

## **Questionnaire**

### **Summary of the main activities of a scientific Organisation of the Slovak Academy of Sciences**

*Period: January 1, 2007 - December 31, 2011*

#### ***I. Formal information on the assessed Organisation:***

##### **1. Legal name and address**

Astronomical Institute of the Slovak Academy of Sciences  
05960 Tatranská Lomnica , Slovakia

##### **2. Executive body of the Organisation and its composition**

Directoriat	name	age	years in the position
director	Aleš Kučera	57	2009 -
deputy director	Ján Svoreň	63	2009 -
scientific secretary	Drahomír Chochol	65	2009 -

##### **3. Head of the Scientific Board**

Augustín Skopal

##### **4. Basic information about the research personnel**

- i. **Number of employees with a university degree (PhD students excluded) engaged in research and development and their full time equivalent work capacity (FTE) in 2007, 2008, 2009, 2010, 2011 and average number during the assessment period**
- ii. **Organisation units/departments and their FTE employees with the university degree engaged in research and development**

Research staff	2007		2008		2009		2010		2011		average	
	No.	FTE	No.	FTE	No.	FTE	No.	FTE	No.	FTE	No.	FTE
organisation in whole	36	32,05	36	29,00	32	27,67	38	31,78	34	30,24	35,20	30,15
Department of interplanetary matter	14	12,75	14	10,80	13	10,95	13	11,20	11	9,95	13,00	11,13
Solar physics department	10	9,50	10	8,75	7	6,50	9	7,67	9	8,25	9,00	8,13
Stellar department	12	9,80	12	9,45	12	10,22	16	12,91	14	12,04	13,20	10,88

## 5. Basic information on the funding

- i. Total salary budget<sup>1</sup> of the Organisation allocated from the institutional resources of the Slovak Academy of Sciences (SAS) in 2007, 2008, 2009, 2010, 2011 and average amount for the assessment period

Salary budget	2007	2008	2009	2010	2011	average
total salary budget (millions of EUR )	0,463	0,495	0,528	0,534	0,522	0,508

## 6. URL of the Organisation's web site

<http://www.astro.sk/>

## ***II. General information on the research and development activity of the Organisation:***

### 1. Mission Statement of the Organisation as presented in its Foundation Charter

[1] Astronomical Institute of the Slovak Academy of Sciences (AISAS) is focused on observations and basic research in the group of sciences "Natural sciences" sub-group "Physical sciences", branches "Astronomy", "Astrophysics", "Plasma physics" and "Environmental Physics", with emphasis on research of the Sun, interplanetary matter, stars and stellar systems.

[2] AISAS provides consulting and other expertise services relating to its main specialization.

<sup>1</sup> Objem mzdových prostriedkov bez odvodov do poisťovní so započítaním sumy miezd pracovníkov THS, ktorú 1€ = 30,126. (Podobne aj v ďalších tabuľkách.)

[3] AISAS organizes the postgraduate (PhD.) study in astronomy and astrophysics and ensures the participation of the staff of the Institute in teaching at universities.

[4] AISAS publishes the results of its scientific activity in journals as well as in non-periodical prints and popularizes the results in media.

## **2. Summary of R&D activity pursued by the Organisation during the assessed period, from both national and international aspects and its incorporation in the European Research Area (max. 10 pages)**

Scientific achievements and results gained at AISAS have been published in high ranked international scientific journals, presented at prestigious international conferences and significantly cited by the scientific community. This documents quality of incorporation of AISAS in European Research Area as well as in international scientific community and it emphasizes correct orientation of the AISAS in the scientific field.

AISAS consists of three scientific departments. Research activities and achievements in 2007-2011 are summarized separately for each department.

In terms of right of freedom in scientific research, several significant results were achieved during the assessed period by our scientists also in interdisciplinary research connected with fundamental astrophysical theories. Also these results are given in the end of this summary.

### **2.1. Solar department - RESEARCH AREAS:**

- a) study of the solar photosphere and chromosphere and active events in it, using photometric, spectroscopic and spectro-polarimetric observations acquired with top level solar telescopes base at the Canary Islands (VTT, SST, DOT, THEMIS), and with space-borne satellites (SoHO, Hinode RHESSI and TRACE) under own joint observing proposals,
- b) study of the solar corona and structures in it (prominences, coronal holes, coronal condensations) and Sun-Earth relations using data acquired with infrastructure at our Observatory Lomnický štít, with space-borne satellites and from VSO – Virtual Solar Observatory (unique access to data from space- and ground-based observations of the Sun) and using data from solar total eclipses observations.
- c) study of evolution of fast and very powerful events in the solar atmosphere (flares, coronal mass ejections, active prominences, jets) using multiple observations from ground based and space-borne instruments,
- d) study of solar cycle - long term variations of solar activity, using patrol observations of the 530.3 nm and 637.4 nm emission coronal lines and H alpha solar prominences at our Observatory Lomnický štít, as well as using patrol data from databases.

### **SELECTED RESULTS PUBLISHED IN THE PERIOD 2007-2011**

#### **(a) solar photosphere and chromosphere and active events**

For the first time with a ground-based telescope we observed, analyzed and interpreted time evolution of an emergent magnetic loop in the interior of a solar granule. In the early stages

there were in the emergence registered only linearly polarized radiation indicating the presence of mainly horizontal magnetic field. Later on both ends of the linear polarization increased the recorded signals corresponding to circularly polarized radiation, indicating presence of a small loop-like structure. The radiation coming from the middle of the emerging loop was significantly shifted to the blue part of spectrum, which supports the hypothesis of its emergence. We found that the mean magnetic induction of the emerging loop is about 450 G and the total flux of about  $3 \times 10^{17}$  Mx. Duration of the analyzed loop was  $\sim 12$  min. We created a 3D numerical model of the emerging loop to demonstrate good qualitative consistency, of simulation and observations. Such type of analysis we did, is extremely important to understand local evolution of small magnetic fields and penetration of them higher to the solar atmosphere. **(5)**

Magnetic field changes depending on the increasing height above the solar spots were analyzed using spectro-polarimetric data from VTT telescope acquired with high spatial resolution. We found that while inside the spot the magnetic induction decrease with height, outside the spot it increase. We documented, that typical values of current densities in the spot area vary in the range  $\pm 40$  mA m<sup>-2</sup> and the values of the current densities and magnetic helicity depend on the fine structure of the sunspot. These findings contribute to the analysis of development of active regions- strong magnetic fields in the solar low atmosphere. **(1)**

We did an analysis of time evolution of 2D turbulence in the solar plasma on the solar surface. The analysis of continuum intensity variations and spectral lines characteristics documented, that occurrence of turbulence is not limited only to inter-granular spaces, but it is located also in some places in the bright granules. This observational fact confirms recent predictions of numerical modeling of convection in the solar photosphere, where the supersonic plasma horizontal motions in the granules can cause plasma turbulences. **(7)**

Study of changes of the speed of plasma in direction from the solar surface to an observer is very important for analysis of turbulences and oscillations on the Sun. There are not many spectral lines suitable for use in the solar spectrum. We analyzed the sensitivity of selected spectral lines to those changes and documented suitability of the line Ba II 649.7 nm for diagnosis of speeds in the solar photosphere and lower chromosphere, because that line has a high sensitivity to changes in the plasma velocity. **(14)**

#### **(b) study of the solar corona and structures in it**

Analysis of solar eclipses data from years 2008-2011 using a unique method of enhancing of the visibility of intensity and magnetic structures in the corona and comparison with data taken at space-borne telescopes brought new results on dynamic of solar structures, oscillations of coronal rays, and behavior of magnetic fields. The results were published in five papers in ApJ, and one in A&A. Here we give examples of them **(23, 28)**

#### **(c) study of evolution of fast and very powerful events**

Generally, solar fibrils (spicules) are supposed to be good candidates for transport of energy from bottom to the higher levels of the solar atmosphere. Therefore studies of dynamics of such events are of high importance. We analyzed images acquired by telescope VAULT depicting dynamic bursts in the spectral line of hydrogen Ly-alpha. We measured the trajectories of the peaks in the case of 30 Ly-alpha jets and tracked their trajectories, from which we derived their initial velocity and acceleration. The similarity between dynamics of Ly alpha jets and H-alpha fibrils suggests that the shock waves, producing H-alpha fibrils, also affect the Ly-alpha jets. **(15)**

Study of plasmoids drifting in the solar atmosphere as a consequence of flares using radio-observations significantly contributes to analysis of fast and energetic events on the Sun. We

presented a new method for separating a complex spectrum of individual radio flare using a radio spectrum in the range of 0.8 to 2.0 GHz from the event on April 11, 2011. The method is based on wavelet analysis technique that separates the different space-time components. The phenomenon we analyzed was found to consist of at least 4 drifting pulsating structures. These indicate the presence of at least 4 plasmoids in the current layer. **(18)**

We found from an observational point of view that the atmosphere during solar flares is much more complex than indicated by hydrodynamic simulations. We found that the energy released at the time of maximum solar flare was sufficient to produce explosive evaporation of the chromosphere. In further development of the eruption, we have found second powerful explosive evaporation during which the plasma velocity reached 280 km/s. **(32)**

#### **d) study of a solar cycle - long term variations of solar activity**

Unique dataset of prominences (prominence catalogue) made from observations of prominences at the Observatory Lomnický štít, enriched now also by data from the Kanzelhöhe observatory (Austria) enables to perform the analysis of a distribution of magnetic field (represented by prominences) over the solar hemispheres up to high latitudes (where there are missing data from other indices e.g. sunspots) during solar cycles. This is of high importance for a better understanding of a magnetic cycle of the Sun. We studied time-latitude prominences distribution at long time span (1967-2006) of solar cycle. Three classes of prominences have been proposed. The first one, where no observable equatorward migration in the time-latitude distribution is seen. The second one predominantly appears in the descending phase of solar cycle at latitudes of about 60 degrees and in the course of solar cycle is contracting to the equator, where it disappears around the solar cycle minimum. The last one denotes two areas. First one is a polar area above 60 degrees. Around the solar cycle maximum those polar components disappear. The second one arises only around the solar cycle minimum and take places in the latitude range between  $\pm 60$  degrees. **(19)**

Analysis of a time-latitude distribution of local maxima of the intensities of green 530.3 nm emission corona and solar magnetic fields the period 1976-2005 showed that the intensities of coronal local maxima are located at the border of large scale magnetic fields. **(20)**

## **2.2 – Department of interplanetary matter - RESEARCH AREAS:**

- a) investigation of populations of small bodies in the Solar system, study of transfer orbits , interrelations and evolution among different populations regarding near-Earth objects, study of the structure of the outer part of the Oort cloud and the Edgeworth-Kuiper belt;
- b) investigation of the activity of selected cometary nuclei and its influence on physical and dynamical evolution of these bodies, photometry and astrometry of asteroids and comets;
- c) study of structure and dynamics of meteoroid streams and evolution of their parent bodies, description of the distribution of meteoroid particles in the inner Solar System, search for meteoroid streams of asteroidal origin, search for hyperbolic and interstellar meteoroids, operation of the all-sky photographic cameras within the European Fireball Network;
- d) dynamics and reflection conditions of cosmic dust particles and understanding of the disintegration processes, investigation of the light scattering of dust particles in the Solar System and the Earth's atmosphere, study of meteorite properties.

