmetry of the cool giant wind distribution at the orbital-plane area. Furthermore, the core emission equivalent width has a secondary maximum at $\varphi \approx 0.1$. The strongest absorption in the profile is measured around the inferior conjunction of the white dwarf, $\varphi \approx 0.4$. This suggests that the ionized region is partially optically thick in the Hα line.

B P21 Mass-outflow from the active symbiotic binary BF Cyg during its 2015 and 2017 bursts

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Symbiotic stars are the widest interacting binaries with orbital periods of, typically, a few years. They consist of a red giant and a white dwarf accreting from the giant's wind. According to behaviour of their long-term optical light curves we distinguish between the so-called quiescent and active phases. The latter are characterized by a few magnitudes (multiple) brightening(s) with signatures of a mass-outflow on the time-scale of months to years. In our contribution we demonstrate the event of outbursts for the symbiotic binary BF Cygni, which erupted during August 2006 showing a brightening by a few magnitudes in the optical and keeps the high level of the activity to date. Our photometric monitoring of BF Cyg indicated an additional activity during 2015 and 2017 in the form of bursts characterized with a 1 mag brightening on the time-scale of weeks and gradual fading to the pre-outburst level for more than 1 year. During these phenomena, our spectra show signatures of a variable mass-outflow and formation of highly-collimated bipolar mass ejection.

B P22 Activity of rapidly rotating dwarf LO Peg an giant FK Com

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In 2017-2018 using a robotic wide-field telescope at the Zvenigorod Observatory of INASAN we carried out new observations of several active late type stars including rapidly rotating dwarf LO Peg and rapidly giant - king of spin FK Com. From the light curves we made restoration of the temperature inhomogeneities on stellar surfaces and determined positions of the active longitudes. The obtained measurements indicate the ongoing evolution of moving active regions and the switching phenomenon (flip-flop) of the positions of active longitudes for both stars. We made estimations of the surface areas covered with spots. New observations of stars carried out in V filter allowed to obtain new data for the long-term variability cycles of these objects. Significant changes in the shape of the power spectrum were noted after taking into account our new observations.

B P23 Gaia18aak is a new SU UMa-type dwarf nova

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We report the discovery of a new SU UMa-type dwarf nova, Gaia18aak/AT2018C, based on its optical observations, which were performed at the four observatories (Lisnyky/Kyiv, Terskol, CrAO, Mayaki/Odesa) with five small telescopes. The observational campaign started just after the alert was published by ESA Gaia, DPAC and the Photometric Science Alerts Team (http://gsaweb.ast.cam.ac.uk/alerts); the object was very intensely observed during the first month. The four-month monitoring allowed us to reveal variations and trends in the light curve of Gaia18aak, i.e. superhumps and outbursts.

We detected the 0.065-d (or 0.069-d) superhump period during five nights of superoutburst. No significant variations of this period on a scale of five days were found from the O-C analysis. Furthermore, we found the only possible outburst during the subsequent 100 nights.

B P24 First glance to the recently discovered symbiotic star HBHA 1704-05 during its current outburst

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Symbiotic stars are the widest interacting binaries with orbital periods of a few years. They consist of a red giant and a white dwarf (WD) accreting from the giant's wind. During the so-called quiescent phase, the high luminosity of the WD can be powered by stable nuclear burning of hydrogen on its surface. Once the accretion rate exceeds the stable burning limit, symbiotic system changes its radiation significantly, brightens up in the optical by a few magnitudes and shows signatures of a mass-outflow.

In this contribution we introduce our photometric and spectroscopic observations of the newly (August 9, 2018) discovered outburst of the emission-line star, HBHA 1704-05, whose photometric variability and the spectrum during the outburst are both characteristic for a symbiotic star. We carried out multicolour $UBVR_cI_c$ CCD photometry by 0.6 m telescope at the Stará Lesná observatory (pavilion G2), while the optical spectra were obtained by 0.6 m and 1.3 m telescopes at the Stará Lesná (pavilion G1) and Skalnaté Pleso observatories. Our spectroscopic observations were complemented with those available at the Astronomical Ring for Access to Spectroscopy Data Base. Our preliminary analysis shows that the current outburst of HBHA 1704-05 is of Z And-type and is very similar to that recently observed (2015) for AG Peg. By inspection of the Moscow's archive of photographic plates we revealed another 2-mag-outburst of HBHA 1704-05 in 1968.