## **SELECTED RESULTS PUBLISHED IN THE PERIOD 2007-2011**

### **(a) populations of small bodies**

Investigation of the outer parts of the Solar system is essential for a better understanding of the processes which formed our planetary system. Modern simulations using a large number of theoretical bodies – points are performed at AISAS.

We simulated the formation of small-body reservoirs in the outer Solar System for the 2-Gyr period considering the model of the initial disc of planetesimals consisting of 10,038 test particles. We found, that a suitable border between the scattered disc and the inner Oort cloud, in terms of semi-major axis, appears to be no more than 2,500 AU. The simulated and observed values of the perihelion distance and inclination to the Ecliptic typically cover the range between 30 and 40 AU and from  $0^\circ$  to  $30^\circ$ , respectively. No simulated or observed values of the inclination exceed  $45^\circ$ . The distributions of eccentricity and inclination in the simulation are more consistent with their observed counterparts if the primary observational selection effects are imitated in the simulated distributions. **(8)**

We found that there is a one-order-of-magnitude less numerous population for the Oort cloud than supposed up to now. Such reduction also solves (or, at least, weakens) the problem of too high a mass of the comet cloud, as well as the problem of too numerous a population of predicted Halley-type objects or too high a space density of interstellar comets. The dominance of the fading over the extinction, dormant-phase, or disintegration is demonstrated with the help of the distributions of the reciprocal semi-major axes of the original orbits of the long-period comets and a more moderate decrease in discoveries of new comets with increasing perihelion distance. The comet discoveries within the LINEAR sky survey are also used to support our conclusions. Previous overestimate of the population is also documented by a significantly smaller amount of new comets with perihelia less or equal 3 AU discovered within the LINEAR. **(21)**

### **(b) comets and asteroids**

We studied near-Earth asteroids (NEAs) and main belt/Mars crossing (MB/MC) asteroids. The spin rate distribution of (MB/MC) asteroids with diameters of 3-5 km is uniform in the range from  $f=1$  to  $9.5 \text{ d}^{-1}$ , and there is an excess of slow rotators with  $f < 1 \text{ d}^{-1}$ . The observed distribution appears to be controlled by the Yarkovsky-O'Keefe Radzievskii-Paddack (YORP) effect. The magnitude of the excess of slow rotators is related to the residence time of slowed down asteroids in the excess and the rate of spin rate change outside the excess. We estimated a median YORP spin rate change of  $\approx 0.022 \text{ d/Myr}$  for asteroids in our sample. The spin rate distribution of near-Earth asteroids (NEAs) with sizes in the range 0.2-3 km ( $\sim 5$  times smaller in median diameter than the MB/MC asteroids sample) shows a similar excess of slow rotators, but there is also a concentration of NEAs at fast spin rates. The concentration at fast spin rates is correlated with a narrower distribution of spin rates of primaries of binary systems among NEAs; the difference may be due to the apparently more evolved population of binaries among MB/MC asteroids. **(24)**

### **(c) meteoroids**

It is of high importance to have correct datasets and parameters of meteors in databases and catalogues if we perform a statistical analysis of them. Therefore, we analyzed the 14763 precise determined meteor orbits collected in the Japanese tv catalogue (SonotaCo (2009)), with the aim of determining the real proportion of interstellar meteors in this database. If interstellar meteors are present among the registered meteor orbits, the distribution of the excesses of their heliocentric velocities should correspond to the distribution of the radial velocities of close stars. Any error in the determination of heliocentric velocity especially near

the parabolic limit, can create an artificial hyperbolic orbit that does not really exist. The analysis of the data did not produce any convincing arguments in favour of the existence of true hyperbolic meteors in the catalogue. It was shown that the vast majority of the 484 hyperbolic orbits have been caused by an overestimation of their velocity, and approximately 50% of them belong to meteor showers. Furthermore, the hyperbolic excesses of the velocities in all cases are very low, about one order less than the velocity distribution of neighbouring stars suggest. **(6)**

We tested if the comet 96P/Machholz and asteroid 2003 EH1 could be the parents of the Quadrantids meteor stream. These two bodies have been regarded as the most probable candidates. Moreover, we investigated a possibility of an existence of their common progenitor, in the past. It was proved that at least one of 96P and 2003 EH1 is the parent body of the Quadrantid meteor stream. Due to an uncertainty in the orbit determination and unknown non-gravitational effects, it is impossible to decide which one of these two bodies is the dominant parent or whether both these bodies have significantly released the meteoroids into the stream. We also demonstrated some possibilities allowing an existence of a progenitor and its splitting to 96P and 2003 EH1. **(9)**

Generally, meteoroids are in streams not distributed uniformly. There exists so-called filaments in which the particles are grouped. We studied a structure of filaments of Geminids. 249 out of 387 selected Geminids are formally grouped into one of the 16 determined orbital filaments. As it was expected, the Geminids seem to be a relatively compact stream. Only a weak conception of 4 branches of filaments can be found. It is hardly recognizable only on the basis of the space visualisation and with the low numerous filaments included. According to our analysis, the two observed maxima of Geminids are product of the activity of two different groups of filaments. These parts of Geminids might appear to be as two different meteor streams, unless the similarity of their orbits was so high. **(10)**

A central depository for meteor orbits obtained by photographic techniques, as part of the IAU Meteor Data Center, is located at the Astronomical Institute of the Slovak Academy of Sciences. The current version of the catalogue contains data on 4581 meteor orbits obtained by 17 different stations or groups from the period 1936 to 1996. Since 1996 a few huge campaigns have been organised including very successful Leonids and Perseids. That is why we prepared a new more complete version of the database. New or recalculated/remeasured data on photographic meteors, after a check and consultations with the observer, are included into the database. **(31)**

#### **(d) cosmic dust**

Cosmic dust in the interplanetary environment is controlled not only by gravitational forces but it is affected also by non-gravitational influences, mainly by radiation.

We investigated the effect of stellar electromagnetic radiation on the motion of arbitrarily shaped dust particles in mean-motion orbital resonances with planets. Giving a resonance and a value of parameter  $\beta$  (the ratio between radiation pressure force and gravitational force of the central star), we calculated nonradial components of radiation pressure force when a given trajectory is prescribed. The obtained values of the nonradial components were found in a good agreement with published detailed numerical simulations for a given nonspherical particle. Therefore nonspherical grains are present in mean-motion resonances with planets. Similarly, the difference between the motion of a real particle and the motion influenced by the Poynting-Robertson effect may be important. **(11)**

We summarized the effects of light scattering on the dynamics of irregularly shaped dust grains in the Solar System. The various aspects of the interaction of electromagnetic radiation with cosmic dust particles cause discrepancies between optical and physical

behavior of realistically-shaped particles. The dynamical evolution of morphologically non-identical particles which are driven by gravity, electromagnetic radiation and the Lorentz forces can dramatically differ. Although spherical particles often enable analytical calculations, an orbital evolution of spheres cannot be considered as a representative evolution for real cosmic dust particles. The effect of electromagnetic radiation on the motion of dust grains plays a crucial role here. While irregularly-shaped interstellar dust particles may be captured in the Solar System, the spherical particles will not survive due to close encounters with the Sun. Spherical grains can be captured almost only in the evaporation region (in the vicinity of the Sun), where they are destroyed due to high temperatures. The spherical dust particles ejected from comets will monotonously inspiral toward the Sun subject to the Poynting–Robertson effect. However, the non-spherical particles of the same origin may be temporarily stabilized at some heliocentric distances and thus their lifetime may be much longer than that for the Mie spheres. Some dust particles may also be captured in mean-motion resonances with planets (commensurability resonances). While spherical particles are always characterized by the secular decrease of the semi-major axes near mean-motion resonances, this may not be true for non-spherical particles. Resonant captures of arbitrarily shaped dust grains exist for exterior and interior mean-motion resonances with planets. **(12)**

We found that temperature gradients in dust beds embedded in a low pressure gaseous environment induce a lift of particles under certain conditions. This effect can erode planetesimals and enables entrainment of dust into the martian atmosphere. We considered a numerical model to calculate the temperature profile in a dust bed which is subject to illumination. We consider the situation when the illumination is switched on and heats the dust bed's surface and when it is switched off again after a certain time. The calculations focus on the heat transfer by infrared radiation within the dust layer. We find that radiative transfer within the dust bed modifies the absolute temperatures and temperature gradients significantly. This is important for effects which are sensitive to absolute temperatures, i.e. ice sublimation or melting of solids. For low thermal conductivity dust beds of  $0.001 \text{ W m}^{-1} \text{ K}^{-1}$  it determines the temperature structure of the dust. For higher thermal conductivities the modifications are moderate with respect to dust eruptions as the order of magnitude of temperature gradients stays the same. **(13)**

### **2.3 – Stellar department - RESEARCH AREAS:**

- a) study of exoplanets – a new modern research area in stellar astronomy, study of basic parameters of exoplanets and development of theoretical tools for analysis;
- b) study of binaries, determination of the absolute parameters of the components of eclipsing binaries using photometric data taken at the telescopes at AISAS and spectroscopic data gained in collaborations, study of close binaries, the mass transfer and mass losses, testing of the predictions of Applegate mechanism, detection of multiple components using the spectroscopic observations from ground-based telescopes, speckle interferometry from CFHT and astrometry from Hipparcos, mapping of the surfaces of active binaries, study of cycles of stellar activity and spots;
- c) study of the structure of active components in symbiotic stars, ionization, scattering and mass outflow by the stellar wind and jets, multifrequency observations of classical novae, determination of their orbital periods, study of the structure of their expanding envelopes using the spectroscopic observations and direct optical and radio images;
- d) study of the chemical composition and properties of the chemically peculiar stars using spectra from ESO, Mt.Stromlo, Nauchnyj, Ondřejov, Rozhen and Zelenchuk, search for possible relations between the orbital parameters of binaries with Am components.



## **SELECTED RESULTS PUBLISHED IN THE PERIOD 2007-2011**

### **(a) exoplanets**

The theoretical atmosphere, spectral, and light-curve models were computed for 6 extrasolar giant planets (EGPs), undergoing strong irradiation, for which the observations by satellite Spitzer were available in 2007. It was discovered, by comparing models with data, that a number of EGP atmospheres experience thermal inversions and have stratospheres. In these exoplanets, the water absorption features invert into emission features and mid-infrared fluxes can be enhanced by a factor of 2. The correlation between the importance of such stratospheres and the stellar flux on the planet suggest the existence of two groups of exoplanets: those with and without stratospheres **(3)**.

A new model of the reflection effect was elaborated. Model describes the shape, surface temperature distribution, lightcurves and spectra of a strongly irradiated stellar or substellar object. The model took into account the reflection (scattering), heating, and heat redistribution over the surface of the irradiated object, limb and gravity darkening, orbital revolution and rotation of the exoplanet with appropriate Doppler shifts for the scattered and thermal radiation. Subsequently, the model was applied to an extreme case of "interacting binaries" - extrasolar planets. It was discovered that some of the 78 currently known transiting exoplanets have significant departures from the spherical shape. The extrasolar planet HD189733b has a low Bond albedo and intense heat redistribution, while the other one WASP-19b has a low Bond albedo and low heat redistribution **(2)**.

### **(b) classical binary stars**

Multicolour photometric observations of a red giant binary V1197 Ori, obtained at the Skalnaté Pleso observatory, showed the small amplitude ellipsoidal variations in the V and Rc bands, although not clearly in U and B band. All four bands show large irregular intrinsic variations, including fleeting quasi-periodicities identified by power spectra, that are caused by dynamical tides generated by orbital eccentricity. To deal with the absence of eclipses and consequent lack of astrophysical and geometrical information, the Hipparcos parallax distance, V and Rc light curves and published radial velocity curves were analyzed simultaneously in terms of absolute flux. The red giant's temperature was estimated from our new spectra taken in David Dunlap Observatory (DDO) in Toronto. Our new method of analysis, called Inverse Distance Estimation can also be applied to other ellipsoidal variables. Advantages gained by utilization of definite distance and temperature are discussed in regard to how radius, fractional lobe filling, and mass ratio information are expressed in the observations. The advantages were tested in solutions of noisy synthetic data. Solutions show red giant masses that are too low for evolution to the red giant stage within the age of the Galaxy **(33)**.

Our new photometry and DDO spectra led to the discovery of the tightest known quadruple system VW LMi, consisting of a contact eclipsing binary with the orbital period 0.477551 days and detached binary with the orbital period 7.93063 days revolving in 355 days orbit. All available radial velocities and minima times were combined to better characterize the orbits and to derive absolute parameters of the components. The total mass of the quadruple system was estimated to be 4.56 Msun. The detached, non-eclipsing binary with orbital period  $P = 7.93$  d was found to show apsidal motion with  $U \sim 80$  yr. Precession period in this binary, caused by the gravitational perturbation of the contact binary, is estimated to be about 120 yr. The wide mutual orbit and orbit of the non-eclipsing pair were found to be close to coplanarity **(25)**.

Our 2D (radial velocity, orbital phase) DDO spectroscopy of the very low mass-ratio close binary AW UMa strongly indicate that the spectroscopic mass ratio ( $q_{sp} = 0.10$ ) does not agree with the photometrically derived one and that the widely adopted contact binary model

appears to experience serious inconsistencies and limitations for this object. There are indications of the existence of an equatorial belt encompassing the whole system. All deficiencies in the interpretation and the discrepancy between the photometric and spectroscopic mass ratio of AW UMa can be solved within a new model of AW UMa where both components are detached and the system is submerged in a stream of hot, optically thick matter which mimics the stellar contact. While the masses and their ratio are correctly given by spectroscopy, the photometric picture is heavily modified by the matter engulfing both stars in the equatorial plane **(26)**.

Our photoelectric observations of the A-type contact binary systems DU Boo and AG Vir show that the light curve asymmetry is extremely temporally stable. The phase dependence of the color indices is unexpectedly small for the observed amplitude of the O'Connell effect, which indicates a very large heated area with a temperature contrast of 1000-1500 K. The broadening functions (BFs) of the systems extracted from DDO spectra, do not show any dark solar-type photospheric spots. On the other hand, there are significant differences of BFs between the quadratures (surprisingly similar in both systems) indicative of stream of matter or bright region causing additional emission seen between the components around the phase 0.25. Absolute parameters of the components slightly depend on the adopted model. Long orbital period of both contact binaries combined with late spectral type indicate that the primary components of the systems already evolved off the main sequence **(27)**.

### **(c) active stars**

The collimated bipolar jets from the symbiotic prototype Z And were detected for the first time. Their presence was transient, being detected during its 2006 outburst. The outburst was monitored with optical high-resolution spectroscopy and multicolor UBV photometry. During the optical maximum, rapid photometric variations with  $\sim 0.06$  mag on the timescale of hours developed. Simultaneously, high-velocity satellite components appeared on both sides of the H $\alpha$  and H $\beta$  emission line profiles. Spectral properties of these satellite emissions indicated ejection of bipolar jets collimated within an average opening angle of 6 degrees. They were launched at a velocity of  $\sim 5000$  km/s, asymmetrically with the red/blue velocity ratio of 1.2-1.3. The average outflow rate via jets was estimated to  $\sim 2 \cdot 10^{-6}$  solar masses per year. Evolution of the rapid photometric variability and asymmetric ejection of jets around the optical maximum can be explained by a disruption of the inner parts of the disk caused by radiation-induced warping of the disk **(30)**.

Symbiotic star AG Draconis produces a strong supersoft X-ray emission. The X-ray and optical-UV fluxes are in a strict anticorrelation throughout the active and quiescent phases. To understand this relationship we modeled the X-ray/near-IR energy distribution at different levels of the star's brightness, and provided a profile-fitting analysis of the broad wings of OVI 1032, 1038 Å and HeII 1640 Å emission lines by Thomson scattering. By this way, we confirmed the observed flux anticorrelation quantitatively, and showed that the optical bursts are associated to an increase in the nebular component of radiation. These results led us to a conclusion that the supersoft X-ray/optical-UV flux anticorrelation is caused by the variable wind from the hot star. The enhanced hot star wind gives rise to the optical bursts by reprocessing high-energy photons from the Lyman continuum to the optical-UV. Understanding the inverse relationship between optical and X-ray fluxes represents an important ingredient in the investigation of the Z And-type outbursts **(29)**.

In optical region, the spectrum of symbiotic binaries consists of contributions from the cool giant, symbiotic nebula and the hot star. Strong emission lines are superposed on the continuum. We developed a simple method to extract individual components of radiation from photometric UBV magnitudes. We applied the method to classical symbiotic stars AX Per, AG Dra, AG Peg and Z And, the symbiotic novae RR Tel and V1016 Cyg and the classical nova V1974 Cyg during its nebular phase. We estimated the electron temperature and emission measure of the nebula in these systems and the V magnitude of the giant in

the symbiotic objects. Our results are in a good agreement with those obtained independently by a previous modelling the UV-IR SED **(4)**.

V471 Tau is the the eclipsing binary with the orbital period around 0.5 days. It is prototype of a post-common envelope system and a progenitor of a cataclysmic binary. The system consists of a cool K2 V red dwarf and a hot white dwarf. The precise photometry of the system and analysis of the (O - C) diagram led to the discovery of the third body in the system in an eccentric orbit with the period of 33.2 years. For an inclination larger than  $35^\circ$ , the mass of this body is below the stable hydrogen-burning, so it is most probably a brown dwarf **(16)**.

#### **(d) chemically peculiar stars**

The star HD 143418 was frequently used as a photometric standard during Be stars observations. After discovering its photometric instability and its binary nature, it was classified as a chemically peculiar (CP) star. In this paper we analysed all the available photometric, as well as spectroscopic observations and we found that this is not a CP star because: 1) photometric variability and relative abundances of chemical elements in the atmosphere do not possess characteristics of a CP star, 2) there is no strong magnetic field, which is always present in photometrically variable CP stars, 3) the intensity of of the spectral lines is not variable. We conclude that HD 143418 may be a prototype of a rare detached interacting close binary containing a subsynchronously rotating primary passing through its synchronisation stage. The seasonal variability of the orbitally modulated light curves may be related to an expected incidence of circumstellar matter originating in the tidally spinning up primary component **(35)**.

Radial velocity determination is one of the basic methods of learning on stars and their systems. We aim at utilizing a computerized method for radial velocity measurements from spectra on electronic and photographic media. We compute the crosscorrelation function of an observed and synthetic spectrum. Applicability of the method is documented on electronic spectra of the double star V624 Her as well as photographic spectra of the binary with CP components AR Aur. The feasibility of the method for detecting of component spectra is demonstrated on systems HD 861 and HD 71973. We also show a possible way of using wide features such as hydrogen lines in early type stars in radial velocity determination **(34)**.

#### **2.4 – Inter-discipline fundamental research**

We studied Stable configuration of ultrarelativistic material spheres, especially the solution for an extremely hot gas. During the last stage of collapse of a compact object into the horizon of events, the potential energy of its surface layer decreases to a negative value below all limits. The energy-conservation law requires an appearance of a positive-valued energy to balance the decrease. We derive the internal-state properties of the ideal gas situated in an extremely strong, ultrarelativistic gravitational field and suggest the application of our result to a compact object with a radius that is slightly larger than or equal to the Schwarzschild gravitational radius. On the surface of the object, we find that the extreme attractivity of the gravity is accompanied with extremely high internal heat energy. This internal energy implies a correspondingly high pressure, the gradient of which has such a behavior that it can compete with the gravity. In more detail, we find the equation of state in the case when the magnitude of the potential-type energy of constituting gas particles is much larger than their rest energy. This equation appears to be identical with the general relativity condition of the equilibrium between the gravity and pressure gradient when the radius of the object becomes identical with the Schwarzschild gravitational radius. This means that the total pressure gradient on the surface of that object completely compensate for gravity. The object then becomes stable. The internal energy of the surface layer thus rises above any limit, so the event horizon is not so far insurmountable barrier the mater. **(22)**

Specific classes of projective rings lines, finite symplectic (and orthogonal) polar spaces, finite generalized polygons and Veldkamp spaces have been employed to reveal intriguing geometrical properties of multi-qudits and certain stringy black hole entropy formulas. Amongst the key results one finds Hjelmslev geometry behind mutually unbiased bases, that single-qudits distinguish whether they live in the Hilbert space of a square-free dimension or not, that the commutation algebra of the generalized Pauli group of  $N$ -qubits is embodied in the geometry of the symplectic polar space of type  $W(2N - 1, 2)$  and that the split Cayley hexagon of order two and the generalized quadrangle of type  $GQ(2,4)$  encode, respectively, the  $E_{\{7\}}$ - and  $E_{\{6\}}$ -symmetric black hole entropy formulas. In the last mentioned case, we have succeeded in showing that the  $E_{\{6(6)\}}$ -symmetric entropy formula describing black holes and black strings in  $D = 5$  is intimately tied to the geometry of the generalized quadrangle  $GQ(2,4)$  whose automorphism group is the Weyl group  $W(E_{\{6\}})$ . The 27 charges correspond to the points and the 45 terms in the entropy formula to the lines of  $GQ(2,4)$ . Different truncations with 15, 11 and 9 charges are represented by three distinguished subconfigurations of  $GQ(2,4)$ , well known to finite geometers. For the 40 different possible truncations with nine charges this labeling yields 120 Mermin squares—objects well known from studies of Bell-Kochen-Specker-like theorems. These results are intricately connected to our previous ones obtained for the  $E_{\{7\}}$ -symmetric entropy formula in  $D = 4$  by observing that the structure of  $GQ(2,4)$  is linked to a particular kind of geometric hyperplane of the split Cayley hexagon of order two, featuring 27 points located on nine pairwise disjoint lines (a distance-3-spread). We also conjectured that the different possibilities of describing the  $D = 5$  entropy formula using Jordan algebras, qubits and/or qutrits correspond to employing different coordinates for an underlying non-commutative geometric structure based on  $GQ(2,4)$ . (17)

### 3. Concept of R&D activity of the Organisation for the next four years (max. 5 pages)

#### i. Present state of knowledge and status of ongoing research related to the subject of the Concept, from both international and national perspective