B P25 Modeling of accretion disk-originated features in the high resolution spectra of U Sge

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U Sge (HD 181182) belongs to the group of short period Algol-type binaries with period of 3.38 days. One hundred and eleven high-resolution spectra of U Sge which are known to exhibit H_α emission were obtained at TUBITAK National Observatory in Turkey. The emission and absorption structures of the system have been analysed. The astrophysical parameters of the system have been obtained by means of analysing the spectral and photometric data. Accordingly, the primary component is a B7-8 spectral type main-sequence star, while the secondary component is a G2 spectral type giant. The cool secondary component has filled its Roche lobe and is transferring material through the L_1 point onto the hot primary component. The effects of both components and the transferring material were detected in the H_α lines. In order to determine these effects, the SHELLSPEC code which uses LTE approximation has been used. The circumstellar structure around U Sge is due to very low density disk, transferring material, a hot spot where the transferring material from the secondary impacts onto the primary and the magnetic activity from secondary itself. Moreover, all of these effects on the system are highly variable in just a few orbital cycles.

B P26 Investigating the possible CMa OB2 membership of eclipsing binary LV CMa: Preliminary analysis

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As an outcome of GAIA mission's second data release, tremendous improvement in measuring the positions, distances and kinematic properties of celestial bodies which is crucial for researchers who study on stellar associations came to light. In this context, being able to reach precise trigonometric parallax information of eclipsing binary or multiple star systems allows us to yield their astrophysical characteristics and absolute parameters as well as their reliable ages, meaning the physical dimensions and evolutionary status of associations or even their sub-groups can be well determined in this phenomenal era of observational data.

In this study, an eclipsing binary of a short orbital period ($P = 1^d.1834857$) LV CMa ($V = 8^m.7$) was selected as a candidate member of CMa OB2 association according to its location in the sky which is oriented in the line of sight of this star forming region. Not just being an early-type system but also the distance derived from GAIA database may indicate a membership. In search for evidence, LV CMa is investigated by the means of both photometry and spectroscopy. Light curves in UBVRcIc photometric bands was observed with a 0.25 m telescope and the low-resolution ($R \sim 5500$) spectra were taken with the Faint Object Spectrograph and Camera (TFOSC) installed at the Cassegrain focus of the 1.5 m Russian-Turkish-Telescope of TUBITAK National Observatory. Preliminary analysis yielded the physical parameters of the system as $M_1 = 5.32$ $M_\odot$, $R_1 = 3.22$ $R_\odot$, $T_{eff1} = 9300$ K and $M_2 = 4.26$ $M_\odot$, $R_2 = 2.53$ $R_\odot$, $T_{eff2} = 8200$ K for primary and secondary, respectively with the distance of 510 pc. Using the distance and the space velocity components from the GAIA mission, the membership of the LV CMa to the CMa OB2 association is investigated. With the new spectroscopic data planned to be obtained in next observing season, it is planned to have more accurate stellar parameters and the age of the system.

B P27 V839 Cep - a new massive eclipsing variable with apsidal motion in the field of Trumpler 37

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The first high-accuracy CCD $UBVRI$ light curves for the recently discovered eclipsing system V839 Cep (P = $9^d.96$, $V = 9^m.85$, Sp B5) were obtained. A photometric solution of the light curves and physical characteristics of the component stars are derived. The apsidal motion in the system is detected. The eclipsing star is the component A of the visual binary GSC 3964 0741, Δ Mag = 1.1, Sep.=0".2 and belongs to galactic open cluster Trumpler 37.

B P28 Cool spotted binary system IN Vir (HD 116544)

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We present an analysis of photometric BVR_cI_c and spectroscopic observations of IN Vir - cool spotted variable star. CCD photometry was conducted in Crimea on mount Koshka in 2015–2018. High- and medium-resolution échelle spectroscopy was obtained at Stará Lesná and Skalnaté Pleso observatories in 2016–2018. Photometric observations were corrected for atmospheric extinction which was carefully studied. Spectroscopic data reveal both components in the system: fairly-rapidly-rotating primary and faint slow-rotating secondary. Rotational velocities of the components are $v_1 \sin i = 24.6$ km/s and $v_2 \sin i < 8$ km/s. Our observations show that the primary component is a giant of K2 spectral class. Basic parameters of the stars: masses, temperatures, radii, and the orbital elements were found. Our BVR_cI_c photometry allowed us to estimate the inclination of the rotational axis of of the primary star to the line of sight. The amplitude of variability is the highest in the B photometric band. The analysis of our photometry together with the ASAS data revealed a solar-like activity cycles of the primary component with about 7 years period. IN Vir started its new cycle of activity this summer. We've found that the period of the photometric variability isn't equal to the orbital period.

B P29 Deep Optical Photometry of Two Nearby Elliptical Galaxies: NGC 4473 and NGC 4697

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We present deep optical photometry of two nearby elliptical galaxies: NGC 4473 and NGC 4697, obtained with new 1.4m Milankovic telescope, mounted at the Astronomical Station Vidojevica (Serbia). For both galaxies we derive surface brightness profiles up to 7 and 3 effective radii, respectively (limited solely by our field of view) to obtain deep color (B-V) gradients. Also, we perform 2D decomposition of galaxy images into Sersic components.

B P30 Search for Dwarf Galaxy Candidates in M 106

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We present preliminary results of a search for dwarf galaxy candidates in the 24 arcmin x 24 arcmin field of view around M 106 galaxy. Total of 107 images were taken in the V-band with the new 1.4m Milankovic telescope (Serbia, near Prokuplje) and 27 images in the L-band. We confirm presence of the satellites from previous studies and find new candidate galaxies.

B P31 A Highly Eccentric Spectroscopic Binary Star: HD 5624

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During the ten years precise Doppler survey at the TÜBİTAK National Observatory (TUG) we discovered one exoplanet and found that a few stars show significant radial velocity variations between 1 and 10 kms^{-1}. Our main goal of this survey is to search exoplanets around selected 50 GK giant stars. However, Doppler surveys are also provide us to examine nature of the other radial velocity variations, such as spectroscopic binaries. In this study, we present precise radial velocity (PRV) measurements of HD 5624. The PRV variation of this star shows extremely large RV scatter and indicate that this star most probably is the spectroscopic binary star. There are no clear spectroscopic indications for the binarity for this star in the literature before. Therefore, we obtained high resolution spectroscopic data using Coude Echelle Spectrograph (CES) equipped with an iodine absorption cell to 1.5 m RTT150 telescope at TUG and performed a spectroscopic analysis to obtain orbital parameters. The best fit Keplerian orbit was obtained with an eccentricity of $e = 0.64$ and periods of $P = 2392$ days by estimating stellar mass. The preliminary results of our analysis indicate that the mass of the companion is less than $0.5M_{\odot}$ and system has a highly eccentric orbit which is one of among all known single-lined spectroscopic binaries.

B P32 Photometric investigation of extremely cool contact binaries near the short period limit

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EW-type contact binaries contain two cool dwarfs where both components are filling the critical Roche lobe and sharing a common convective envelope. New period distribution of EWs indicates that the short-period limit for EWs is around 0.2 days. Close binary stars with orbital period nearly this limit are an important source to understand the formation and evolution of contact binaries. Recently, some close binary stars with orbital periods in the rang from 0.2 to 0.23 days were monitored and their light curves were analyzed by using the W-D method. In the poster, their photometric solutions and period changes are presented. Then their formation and evolutionary state as well as their triplicity, all will be discussed.

B P33 Progress in optical monitoring of eight radio-loud, FR II-type QSOs

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We present results derived from a monitoring program of a sample of FR-II type radio quasars. The flux variability detected in their densely covered light curves, that have being gathered over a period of more than 9 years with small telescopes in Poland and USA, are analyzed with statistical methods: LSP, WWZ and the structure function. We found no statistically significant, strictly periodic behavior in the QSOs light curves using both LSP or WWZ methods. Based on the targets structure functions shapes, we conclude that all three (supernowae + starbursts, disk instability and gravitational microlensing), most oftern proposed models, could be responsible for their optical variability.

Session C: GROUND-BASED SUPPORT OF COSMIC MISSIONS AND TELESCOPE NETWORKS

C 01 The role of small telescopes as a ground-based support for exoplanetary space missions

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Small telescopes equiped with modern instrumentation are gaining on importance, especially, in the era of exoplanetary space missions such as TESS, PLATO and ARIEL. Crucial part of every planet hunting mission is now a ground-based follow-up of detectd planetary candidates. Mid-sized telescopes with apertures of 2 to 4-m with an existing instrumentation become more and more valued due to increasing need for observing time.