There are supported at AISAS **only high ranked** research visions **proved periodically** by Scientific board of AISAS, (every 5 years). The most recent evaluation was done in 2011. There must be given clearly in each vision: *“present state of knowledge”, “significance of the vision within the field of research”, “objectives of the concept” and “proposed strategies and methods to be applied”*. Only the following visions which fulfilled criteria of high ranked level of research from both, international and national perspective were selected for next five years:

- a) *Physics of the solar photosphere and chromosphere*
- b) *Physics of an active solar corona and Sun-Earth connections*
- c) *Structure of meteoroid streams and complexes of small bodies of the Solar System, evolution and physical characteristics of the meteoroids parent bodies*
- d) *Dynamical evolution of small bodies of the Solar system*
- e) *Characterization of dust particles by electromagnetic radiation*
- f) *Exoplanets, brown dwarfs and low-mass stars*
- g) *Study of activities of selected interacting binaries*
- h) *Classical binaries and multiple star systems*
- i) *Symbiotic stars and novae*

These perspective research areas will guarantee that AISAS will continue its cutting edge research in the next four years

Detailed description of the *Present state of knowledge* for each particular vision, can be found at: [http://www.astro.sk/general/scientific\\_council/devel\\_studies/](http://www.astro.sk/general/scientific_council/devel_studies/)

**ii. Organisation's role or significance in the overall research effort within the field of the Concept on both the national and international scales**

Significance of AISAS in the overall research **on national scale** is documented by several facts:

- a) AISAS runs 2 projects of Structural funds of EU as a coordinator within the "Center of excellence - Center of space research: Influences of the space weather" and applied for another one which is in process of evaluation
- b) AISAS obtained 3 APVV scientific grants in the assessed period and applied for another three for near future
- c) AISAS was ranked among the best 5 institutes every time in the "Annual evaluation of institutes of the Section I. of SAS"
- d) AISAS run 22 VEGA grants predominantly in class "A" during the assessed period and it will run a similar number of VEGA grants for the next four years.

Significance of AISAS in the overall research **on international scale** is documented and guaranteed:

- a) with a large number of international projects run during the assessed period, number of papers produced in close international collaboration, number of citations and number of visits of scientists from abroad at AISAS
- b) with a number of international projects of AISAS which will run in next four years and with several important international projects and collaborations with AISAS membership which are prepared. The most important among them is Project "INFRA-2012-1.1.26 - Research Infrastructures for High-Resolution Solar Physics" within the Call N° 10 - FP7-INFRASTRUCTURES-2012-1 INFRA-2012. There was already set invitation for preliminary negotiation of contract of the project
- c) with fact that AISAS further ranks among the institutions with high credibility in the field of meteor and cometary-asteroidal research, coordinating the IAU Meteor Data Center, which is a central depository and database summarizing all available basic parameters of photographic and radio meteors and their orbits
- d) with fact that AISAS belongs to the European Bolide Network stations, where it will enhance its role, being equipped with new bolid cameras from Structural funds of EU in frame of Center of excellence - Center of space research: Influences of the space weather
- e) that AISAS plays a significant international role in the modern research of exoplanets. It is documented by organization of the top level international IAU Symposium (see Section 3.ii), by several long-term visits of top scientists in the field from USA at

AISAS and by an outstanding number of citations of papers produced by our scientists in international collaboration

- f) high international status of AISAS is documented also by the fact, that there were identified **two top scientific teams of AISAS** in the project "*Identification of the top scientific teams and their members at Slovak Academy of Sciences*" organised by ARRA (Academic Ranking and Rating Agency). One team (stellar astronomy) was ranked as the **top** and one (solar research) as an **outstanding** in comparison with the world top in the particular scientific field

### iii. Objectives of the Concept

*Research activities in the **Solar physics department** will be focused on:*

- a) investigation of physical properties of the solar corona, especially magnetic and velocity field in coronal structures and their temporal evolution with consequences to the near Earth environment – Space Weather
- b) investigation of physics and fast dynamics of the structures of the solar photosphere and chromosphere at distances less than 100 km (a high spatial resolution). Investigation will be focused on temporal evolutions measured with a high temporal resolution.
- c) continuation in the patrol measurements of the solar coronal emission lines and H alpha prominences using them for study of the solar activity cycle and solar-terrestrial relations
- d) study of fundamental open problems in the solar physics, i.e. dynamics and mechanisms of the energy production, modification and transfer to upper layers of the solar atmosphere (chromosphere and corona). Wave and nanoflare heating mechanisms are planned to be observationally addressed.

*Research activities in the **Department of interplanetary matter** will be focused on:*

- a) attempt to fulfill a giant challenge to create a unified theory of the origin of major parts of the Solar system (giant planets, the Kuiper belt and Oort cloud)
- b) clarifying dynamical properties of the interplanetary hazardous bodies which come to the vicinity of the Earth and Sun, their space migration and transitional phases among individual populations. Particular attention will be paid to determination of the physical properties of the medium-size main-belt asteroids and sufficiently bright Near-Earth asteroids and comets. Based on observational material obtained by the 1.3-m telescope we will study an evolution of cometary nuclei at large heliocentric distances in time when coma is absent and we can analyze a naked cometary nucleus
- c) study of mechanisms of generation of the complexes of meteoroids, asteroids and comets, dynamical evolution of the individual members of the complexes, mechanisms of generation of the meteoroid streams up to their contribution to stability of the zodiacal cloud.
- d) development of complex theories, of the dynamical behavior of dust populations consisting of arbitrarily shaped grains and analyze possible erosions processes of the

grains. Further an interaction of the irregular particles with an incident electromagnetic radiation will be investigated. An attention will be paid to optical effects by fluffy particles, which typically occur in the space.

*Research activities in the **Stellar department** will be focused on:*

- a) study of exoplanets, discovery new exoplanets, study of their physical parameters, development of the top level theoretical tools for interpretation of observables
- b) determination of the absolute parameters of the components of interacting binaries, to study interactions in binaries with emphasise to systems with eccentric orbits, to study evolution and origin of binaries, to detect binaries in stellar clusters, to detect and study gravitational interaction in multiple systems
- c) study of active stars, classical novae, cataclysmic variable stars and close binaries and achieve a better understanding of the nature of these objects, namely the outburst stages, mass transfer processes, the nature of the accreting stars and physical reasons of the outbursts
- d) study of hot stars with emphasis on chemically peculiar stars, realistic models of atmospheres with dipole magnetic field, determination of relative abundances of chemical elements.

#### **iv. Proposed strategies and methods to be applied, and time schedule**

*Strategies in the **Solar physics department** in objectives for the next four years*

- a) there will be used modern tools – high resolution spectro-polarimetry of the solar corona performed with the state of art instrument *Coronal multi channel polarimeter (CoMP-S)* installed at the Observatory Lomnický štít in 2011. Close collaboration with colleagues from HAO, Boulder and Univ. of Hawaii (USA) is planned in this field
- b) inversion of the high spatial and temporal resolution spectral and spectro-polarimetric data taken at top level ground based telescopes (VTT, SST, DOT, THEMIS) at Canary Islands will be used together with predictions of the advanced numerical simulations of the convection in the solar atmosphere. Close collaboration with colleagues from Germany, Spain, Sweden and France is planned in this field. The above mentioned FP7 project guarantees for four years an observational time at those facilities
- c) important data for investigation of a solar cycle will be acquired regularly at the Observatory Lomnický štít with the classical coronagraph and with the attached new CoMP instrument. Additional data from the Kanzelhöhe Observatory (Austria) will be used in close collaboration with colleagues from the University Graz
- d) problem of the energy production, modification and transfer to upper layers of the solar atmosphere will be addressed using data of observing campaigns performed at ground-based telescopes together with space-borne satellites (SOHO, RHESSI, HINODE, SDO). Close international cooperation is planned for an interpretation of the acquired data – monochromatic images, spectra, spectro-polarimetric data and UV and X-ray data.

*Strategies in the **Department of interplanetary matter** in objectives for the next four years*

- a) there will be used state of art tools: massive parallel computing numerical simulations including the most modern codes available. The new own facility – computational cluster bought from Structural funds of EU will be used. This will be done in close, well-developed, cooperation with the leading group in this field at L'Observatoire de la Côte d'Azur (Observatory of Nice). Two computing clusters were obtained from the Structural funds of EU in 2011
- b) the best quality and long-term data series will be used to create 3-D models of asteroids. Using the new AISAS facility 1.3 m telescope constructed in the frame of Structural funds of EU (installation in 2013 at the Skalnaté Pleso Observatory) and equipped with high-tech post-focus technology will be used for acquiring data for this purpose
- c) within the foreign partnership, we have an intention to model initial conditions of the particle release (ejection velocity distribution and spatial angle) from the parent comets. We will continue in separation the main meteoroid showers from the updated database of the precise photographic meteor orbits and search for minor showers and associations. In cooperation with Astronomical Institute, Ondřejov, Czech Republic we will obtain atmospheric orbits of bolides in the frame of European Bolide Network. All the characteristic (dynamical, physical and mineralogical) of the meteorite Košice we will publish in a special issue of Meteoritics and Planetary Science (scientific journal of the Meteoritics Society)
- d) modern computational methods will be used, namely light scattering tools (DDA and T-matrix) that represent extensions of the conventional Mie theory. Thanks to close cooperation with German colleagues (Universität Duisburg-Essen, Universität Münster) we have possibilities to proof theoretical results with real “in laboratory radiation influenced” dust grains.

*Strategies in the **Stellar department** in objectives for the next four years*

- a) there will be used infrastructure of AISAS (telescopes) for collection of observational material, including a new AISAS facility 1.3 m class telescope constructed from the Structural funds of EU (installation in 2013 at Skalnaté Pleso Observatory) and equipped with high-tech post-focus technology. For theoretical interpretation and modeling of physical picture of exoplanets there will be used state of art codes for advanced simulations
- b) we will continue in our photoelectric and CCD photometry to obtain light-curves of close binaries and the high-dispersion spectroscopy acquired in international collaboration to get radial velocity curves. We will analyze light curves using our own software ROCHE and determine the basic parameters of the components. We will continue in determination of minima times of eclipsing binaries from the photometric observations by the telescopes of the AI SAS and interpret their orbital period changes. For the determination of the light-time orbits we will use our own software MULTIPLE. We will apply for observing time on larger telescopes and analyze different types of observations obtained in the frame of international collaboration



- c) we will use long-term photometry as well as high-resolution spectroscopy for studying details in the electromagnetic spectrum of active stars. We plan to develop more sophisticated model of the energy distribution in the composite spectra of symbiotic and cataclysmic binaries to build better picture of fundamental parameters and photometric behavior of them. Multi-frequency observational approach (X-ray, UV, visible and IR) will be used to gain the data and modeling processes of ionization, Raman and Rayleigh scattering, acting in these binaries, will be applied to understand the structure of active objects during outbursts and mass-outflows. Our own software will be applied.
- d) photometry and spectroscopy of binaries with CP components will be used to get periods and shapes of phase light curves of chemically peculiar stars and spectroscopy will determine a chemical composition and stratification of elements on the surfaces of these stars. Photometry will be done at our own facilities and spectra will be obtained in close collaboration with colleagues from Special Astrophysical Observatory, Russian Academy of Sciences and from Institute of Astronomy, NAO Rozhen (Bulgaria).