In this talk, a brief overview on the follow-up process for exoplanetary space missions will be given. Requirements for the ground-based follow-up instrumentation will be discussed. Some of existing 2-m class telescope facilities and their capability and potential for the follow-up process of exoplanetary candidates will be presented. A special focus will be put on existing 2-m class telescopes in central Europe, their results and their potential for network observations. In the last part of the talk, new planned ground-based projects for 2-m class telescopes will be introduced.

C 02 Ground-based observations for the BRITE-Constellation Satellites

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BRITE (BRIght Target Explorer) Constellation is a network of five nanosatellites to investigate stellar structure and evolution of the brightest stars in the sky and their interaction with the local environment. Micropulsation, wind phenomena, and other forms of stellar variability are recorded via high precision photometry in two colours (red and blue).

The success of this mission is also very much depending on supportive ground-based observations, especially spectroscopy. We will review the whole variety of such needed observations together with already published results.

C 03 AMOS global meteor network

J. Tóth

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Meteoroids are fragments of asteroids, comets, moons and planets. The meteoroids that enter Earth's atmosphere create spectacular events and delivering thousands of tons of interplanetary matter to Earth annually. A typical meteor shines for only a fraction of a second, but this short time interval is sufficient to learn about its orbit and physical properties. All-sky meteor detection and characterization is needed for continuous monitoring of the meteoroid flux, particularly in the detection of weak or short-duration meteor showers. Multi-station detection of a single meteor provides heliocentric orbits for meteoroids that can be used for population studies and searches for their parent bodies. Spectral observations of the emission lines of meteoric plasma is essential for understanding the original and evolved physical properties of meteoroids.

We have developed AMOS (All-Sky Meteor Orbit System), an original automated camera system, to detect and characterize meteors. The network of AMOS cameras has been deployed in Slovakia since 2009, at the Canary Islands since 2015, and in Chile since 2016. Currently, we are installing pair of AMOS systems on Hawaii islands with the aim to build global coverage and monitor network to register the influx of millimeter to meter sized objects in real time.

C 04 The Las Cumbres Observatory robotic telescope network

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The Las Cumbres Observatory (LCO; https://lco.global) is a fully robotic network of telescopes, deployed around the globe in several sites, in both Northern and Southern hemispheres. LCO telescopes currently include 10×0.4m, 10×1.0m, and 2×2.0m. All telescopes are mounted with imaging cameras, 4×1.0m telescopes are mounted with a high-resolution spectrograph (called NRES) used for stellar spectroscopy and radial velocity measurements, and the 2×2.0m are mounted with low-resolution spectrographs used for supernovae classification.

LCO observations are carried out through observing requests that are entered online, including the required telescope aperture and other technical information (e.g., exposure time, filter, defocus), and the scheduling software decides in which site to carry out the observation and with which telescope, as many of the LCO sites contain 2-3 telescopes of the same aperture. All data obtained by LCO telescopes is reduced by an automated pipeline and made available to the users.

Science done with LCO telescopes is focused on time series astronomy, including but not limited to supernovae, exoplanets (transiting and microlensing), and Solar System objects. Specifically, LCO is taking a leading role in follow-up of transiting planet candidates identified in TESS Mission data. This activity includes obtaining both transit light curves and stellar spectroscopy.

C 05 WET stars and planets: telescope network observations of mCP stars and exoplanets

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This talk will briefly review the Whole Earth Telescope (WET) and similar global telescope networks. In particular I will focus on the recent contribution of such networks to the study of magnetic A-type stars with particular attention given to pulsating variable stars. In addition, telescopes that are part of such networks have the ability to provide similar observations for the study of multi-planetary systems. The short duration of data that the TESS satellite will collect, coupled with its red filter, will demand the need for such facilities to perform complementary observations of both stars and planets.

C 06 Synergy of ground and space based telescopes for mass detection of 10 m class Near Earth Objects

A. Shugarov

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Chelyabinsk event of Feb 15, 2013 clearly demonstrated that decameter size Near Earth Objects (NEOs) should be considered as hazardous ones. Another important lesson is that bodies approaching the Earth from day sky could not be discovered by any ground-based or near Earth space telescopes because of unfavorable phase angle and scattering light. The only way to detect these bodies reasonably well beforehand is to put the telescope(s) relatively far from the Earth, e.g. in the vicinity of the L1 libration point in the Sun-Earth system.

INASAN developed two concepts of survey projects to detect 10 m class NEOs.

The Space project SODA (System for the Observation of Daytime Asteroids) was focused on daytime NEOs detection from L1 libration point, the ground based project INF (INASAN NEO Finder) was focused on night-sky.

The main instrument of SODA project is set of three 30 cm aperture wide field (3 deg) telescopes coupled with full aperture slewing mirror for fast repointing of the telescope without moving of the space platform.

The INF multiaperture telescope consists of 8 VT-78d telescopes of 25 cm aperture with 10 deg field of view. The INF total field of view is 574 sq. deg (298 Mpixels) with 5.2 arcsec/pix scale.

The main requirement for both surveys are the combination of cadence time (less than 1 h) and sensitivity to detect 10 m bodies at distance of about 1 million kilometer.

We present the photometric simulation of visibilities zones of SODA and INF projects. Together they cover the entire celestial sphere and provides the initial detection 10 m class impactors 1 day before it's possible collision with Earth.

C P01 Korea Microlensing Telescope Network and byproduced light curves

C.-U. Lee, D.-J. Lee, S.-L. Kim, KMTNet operation team

Korea Astronomy and Space Science Institute, Daejeon, Republic of Korea

Korea Astronomy and Space Science Institute (KASI) has installed three identical 1.6m wide-field telescopes and 324M pixel Mosaic CCD camera having 2 x 2degree FOV at Chile, South Africa and Australia. The three major goals of Korea Microlensing Telescope Network (KMTNet) sciences are to search for exoplanets using microlensing method in Bulge season, to observe the very beginning moment of SN explosion and to keep monitoring of NEO during non-Bulge season. Not only the three science programs but also mini programs for external galaxies and target of opportunity observations are running. The most powerful performance of KMTNet comes from the 24-hour uninterrupted observation with high cadence for the 2 x 2degree FOV, which is optimized for microlensing science. After the third year of its operation we are producing remarkable science results in microlensing science fields, however 0.5 billions of light curves in the Galactic Bulge regions are still stored in the dark disk storage in unexplored. In this paper some samples of light curves showing the excellence of continuity and cadence will be introduced.

C P02 Science with Global Astrophysical Telescope System

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The Global Astrophysical Telescope System (GATS) project managed by Astronomical Observatory Institute of Adam Mickiewicz University in Poznań (Poland) operates a global network of robotic telescopes mainly dedicated for stellar spectroscopy. The system consists of two telescopes: PST1 (Poznań Spectroscopic Telescope) near Poznań (Poland) and RBT/PST2 in Arizona (USA).

PST1 is a twin 0.5m Newtonian telescope with a fiber-fed echelle spectrograph of resolution R$\sim$ 35000 attached to one focus and imaging CCD camera at the second focus. PST1 is a remotely controlled, multipurpose instrument capable of performing simultaneous spectroscopic and photometric observations. It has recently been upgraded to allow astrometry of Earth orbiting objects.

RBT/PST2 is placed about 120 degrees apart from PST1 in longitude in oder to perform long duty-cycle observations. The telescope is 0.7m f/6.6 Planewave CDK700 on alt-az robotic direct-drive mount. One Nasmyth focus is connected with R$\sim$40000 echelle spectrograph, the second focus is occupied by Andor electron-multiplying CCD camera.

The main research topics of GATS are: eclipsing binary stars, asteroseismology of pulsating stars, stellar rotation and dynamical evolution in binary eclipsing stars, cataclysmic variables, photometric observations of Main Belt asteroids, Near Earth Objects, artifical satellites and space debris. GATS also participates in research programs of the BRITE consortium and it is also observing "targets of opportunity", such as gamma ray bursts or Gaia alerts.

We would like to present examples of results obtained from GATS for eclipsing binary star BD-00 2862 (spectroscopy), asteroid 1416 Renauxa and satellites (photometry and astrometry).

For more information about the GATS project visit the website: www.astro.amu.edu.pl/GATS.