### **III. Partial indicators of the main activities:**

#### **1. Research output**

- i. List of the selected publications documenting the most important results of basic research. Total number of publications in the whole assessed period should not exceed the average number of the research employees**

- [1] BALTHASAR, Horst - GÖMÖRY, Peter. The three-dimensional structure of sunspots. I. The height dependence of the magnetic field. In *Astronomy and Astrophysics*. ISSN 0004-6361, 2008, vol. 488, p. 1085-1092. (4.259 - IF2007).
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- [3] BURROWS, Adam - BUDAJ, Ján - HUBENY, Ivan. Theoretical spectra and light curves of close-in extrasolar giant planets and comparison with data. In *The Astrophysical Journal*. ISSN 0004-637X, 2008, vol. 678, p. 1436-1457. (6.405 - IF2007).
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- [10] KAŇUCHOVÁ, Zuzana - SVOREŇ, Ján. Looking for the Geminids structure in the range of photographic meteors. In Contributions of the Astronomical Observatory Skalnaté Pleso. ISSN 1335-1842, 2008, vol. 38, p. 501-518.
- [11] KOCIFAJ, Miroslav - KLAČKA, Jozef. Nonspherical dust grains in mean-motion orbital resonances. In Astronomy and Astrophysics. ISSN 0004-6361, 2008, vol. 483, p. 311-315. (4.259 - IF2007).
- [12] KOCIFAJ, Miroslav. A review of the effects of light scattering on the dynamics of irregularly shaped dust grains in the Solar System. In Journal of Quantitative Spectroscopy & Radiative Transfer, 2009, vol. 110, p. 879-888. (1.635 - IF2008). (2009 - Current Contents, EBSCO, SCOPUS, NASA ADS). ISSN 0022-4073.
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- [31] SVOREŇ, Ján - PORUBČAN, Vladimír - NESLUŠAN, Luboš. Current status of the photographic meteoroid orbits database and a call for contributions to a new version. In *Earth, Moon and Planets*. ISSN 0167-9295, 2008, vol. 102, p. 11-14. (0.558 - IF2007).
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**ii. List of the selected publications documenting the most important results of applied research**

AISAS is the organisation exclusively aimed at a basic research and it, therefore, does not have any publications related to applied research.

### iii. List of monographs/books published abroad

#### Chapters in monographs

- [1] KOCIFAJ, Miroslav. Interaction of solar radiation with non-spherical inhomogenous aerosol particles. In *Aerosols: Chemistry, Environmental Impact and Healths Effects*. - New York: Nova Science Publishers, 2009, p. 161-184. ISBN 978-1-60692-925-4.
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- [3] LETO, Giuseppe - ASTALOŠ, Ján - JAKUBÍK, Marián - NESLUŠAN, Luboš - DYBCZYŃSKI, Piotr A. The usage of the Grid in the simulation of the comet Oort-Cloud formation. In *Grid Computing: Towards a Global Interconnected Infrastructure*. - London : Springer-Verlag, 2011, p. 293-306. ISBN 978-0-85729-675-7.

### iv. List of monographs/books published in Slovakia

- [1] *Astronomical Handbook for 2008*. Slovak Central Observatory Hurbanovo, 2007, KASICO, Bratislava, pp 200, ISBN 978-80-85221-56-5. Eds. PITTICH, Eduard
- [2] *National astronomical meeting for teachers – 2007, Proceedings* Tatranská Lomnica: Astronomical Institute SAS, 2007, pp 80, ISBN 978-80-969842-1-3. Eds. RYBÁK, Ján, SVOREŇ, Ján,
- [3] *Astronomical Handbook for 2009*, Slovak Central Observatory Hurbanovo, 2008, KASICO, Bratislava, pp 200, ISBN 978-80-85221-58-9. Eds. PITTICH, Eduard
- [4] *National astronomical meeting for teachers – 2008. Proceedings*, Tatranská Lomnica, Astronomical Institute SAS, 2008, pp 80, ISBN 978-80-970059-0-0. Eds. RYBÁK, Ján, SVOREŇ, Ján,
- [5] RUŠIN, Vojtech, *Astronóm Milan Rastislav Štefánik*, Bratislava, VEDA, 2009, pp 163, ISBN 978-80-224-1071-7.
- [6] *Astronomical Handbook for 2010*, Slovak Central Observatory Hurbanovo, 2009, KASICO, Bratislava, pp 199, ISBN 978-80-85221-63-3. Eds. PITTICH, Eduard
- [7] *National astronomical meeting for teachers – 2009, Proceedings*, Tatranská Lomnica, Astronomical Institute SAS, 2009, pp 83, ISBN 978-80-970059-1-7. Eds. RYBÁK, Ján, SVOREŇ, Ján,
- [8] *Astronomical Handbook for 2011*, Slovak Central Observatory Hurbanovo, 2010, KASICO, Bratislava, pp 199, ISBN 978-80-85221-67-1. Eds. PITTICH, Eduard
- [9] *National astronomical meeting for teachers - 2010, Proceedings*, Tatranská Lomnica, Astronomical Institute SAS, 2010, pp 84, ISBN 978-80-970059-2-4. Eds. SVOREŇ, Ján, HUSÁRIK, Marek
- [10] ZVERKO, Juraj, HRIC, Ladislav, *Pozorovateľská astronómia na hvezdárňach Slovenska*, Proceedings of the conference to the 50-th anniversary of the Slovak Astronomical Society, Tatranská Lomnica, Slovak Astronomical Society, 2010, pp 106 ISBN 978-80-970333-5-4.

[11] *National astronomical meeting for teachers - 2011, Proceedings*, Tatranská Lomnica, Astronomical Institute SAS, 2011, pp 76, ISBN 978-80-970059-3-1. Eds. SVOREŇ, Ján, HUSÁRIK, Marek

**v. List of other scientific outputs specifically important for the Organisation (normalization, standardization, maps, etc.)**

**vi. Table of research outputs**

*Table Research outputs shows research outputs in number of specified entries; these entries are then divided by FTE employees with a university degree (from Tab. Research staff) for all Organisation at the respective year; finally these entries are divided by the total salary budget (from Tab. Salary budget).*

Research outputs	2007			2008			2009			2010			2011			total			
	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	averaged number per year	av. No. / FTE	av. No. / salary budget
chapters in monographs, books published abroad	1	0,031	2,16	0	0,000	0,00	2	0,072	3,79	0	0,000	0,00	1	0,033	1,92	4	0,8	0,027	1,57
chapters in monographs, books published in Slovakia	15	0,468	32,41	15	0,517	30,30	1	0,036	1,89	0	0,000	0,00	0	0,000	0,00	31	6,2	0,206	12,19
CC publications	34	1,061	73,46	42	1,448	84,84	41	1,482	77,63	29	0,913	54,27	31	1,025	59,41	177	35,4	1,174	69,63
scientific publications indexed by other databases (WOS, Scopus, NASA ADS, MathSciNet, Math)	25	0,780	54,02	34	1,172	68,68	32	1,156	60,59	16	0,503	29,94	19	0,628	36,41	126	25,2	0,836	49,56
scientific publications in other journals	7	0,218	15,12	5	0,172	10,10	0	0,000	0,00	9	0,283	16,84	10	0,331	19,16	31	6,2	0,206	12,19
publications in proc. of international scientific conferences	2	0,062	4,32	10	0,345	20,20	10	0,361	18,93	4	0,126	7,49	35	1,157	67,07	61	12,2	0,405	24,00
publications in proc. of nat. scientific conferences	0	0,000	0,00	0	0,000	0,00	6	0,217	11,36	19	0,598	35,56	5	0,165	9,58	30	6,0	0,199	11,80
active participations at international conferences	63	1,966	136,1	61	2,103	123,2	70	2,530	132,5	82	2,580	153,4	49	1,620	93,90	325	65,0	2,156	127,8
active participations at national conferences	1	0,031	2,16	8	0,276	16,16	7	0,253	13,25	0	0,000	0,00	2	0,066	3,83	18	3,6	0,119	7,08

### vii. List of registered patents

AISAS is the organisation exclusively aimed at a basic research and it, therefore, does not have any patents.

### viii. Supplementary information and/or comments on the scientific output of the Organisation

AISAS regularly contributes to astronomical databases with an observational data acquired with its instruments (solar data, meteors, asteroids and comets positions and photometry, stellar photometry)

## 2. Responses to the scientific output

Table *Citations* shows specified responses to the scientific outputs; these entries are then divided by the FTE employees with a university degree (from Tab. Research staff) for all Organisation at the respective year; finally these entries are divided by the total salary budget (from Tab. Salary budget).

Citations	2006			2007			2008			2009			2010			total			
	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	No. / FTE	No. / salary budget	number	averaged number per year	av. No. / FTE	av. No. / salary budget
Web of Science	191	6,0	412,7	184	6,3	371,7	270	9,8	511,2	467	14,7	873,9	547	18,1	1048	1659	331,8	11,0	652,6
SCOPUS	11	0,3	23,8	22	0,8	44,4	10	0,4	18,9	5	0,2	9,4	5	0,2	9,6	53	10,6	0,4	20,8
NASA ADS	30	0,9	64,8	103	3,6	208,1	120	4,3	227,2	14	0,4	26,2	37	1,2	70,9	304	60,8	2,0	119,6
in monographs, conf. proceedings and other publications abroad	62	1,9	134,0	38	1,3	76,8	14	0,5	26,5	6	0,2	11,2	4	0,1	7,7	124	24,8	0,8	48,8
in monographs, conf. proceedings and other publications in Slovakia	9	0,3	19,4	5	0,2	10,1	2	0,1	3,8	2	0,1	3,7	0	0,0	0,0	18	3,6	0,1	7,1

**i. List of 10 top-cited publications from staff members since the establishment of the Organisation up to 2010 and number of their citations in the period 2006 - 2010**