AUTHOR INDEX

PROGRAM

Sunday September 23, 2018

17:00 – 20:00 Registration (entrance hall of the Astronomical Institute)
19:00 – 21:00 *Welcome party (Hotel Academia)*

Monday September 24, 2018

08:00 – 08:45 Registration (foyer of Academia)

Welcome address

08:45 – 09:00	Martin Vaňko	Institute Director
	Theodor Pribulla	SOC Chair
	Ľubomír Hambálek	LOC Chair

Session A: OBSERVING TECHNIQUES AND INSTRUMENTATION FOR METRE-CLASS TELESCOPES

Chair: Drahomír Chochol

09:00 – 09:15	Martin Vaňko	75 years of the Skalnaté Pleso observatory
09:15 – 09:50	Luca Zampieri	Fast astronomical photometry for meter-class telescopes (A01)
09:50 – 10:25	Rachael Roettenbacher	Interferometry with Meter-Class Telescopes (A02)
10:25 – 10:55	*Coffee Break*	

Chair: Theodor Pribulla

10:55 – 11:30	Monika Lendl	High precision ground-based photometry (A03)
11:30 – 11:50	Przemyslaw Mikolajczyk	Precise photometry with the use of 60-cm Cassegrain reflector of Bialkow, Poland (A04)
11:50 – 12:10	Robert Harris	Astrophotonics for small telescopes (A05)
12:10 – 12:30	Pawel Zielinski	The Cambridge Photometric Calibration Server 2.0 - new automatic tool for time-domain astronomy (A06)
12:30 – 14:00	*Lunch*	

Chair: Augustín Skopal

14:00 – 14:20	Miloslav Zejda	Photometric data around us (A07)
14:20 – 14:40	Marek Skarka	Synergy of professional and amateur astronomers (A08)
14:40 – 15:00	John Davies	The OPTICON Trans-National Access program (A09)
15:00 – 15:30	*Coffee Break*	

Session B: SCIENCE WITH SMALL TELESCOPES

Chair: Ernst Paunzen

15:30 – 16:05	Ulisse Munari	The study of novae with small telescopes (B01)
16:05 – 16:25	Drahomír Chochol	Optical photometry and spectroscopy of V612 Sct: slow classical nova with rebrightenings (B02)
16:25 – 16:45	Polina Golysheva	Multicolor Photometry of unusual Nova KT Eri (B03)
16:45	*Poster session A + B*	
18:00	*Dinner*	

Tuesday September 25, 2018

Chair: Ulisse Munari

09:00 – 09:35	László Szabados	Selected new results on pulsating variable stars (B04)
09:35 – 09:55	Michal Pawlak	ASAS-SN as a stellar variability survey (B05)
09:55 – 10:15	Dmitry Tsvetkov	Optical observations of bright Supernovae (B06)
10:15 – 10:35	Augustín Skopal	Studying symbiotic stars and classical nova outbursts with small telescopes (B07)
10:35 – 11:05	*Coffee Break*	

Chair: Petr Zasche

11:05 – 11:40	Rudolf Gális	The current active stage of the symbiotic system AG Draconis (B08)
11:40 – 12:00	Keisuke Isogai	Recent progress of research on evolution of dwarf novae by using time-series photometry (B09)
12:00 – 12:20	Natasha Katysheva	An evolution of superhumps of a WZ Sge-type system in Leonis OT J104411.4+211307 (B10)
12:20 – 12:40	Elena Pavlenko	ASASSN-18fk: a new WZ Sge-type dwarf nova with multiple rebrightenings and a new candidate for superhumping intermediate polars(B11)
12:40 – 14:00	*Lunch*	

Chair: László Szabados

14:00 – 14:35	François Teyssier	Spectroscopic Monitoring of Eruptive Stars and the ARAS database (B12)
14:35 – 14:55	Jaroslav Merc	Study of long-term spectroscopic variability of symbiotic stars based on observations of the ARAS Group (B13)
14:55 – 15:15	Olga Barsunova	UX Ori type stars in the young cluster IC 348. Results of the 15-year photometric monitoring (B14)
15:15 – 15:35	Gökhan Yücel	Digging out twin-binary star systems from the ASAS Catalogue and determining their physical parameters (B15)
15:35 – 16:05	*Coffee Break*	

Chair: Luca Zampieri

16:05 – 16:40	Ronald Mennickent	Results of monitoring hot Algols showing long photometric cycles (B16)
16:40 – 17:05	Petr Zasche	Double eclipsing systems (B17)
17:05 – 17:25	Mauricio Cabezas	KOREL disentangling of the LMC eclipsing Algol (B18)
17:25	*Poster session B*	
18:00	*Dinner*	

Wednesday September 26, 2018

Chair: Staszek Zoła

09:00 – 09:20	Milena Ratajczak	Tracking massive pairs (B19)
09:20 – 09:40	Elena Panko	Observations of Slightly Studied CBS with period variations (B20)
09:40 – 10:00	Bartłomiej Dębski	A relation between the brightness maxima separation and mass ratio in contact binaries (B21)
10:00 – 10:20	Joris Vos	Using wide sdB+MS binaries to constrain RLOF models (B22)
10:20 – 10:50	*Coffee Break*	

Chair: Ronald Mennickent

10:50 – 11:10	Staszek Zola	Parameters of 2MASS J16211735+4412541 in the quiescent state (B23)
11:10 – 11:30	Ibrahim Özavcı	Surface Inhomogeneities of the Eclipsing Binary System ER Vulpeculae (B24)
11:30 – 11:50	Bálint Seli	Deriving photospheric parameters and elemental abundances for a sample of stars showing the FIP effect (B25)
11:50 – 12:10	Andrey Shugarov	INASAN NEO finder (INF) project (B26)
12:10 – 12:30	Igor Volkov	Spectral observations and photometry of near Earth object (NEO) 2001CP44-s1 (B27)
12:30 – 14:00	*Lunch*	

Chair: Ján Budaj

14:00 – 14:35	Jiří Šilha	Small telescopes and their application in space debris research and space surveillance tracking (B28)
14:35 – 15:10	Tomaž Zwitter	Galactic astronomy and small telescopes (B29)
15:10 – 15:40	*Coffee Break*	

Chair: Ján Budaj

15:40 – 16:15	George Zhou	Planets across the HR diagram (B30)
16:15 – 16:35	Daniel Bayliss	The Next Generation Transit Survey (NGTS) (B31)
16:35 – 17:10	Markus Mugrauer	YETI - The Young Exoplanet Transit Initiative (B32)
17:10	*Poster session B + C*	
18:30	*Conference dinner*	

Thursday September 27, 2018

Chair: George Zhou

09:00 – 09:35	Matthias Mallonn	Exoplanet science with the robotic 1.2m STELLA observatory (B33)
09:35 – 09:55	Selcuk Yalcinkaya	Timing precision in defocused observations of exoplanet transits with a meter-size telescope (B34)
09:55 – 10:15	Gracjan Maciejewski	Planet-star tidal interactions with precise transit timing (B35)
10:15 – 10:45	*Coffee Break*	

Chair: Theodor Pribulla

10:45 – 11:05	Ján Budaj	Mysterious eclipses in the light curve of Boyajian star: a possible explanation (B36)
11:05 – 11:25	Yuliana Kuznyetsova	Researches of exoplanets influence on host star chromospheric activity (B37)
11:25 – 13:00	*Lunch*	
13:00 – 17:30	*Conference trip to Kežmarok*	
18:00	*Dinner*	

Friday September 28, 2018

Chair: Tomaž Zwitter

09:00 – 09:35	Petr Pravec	Complex asteroid systems and their observations with meter-size telescopes (B38)
09:35 – 10:10	Rene Duffard	Stellar occultation by asteroids and Trans-Neptunian bodies (B39)
10:10 – 10:40	*Coffee Break*	

Session C: GROUND-BASED SUPPORT OF COSMIC MISSIONS AND TELESCOPE NETWORKS

Chair: Monika Lendl

10:40 – 11:15	Petr Kabáth	The role of small telescopes as a ground-based support for exoplanetary space missions (C01)
11:15 – 11:50	Ernst Paunzen	Ground-based observations for the BRITE-Constellation Satellites (C02)
11:50 – 12:25	Juraj Tóth	AMOS global meteor network (C03)
12:25 – 14:00	*Lunch*	

Chair: Petr Kabáth

14:00 – 14:35	Avi Shporer	The Las Cumbres Observatory robotic telescope network (C04)
14:35 – 15:10	Daniel Holdsworth	WET stars and planets: telescope network observations of mCP stars and exoplanets (C05)
15:10 – 15:30	Andrey Shugarov	Synergy of ground and space based telescopes for mass detection of 10 m class NEOs (C06)

Chair: Ján Budaj

15:30 – 16:00 *Conference closing*

Saturday September 29, 2018

09:00 – 12:00 *Optional trip to the Skalnaté Pleso observatory*