- [1] BURROWS, Adam - HUBENY, Ivan - BUDAJ, Ján - HUBBARD, William. Possible solutions to the radius anomalies of transiting giant planets. In *The Astrophysical Journal*, 2007, vol. 661, no. 1, Part 1, p. 502-514. (6.119 - IF2006). (2007 - Current Contents, SCOPUS, NASA ADS). ISSN 0004-637X. Citations: **128**
- [2] CEPLECHA, Zdeněk - BOROVIČKA, Jiří - ELFORD, William G. - REVELLE, Douglas O. - HAWKES, Robert L. - PORUBČAN, Vladimír - ŠIMEK, Miroslav. Meteor phenomena and bodies. In *Space Science Reviews*, 1998, vol. 84, p. 327-471. (1998 - Current Contents, SCOPUS, NASA ADS). ISSN 0038-6308. Citations: **109**
- [3] PRIBULLA, Theodor - RUCINSKI, Slavek M. Contact binaries with additional components. I. The extant data. In *The Astronomical Journal*, 2006, vol. 131, p. 2986-3007. (5.377 - IF2005). (2006 - Current Contents, SCOPUS, NASA ADS). ISSN 0004-6256. Citations: **68**
- [4] BURROWS, Adam - BUDAJ, Ján - HUBENY, Ivan. Theoretical spectra and light curves of close-in extrasolar giant planets and comparison with data. In *The Astrophysical Journal*, 2008, vol. 678, p. 1436-1457. (6.405 - IF2007). (2008 - Current Contents, SCOPUS, NASA ADS). ISSN 0004-637X. Citations: **63**
- [5] BURROWS, Adam - HUBENY, Ivan - BUDAJ, Ján - KNUTSON, Heather A. - CHARBONNEAU, David. Theoretical spectral models of the planet HD 209458b with a thermal inversion and water emission bands. In *The Astrophysical Journal*, 2007, vol. 668, p. L171-L174. (6.119 - IF2006). (2007 - Current Contents, SCOPUS, NASA ADS). ISSN 0004-637X. Citations: **48**
- [6] SANIGA, Metod - PLANAT, Michel - ROSU, Haret. Mutually unbiased bases and finite projective planes. In *Journal of Optics B: Quantum and Semiclassical Optics*, 2004, vol. 6, p. L19-L20. (1.214 - IF 2003). (2004 - Current Contents, SCOPUS, NASA ADS). ISSN 1464-4266. Citations: **30**
- [7] PRIBULLA, Theodor - KREINER, Jerzy - TREMKO, Jozef. Catalogue of the field contact binary stars. In *Contributions of the Astronomical Observatory Skalnaté Pleso*, 2003, vol. 33, no. 1, p. 38-70. (2003 - Current Contents, NASA ADS). ISSN 1335-1842. Citations: **27**
- [8] MEECH, Karen J. - SVOREŇ, Ján. Using cometary activity to trace the physical and chemical evolution of cometary nuclei. In *Comets II. - Tucson : The University of Arizona Press*, 2005, p. 317-335. (2005 - Current Contents, NASA ADS). ISBN 0-8165-2450-5. Citations: **25**
- [9] TEMMER, Manuela - RYBÁK, Ján - BENDÍK, Pavol - VERONIG, Astrid - VOGLER, Franz - OTRUBA, Wolfgang - PÖTZI, Werner - HANSLMEIER, Arnold. Hemispheric sunspot numbers  $R_n$  and  $R_s$  from 1945-2004: catalogue and N-S asymmetry analysis for solar cycles 18-23\*. In *Astronomy and Astrophysics*, 2006, vol. 447, p.735-743. (4.223 - IF2005). (2006 - Current Contents, SCOPUS, NASA ADS). ISSN 0004-6361. Citations: **25**
- [10] BADALYAN, Olga G. - OBRIDKO, Vladimir N. - SÝKORA, Július. Brightness of the coronal green line and prediction for activity cycles 23 and 24. In *Solar Physics*, 2001,



vol. 199, p. 421-435. (2.095 - IF2000). (2001 - Current Contents, SCOPUS, NASA ADS). ISSN 0038-0938. Citations: **22**

**ii. List of 10 top-cited publications from staff members published 2000 - 2010 and number of their citations in the period 2006 - 2010**

- [1] BURROWS, Adam - HUBENY, Ivan - BUDAJ, Ján - HUBBARD, William. Possible solutions to the radius anomalies of transiting giant planets. In The Astrophysical Journal, 2007, vol. 661, no. 1, Part 1, p. 502-514. (6.119 - IF2006). (2007 - Current Contents, SCOPUS, NASA ADS). ISSN 0004-637X. Citations: **128**
- [2] PRIBULLA, Theodor - RUCINSKI, Slavek M. Contact binaries with additional components. I. The extant data. In The Astronomical Journal, 2006, vol. 131, p. 2986-3007. (5.377 - IF2005). (2006 - Current Contents, SCOPUS, NASA ADS). ISSN 0004-6256. Citations: **68**
- [3] BURROWS, Adam - BUDAJ, Ján - HUBENY, Ivan. Theoretical spectra and light curves of close-in extrasolar giant planets and comparison with data. In The Astrophysical Journal, 2008, vol. 678, p. 1436-1457. (6.405 - IF2007). (2008 - Current Contents, SCOPUS, NASA ADS). ISSN 0004-637X. Citations: **63**
- [4] BURROWS, Adam - HUBENY, Ivan - BUDAJ, Ján - KNUTSON, Heather A. - CHARBONNEAU, David. Theoretical spectral models of the planet HD 209458b with a thermal inversion and water emission bands. In The Astrophysical Journal, 2007, vol. 668, p. L171-L174. (6.119 - IF2006). (2007 - Current Contents, SCOPUS, NASA ADS). ISSN 0004-637X. Citations: **48**
- [5] SANIGA, Metod - PLANAT, Michel - ROSU, Haret. Mutually unbiased bases and finite projective planes. In Journal of Optics B: Quantum and Semiclassical Optics, 2004, vol. 6, p. L19-L20. (1.214 - IF 2003). (2004 - Current Contents, SCOPUS, NASA ADS). ISSN 1464-4266. Citations: **30**
- [6] PRIBULLA, Theodor - KREINER, Jerzy - TREMKO, Jozef. Catalogue of the field contact binary stars. In Contributions of the Astronomical Observatory Skalnaté Pleso, 2003, vol. 33, no. 1, p. 38-70. (2003 - Current Contents, NASA ADS). ISSN 1335-1842. Citations: **27**
- [7] MEECH, Karen J. - SVOREŇ, Ján. Using cometary activity to trace the physical and chemical evolution of cometary nuclei. In Comets II. - Tucson : The University of Arizona Press, 2005, p. 317-335. (2005 - Current Contents, NASA ADS). ISBN 0-8165-2450-5. Citations: **25**
- [8] TEMMER, Manuela - RYBÁK, Ján - BENDÍK, Pavol - VERONIG, Astrid - VOGLER, Franz - OTRUBA, Wolfgang - PÖTZI, Werner - HANSLMEIER, Arnold. Hemispheric sunspot numbers  $R_n$  and  $R_s$  from 1945-2004: catalogue and N-S asymmetry analysis for solar cycles 18-23\*. In Astronomy and Astrophysics, 2006, vol. 447, p.735-743. (4.223 - IF2005). (2006 - Current Contents, SCOPUS, NASA ADS). ISSN 0004-6361. Citations: **25**
- [9] BADALYAN, Olga G. - OBRIDKO, Vladimir N. - SÝKORA, Július. Brightness of the coronal green line and prediction for activity cycles 23 and 24. In Solar Physics, 2001,

vol. 199, p. 421-435. (2.095 - IF2000). (2001 - Current Contents, SCOPUS, NASA ADS). ISSN 0038-0938. Citations: **22**

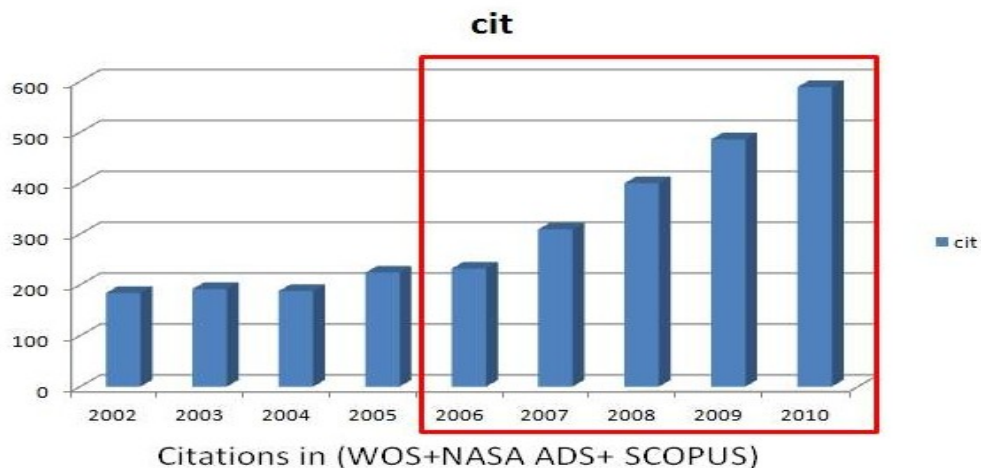
[10] ÖZGÜÇ, Atila - ATAÇ, Tamer - RYBÁK, Ján. Temporal variability of the flare index (1966-2001). In Solar Physics, 2003, vol.214, p. 375-396. (1.875 - IF2002). (2003 - Current Contents, SCOPUS, NASA ADS). ISSN 0038-0938. Citations: **21**

**iii. List of top-cited authors from the Organisation (at most 10 % of the research employees) and their number of citations in the period 2006 – 2010**

- [1] T. Pribulla     **392** citations
- [2] J. Budaj       **311** citations
- [3] D. Chochol    **212** citations
- [4] V. Porubčan   **212** citations
- [5] A. Skopal      **212** citations

**iv. Supplementary information and/or comments on responses to the scientific output of the Organisation**

[1] The responses to the scientific output - citations, **increased remarkably** (3x) in comparison to the previous assessed period even though the numbers of CC publications were not increased. The following figure documents this fact.



There have been, in the same manner, increased the citations in “*top 10 cited publications*” and by “*the most times cited authors*”. **These results have been achieved by targeted effort to publish in top impacted journals.**

### 3. Research status of the Organisation in the international and national context

- **International/European position of the Organisation**

- i. **List of the most important research activities documenting international importance of the research performed by the Organisation, incl. major projects (details of projects should be supplied under Indicator 4). Provide the arguments why the selected projects are particularly important and represent the international position of the Organisation ).**

[1] AISAS acts as an associate member of ASTRONET (<http://www.astronet-eu.org/?lang=en>). *“ASTRONET was created by a group of European funding agencies in order to establish a strategic planning mechanism for all of European astronomy”*. The membership in this organisation documents, that AISAS is a relevant partner in European Research Area for planning the major European astronomical infrastructures and strategies, as, for example, the project EST (The large aperture European Solar Telescope).

[2] AISAS ranks among the institutions with high credibility in the field of meteor research and cometary - asteroidal research. Therefore, AISAS coordinates the IAU Meteor Data Center, which is a central depository and database summarizing all available basic parameters of photographic, radio and TV meteors and their orbits (<http://www.astro.sk/~ne/IAUMDC/Ph2003/database.html>).

[3] AISAS is a founding member of the Consortium EAST – European Association for Solar Telescopes (<http://www.astro-east.org/index.php?id=214>). *“The goal of the EAST is to ensure access of European solar astronomers to world-class high-resolution ground-based observing facilities”*. As it follows from the goal of the EAST the membership of AISAS in the Consortium documents at one side high credibility of AISAS in the European solar research and on other hand it guarantees to AISAS an access to the top level telescopes and technique for solar research for long time.

[4] AISAS is a member of international Joint Organisation for Solar Observations-JOSO. ([http://www.joso-info.org/JOSO\\_PROJEKT/main/index.htm](http://www.joso-info.org/JOSO_PROJEKT/main/index.htm)). *“The aim of JOSO is 1) to activate collaboration in solar physics, with special regard to the integration of East European observatories into the JOSO community, 2) to organize cooperation of different branches of observational solar physics (optical, radio and space research), 3) to assess existing and initiate new instrumentation, observing and evaluation techniques”*. JOSO associates 29 countries over the world. The international position and acceptance of the AISAS in JOSO is documented by fact that our scientists have been several times elected for the position of vice-president, last time for period 2008-2011.

[5] In the assessment period AISAS obtained 10 grants in the frame of FP6 and FP7 EU. The major project among these was the SP4-Capacities, Collaborative project EST - The large aperture European Solar Telescope under call FP7-INFRASTRUCTURES-

2007-1. In the frame of the project, AISAS is involved to participate at design and construction of a worldwide class telescope with possible future access to the facility.

- [6] In the assessment period AISAS has run 29 international and multilateral projects. It represents wide acceptance of AISAS in the European Research Area.
- [7] AISAS has organized a top-level IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia. The right to organize the Symposium was given to AISAS from the International Astronomical Union as recognition of an important contribution of AISAS to one of the most developing modern astrophysical discipline - Research of exoplanets.
- [8] AISAS has organized worldwide EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes, October 4-7, 2010, Tatranská Lomnica, Slovakia. The right to organize the Workshop was given to AISAS from the EAST as a recognition of an important role of AISAS in this Consortium and its achievements in the patrol observations with Solar coronagraphs at the Lomnický štít Observatory.
- [9] AISAS participated on major international scientific Solar eclipses expeditions, namely in Mongolia (2008), in the Republic of the Marshall Islands (2009) and in French Polynesia (2010). This documents high credibility of AISAS in research of the solar corona from eclipses' observations. Interpretations from observations of white and coronal emission of these eclipses were published in five papers in high impacted journal (*The Astrophysical Journal*).
- [10] In the assessment period scientists of AISAS have been asked for 328 referee reports of manuscripts of articles proposed for publication in scientific journals and proceedings or reports about grant proposals applied both in Slovakia and abroad.
- [11] Permanently, 3-5 employees of AISAS are every year accepted for long-time stays (longer than 60 days) at renowned astronomical institutions (The Netherlands, Italy, Germany, Austria, USA, Canada, France). Among these, there were also the highest ranked positions under Marie Curie Actions - Human Resources and Mobility Activity - Structuring the European Research Area.

## ii. List of international conferences (co-) organised by the Organisation

- [1] **IAU Symposium 282 - From Interacting Binaries to Exoplanets: Essential Modeling Tools**, July 18-22, 2011, Tatranská Lomnica, Slovakia  
 (Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) Pennsylvania State University, USA, 3) International Astronomical Union.  
 207 participants from 36 countries all over the world  
<http://www.ta3.sk/IB2E/index.php?part=home>  
 The top level conference in Astrophysics (The International Astronomical Union)

- [2] **EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes**, October 4-7, 2010, Tatranská Lomnica, Slovakia  
 (Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) European Association for Solar Telescopes, 3) Center of Excellence for Cosmic Research – Space Weather influences  
 30 participants from 11 countries (Asia, Europe and USA)  
<http://www.astro.sk/EAST/>  
 Worldwide level conference in Solar Physics
- [3] **2011 ISWI- Europe Summer School in Space Science**, August 21-27, 2011, Astronomical Institute of the SAS, Tatranská Lomnica, Slovakia  
 (Co-) organizers: 1) The International Space Weather Initiative, 2) Centre of Space Research: Space Weather Influences, 3) Astronomical Institute of the Slovak Academy of Sciences, 4) Institute of Experimental Physics of SAS in Kosice, 5) Institute of Physics of UPJS in Kosice, 6) Slovak Central Observatory, Hurbanovo.  
 71 participants from 15 European and 12 other countries  
[http://stara.suh.sk/id/iswi/summer\\_school/](http://stara.suh.sk/id/iswi/summer_school/)  
 International School in frame of The International Space Weather Initiative, under agenda of United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS)
- [4] **Center of space research – Objectives and results**, October 7-9, 2010, Tatranská Lomnica, Slovakia  
 (Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) Institute of experimental physics of SAS in Kosice, 3) Institute of physics of Pavol Jozef Šafárik University in Košice  
 57 participants from 11 countries  
[http://www.astro.sk/~choc/open/10\\_ckv\\_conf/10\\_ckv\\_conf.html](http://www.astro.sk/~choc/open/10_ckv_conf/10_ckv_conf.html)  
 An international conference organized by the Center of Excellence - Centre of Space Research: Space Weather Influences
- [5] **XXVI. European Symposium on Occultation Projects**, August, 24-26, 2007, Stará Lesná, Slovakia  
 (Co-) organizers: 1) SZAA Rimavská Sobota, 2) Astronomical Institute of the Slovak Academy of Sciences,  
 66 participants from 10 countries  
 ESOP is an annual symposium held at a different European venue each year. It is a forum for advanced amateur, semi-professional and professional astronomers specialising in occultation work.
- [6] **Czech and Slovak Workshop on Interplanetary Matter**, May 12.-16, 2008, Modra, Slovakia  
 (Co-) organizers: 1) Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, 2) Astronomical Institute of the Slovak Academy of Sciences, 3) Slovak Astronomical Society  
 30 participants from 3 countries  
 Biannual workshop devoted to progress in research of comets, asteroids, meteors, and interplanetary dust.

- [7] **Czech and Slovak Workshop on Interplanetary Matter**, April, 26.-30, 2010, Modra, Slovakia  
(Co-) organizers: 1) Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, 2) Astronomical Institute of the Slovak Academy of Sciences, 29 participants from 3 countries  
Biannual workshop devoted to progress in research of comets, asteroids, meteors, and interplanetary dust.
- [8] **An Intensive Mini-Workshop Going Beyond Metric: Black Holes, Non-Locality and Cognition**, October, 3–7 2010, Tatranská Lomnica, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) Harvard–Smithsonian Center for Astrophysics, 3) J. Heyrovsky Institute of Physical Chemistry AV CR, 4) UCLA, USA  
6 participants from Czech Republic, Slovakia, USA  
<http://www.ta3.sk/~msaniga/beyond.pdf>  
Interdisciplinary workshop discussing challenges in the interface between cosmology and human mind
- [9] **An Intensive Mini-Workshop Finite Projective Geometries in Quantum Theory**, - August, 1-4. 2007, Tatranská Lomnica, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) University of Lyon, France  
9 participants from Austria, Czech Republic, France, Slovakia, USA  
<http://www.ta3.sk/~msaniga/QuantGeom.htm>  
The workshop in frame of the international project ECO-NET
- [10] **Conference Achievements of Stellar Astronomy - Bezovec 2007**, May 25.-27, 2007, Bezovec, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) Slovak Astronomical Society, 3) Observatory of M. R. Štefánik in Hlohovec  
49 participants from 5 countries  
Annual conference devoted to progress in stellar astronomy.
- [11] **International conference Successes of stellar astronomy - Bezovec 2008**, May 30-June 1, 2008, Bošáca, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) Slovak Astronomical Society, 3) Observatory of M. R. Štefánik in Hlohovec  
<http://sas.astro.sk/Akcie/Bezovec08/bezpoz08eng-cr.pdf>  
44 participants from 5 countries  
Annual conference devoted to progress in stellar astronomy.
- [12] **International conference Successes of stellar astronomy - Bezovec 2009**, May 29-31, 2009, Bošáca, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) Slovak Astronomical Society, 3) Observatory of M. R. Štefánik in Hlohovec  
<http://sas.astro.sk/Akcie/Bezovec09/bezprog09eng-sl.pdf>  
45 participants from 2 countries  
Annual conference devoted to progress in stellar astronomy.

- [13] **International conference Successes of stellar astronomy - Bezovec 2010**, May 28-30, 2010 Modrová, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) Slovak Astronomical Society, 3) Observatory of M. R. Štefánik in Hlohovec  
<http://sas.astro.sk/docs/bezpoz10eng3.pdf>  
41 participants from 3 countries  
Annual conference devoted to progress in stellar astronomy.
- [14] **Conference Successes of stellar astronomy - Bezovec 2011**, June 3 - 5, 2011, Bezovec, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) Slovak Astronomical Society, 3) Observatory of M. R. Štefánik in Hlohovec  
41 participants from 4 countries  
<http://sas.astro.sk/docs/Bezovec11-program2.pdf>  
Annual conference devoted to progress in stellar astronomy.
- [15] **International school Modern developments in solar and stellar spectroscopy**, May 17-21, 2010, Tatranská Lomnica, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences  
20 participants from 3 countries  
[http://www.astro.sk/~choc/open/10\\_kp\\_spec/10\\_kp\\_spec.html](http://www.astro.sk/~choc/open/10_kp_spec/10_kp_spec.html)  
Intensive international school for graduate and PhD. students and young post-docs
- [16] **The Third transnational meeting of participants of the multilateral project AU-RORA POLARIS of the program GRUNDTVIG**, September 29 – October 5, 2009, Tatranská Lomnica, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) The SHARE Initiative (UK), 3) Olsztyn Planetarium and Astronomical Observatory (Poland), 4) University of Athens (Greece).  
25 participants from 4 countries  
<http://sun.planetarium.olsztyn.pl/>  
Meeting in frame of the program GRUNDTVIG - Partnership Opportunity for Learning: Astronomy Resources for Inspiring Seniors for further development of astronomy outreach.

### iii. List of international journals edited/published by the Organisation

[1] Scientific journal ***Contributions of the Astronomical Observatory Skalnaté Pleso*** (CAOSP) is edited and published by AISAS. (<http://www.ta3.sk/caosp.html>) CAOSP is a scientific astronomical journal in English language published three times a year. CAOSP has international identifiers as follows: ISSN - 1336-0337 (online edition), ISSN - 1335-1842 (printed edition), CODEN - CAOPF8. CAOSP journal has been covered/indexed by:

#### 1) ISI:

Due to the fact that CAOSP is published three times a year, it can be found among books, not journals within ISI service.

- a) continuously since its volume 22 (year 1992) However, it is covered in:  
Index to Scientific Book Contents (ISBC)  
CC/Physical, Chemical & Earth Sciences / Current Book Contents
- b) since volume 37 No. 1 (Jan 2007) the journal has been indexed and abstracted in.  
Science Citation Index Expanded (also known as SciSearch)  
Journal Citation Reports/Science Edition
- c) since volume 39 (2009) you can find the journal impact factor

2) **SCOPUS:** indexed since 2008

3) **WOS:** covered all individual articles published since 2007 (and a significant part of previous papers)

Editorial board:	Scientific editor:	Ján Svoreň
	Executive editor:	Richard Komžík

Members:

Drahomír Chochol  
Bernhard Fleck (USA)  
Arnold Hanslmeier (Austria)  
Marian Karlický (Czech Republic)  
Július Koza  
Aleš Kučera  
Vladimír Porubčan  
Theodor Pribulla  
Tanya Ryabchikova (Russia)  
Giovanni Battista Valsecchi (Italy)  
Jan Vondrák (Czech Republic)

Electronic archive with abstracts and full text versions is available at:

<http://www.ta3.sk/caosp/index.html>

The full text version is also available on-line within the ADS article service:

[http://adsabs.harvard.edu/article\\_service.html](http://adsabs.harvard.edu/article_service.html).

In the assessment period the CAOSP appeared in 13 regular issues of the volumes 37-41.



**iv. List of edited proceedings from international scientific conferences and other proceedings**

- [1] ŽIŽŇOVSKÝ, Jozef, ZVERKO, Juraj, PAUNZEN, Ernst, NETOPIL, Martin, SVOREŇ, Ján. Proceedings of the CP#AP Workshop 2007, published in Contributions of the Astronomical Observatory Skalnaté Pleso, vol. 38, no. 2, Tatranská Lomnica, Astronomical Institute of the Slovak academy of Sciences, 2008, pp 404, ISSN 1335-1842.
- [2] RYBÁK, Ján, KOMŽÍK, Richard, SVOREŇ, Ján. Proceedings of the Conference - Centre of Space Research: Objectives and Results, published in Contributions of the Astronomical Observatory Skalnaté Pleso, vol. 40, no. 3, Tatranská Lomnica, Astronomical Institute of the Slovak academy of Sciences, 2010, pp 242, ISSN 1335-1842.
- [3] KOZA, Július, KOMŽÍK, Richard, SVOREŇ, Ján. Science with Synoptic Solar Telescopes: Proceedings of the EAST Workshop on Solar Physics, published in Contributions of the Astronomical Observatory Skalnaté Pleso, vol. 41, no. 2, Tatranská Lomnica, Astronomical Institute of the Slovak Academy of Sciences, 2011, pp 121, ISSN 1335-1842.
- [4] KOMŽÍK, Richard, RICHARDS, Mercedes T., PRIBULLA, Theodor, HRIC, Ladislav, BUDAJ, Ján. From Interacting Binaries to Exoplanets: Essential Modeling Tools: IAU Symposium no. 282. Abstract Book, Tatranská Lomnica, Astronomical Institute of the Slovak Academy of Sciences, 2011, pp 156.

- **National position of the Organisation**

- i. **List of selected most important national projects (provide the arguments why the selected projects are particularly important and represent the international position of the Organisation)**

- [1] **Centre of Excellence** consisting of two projects of Structural Funds of EU “*Center of space research: Influences of the space weather*” and “*Center of space research: Influences of the space weather – the second phase*”. Both projects are coordinated by AISAS. There are two partners in those projects - Institute of Experimental Physics of the Slovak Academy of Sciences and Pavol Jozef Šafárik University in Košice. The projects, obtained on a competitive basis, documents high ranking of national and international position of AISAS in the particular field of research. Both projects are crucially important for fundamental improvement of infrastructure of AISAS to be able to continue as a relevant partner for scientific cooperation in European Research Area in future.

- [2] **Three APVV projects** obtained on a competitive basis in the main “scientific” calls with total funding of **174 784 EUR**,
- a) *“The solar emission corona and prominences: solar activity and space weather indicators”*
  - b) *“Heating of the solar corona: observational verification of the physical mechanisms”*,
  - c) *“Investigation of Slovak meteorites”*,

allow us to concentrate finances and men power to research in the same fields in which we have obtained the two Structural Funds of EU (see above)

- [3] In the assessment period AISAS performed 22 projects granted by the Scientific Grant Agency of the Slovak Academy of Sciences and the Ministry of Education (VEGA) majority of them in category “A”.
- [4] AISAS is a real center of the astronomical life in Slovakia – seat of the Slovak National Committee for the IAU, Slovak Astronomical Society, place for practicum courses and diploma works of students of both the Slovak universities with astronomical departments.
- [5] In collaborations with Humenné Observatory, Faculty of Science of Pavol Jozef Šafárik University in Košice and Odessa University (Ukraine) AISAS is responsible for the scientific programme of the 1-meter telescope at the Kolonica observatory.

## ii. List of national scientific conferences (co)-organised by the Organisation

- [1] National astronomical meeting for teachers – 2007, October 4-6, 2007, Tatranská Lomnica, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 60 participants  
[http://www.astro.sk/~choc/open/07\\_casu/str/seminar.html](http://www.astro.sk/~choc/open/07_casu/str/seminar.html)
- [2] National astronomical meeting for teachers – 2008, December 4-6, 2008, Tatranská Lomnica, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 60 participants  
[http://www.astro.sk/~choc/open/08\\_casu/str/seminar.html](http://www.astro.sk/~choc/open/08_casu/str/seminar.html)
- [3] National astronomical meeting for teachers – 2009, April 23-25, 2009, Tatranská Lomnica, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 60 participants  
[http://www.astro.sk/~choc/open/09\\_casu/str/seminar.html](http://www.astro.sk/~choc/open/09_casu/str/seminar.html)

- [4] National astronomical meeting for teachers – 2010, April 8-10, 2010, Tatranská Lomnica, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 60 participants  
[http://www.ta3.sk/~mhusarik/APVV\\_LPP-0078-09/10\\_CASU/](http://www.ta3.sk/~mhusarik/APVV_LPP-0078-09/10_CASU/)
- [5] National astronomical meeting for teachers – 2011, April 14-16, 2011, Tatranská Lomnica, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 60 participants  
[http://www.ta3.sk/~mhusarik/APVV\\_LPP-0078-09/11\\_CASU/](http://www.ta3.sk/~mhusarik/APVV_LPP-0078-09/11_CASU/)
- [6] Conference to the 50-th Anniversary of the Slovak Astronomical Society Observing Astronomy at the Slovak Observatories, November 5 – 7, 2009, Tatranská Lomnica, Slovakia  
(Co-) organizers: 1) Astronomical Institute of the Slovak Academy of Sciences, 2) Slovak Astronomical Society  
54 participants  
<http://sas.astro.sk/?p=akcie>
- [7] Congress of young researchers - astronomers 2010, March 4 – 6, 2010, Stará Lesná, Slovakia  
(Co-) organizers: 1) The Young Scientists of Slovakia, Bratislava, 2) Slovak Astronomical Society, 3) Astronomical Institute of the Slovak Academy of Sciences  
24 participants  
<http://sas.astro.sk/?p=akcie>

### iii. List of national journals published by the Organisation

- [1] Three scientists of AISAS are members of the editorial board of the Kozmos, journal for popularization of Astronomy.

### iv. List of edited proceedings of national scientific conferences/events

- [1] RYBÁK, Ján, SVOREŇ, Ján, National astronomical meeting for teachers – 2007, Proceedings Tatranská Lomnica: Astronomical Institute SAS, 2007, pp 80, ISBN 978-80-969842-1-3
- [2] RYBÁK, Ján, SVOREŇ, Ján, National astronomical meeting for teachers – 2008, Proceedings, Tatranská Lomnica, Astronomical Institute SAS, 2008, pp 80, ISBN 978-80-970059-0-0
- [3] RYBÁK, Ján, SVOREŇ, Ján, National astronomical meeting for teachers – 2009, Proceedings, Tatranská Lomnica, Astronomical Institute SAS, 2009, pp 83, ISBN 978-80-970059-1-7

- [4] SVOREŇ, Ján, HUSÁRIK, Marek, National astronomical meeting for teachers - 2010, Proceedings, Tatranská Lomnica, Astronomical Institute SAS, 2010, pp 84, ISBN 978-80-970059-2-4
- [5] ZVERKO, Juraj, HRIC, Ladislav, Observational astronomy at observatories in Slovakia, Proceedings of the conference to the 50-th anniversary of the Slovak Astronomical Society, Tatranská Lomnica, Slovak Astronomical Society, 2010, pp 106 ISBN 978-80-970333-5-4.
- [6] SVOREŇ, Ján, HUSÁRIK, Marek, National astronomical meeting for teachers - 2011, Proceedings, Tatranská Lomnica, Astronomical Institute SAS, 2011, pp 76, ISBN 978-80-970059-3-1

- **International/European position of the individual researchers**

- i. **List of invited/keynote presentations at international conferences, documented by an invitation letter or programme**

- [1] PRIBULLA, Theodor: Planets beyond the Solar System: Extrasolar Planets. UK V4 Frontiers of Science meeting, Cracow, Poland, 21–23.2.2007.
- [2] PLANAT, M. – SANIGA, Metod The N-qudit fabric: Pauli graph and finite geometries. 10th International Conference on Squeezed States and Uncertainty Relations, Bradford, UK, 31.3.- 4.4. 2007. (<http://conf.inf.brad.ac.uk/>)
- [3] PLANAT, M. – SANIGA, Metod Finite geometries and quantum information. Aspects Theoriques de l'Information Quantique, Aspet, France, 7.-8. 6. 2007. ([http://www-lsp.ujf-grenoble.fr/vie\\_scientifique/gdr/info\\_quantique/Colloque\\_theorie\\_Toulouse.html](http://www-lsp.ujf-grenoble.fr/vie_scientifique/gdr/info_quantique/Colloque_theorie_Toulouse.html))
- [4] SANIGA, Metod A fine structure of finite projective ring lines. Prolegomena for Quantum Computing, Besançon, France, 21.-22. 11. 2007. (<http://www.femto-st.fr/fr/Departementsderecherche/LPMO/Presentation/actualite.php?eid=21&y=2007>)
- [5] KOCIFAJ, Miroslav: Light scattering by small particles – astronomical application. GAeF-Meeting 2008: Light Scattering: Mie and More, Karlsruhe, Germany, 3.-4.7.2008.
- [6] RUŠIN, Vojtech: Historical status in astronomy in Republic of Slovakia and in Czech Republic. World Observatories Forum/140th Anniversary of Kandilli Observatory, Istanbul, Turkey, 4.-6.9.2008.
- [7] JAKUBÍK, Marian. - NESLUŠAN, Luboš - LETO, G.: The dynamics of outer trans-Neptunian objects from its simulation for 2 Gyr. The 5th International Workshop on Grid Computing for Complex Problems, Bratislava, Slovakia, 26.-28.10.2009.

- [8] SANIGA, Metod - LÉVAY, P. - VRANA, P. - PRACNA, P.: GQ(2,4), Split Cayley Hexa-gon of Order Two and Black Hole Entropy Formulas. Groups, Discrete Geometry and Quantum Information, Lyon, France, 11.-12.6.2009.
- [9] PLANAT, M. - LÉVAY, P. - SANIGA, Metod: Balanced Tripartite Entanglement, the Alter-nating Group  $A_4$  and the Lie Algebra  $sl(3,C) + u(1)$ . Algebra, Algorithms, Applica-tions, Galway, Ireland, 30. 11. -10. 12. 2009.
- [10] MIKULÁŠEK, Z. - KRTIČKA, J. - JANÍK, J. - ZVERKO, Juraj. - ŽIŽŇOVSKÝ, Jozef. - ZVĚŘINA, P. - ZEJDA, M. Magnetic CP stars with unsteady periods, International conference MAGNETIC STARS 2010, SAO, Nizhnij Arkhyz, Russia, 27.8 -1.9. 2010
- [11] BUDAJ, Ján: Synthetic spectra and lightcurves of interacting binaries and exoplanets with circumstellar material: Shellspec, IAU Symposium 282: From interacting binaries to exoplanets, Tatranská Lomnica, Slovakia, 18.-22.7.2011.
- [12] BUDAJ, Ján: From interacting binaries to exoplanets, Conference about successes of stellar astronomy - Bezovec 2011, Bezovec, Slovakia, 3.-5.6.2011.
- [13] KOCIFAJ, Miroslav. - KLAČKA, J - VIDEEN, G: Electromagneic scattering by a polydispersion of small charged cosmic dust paricles. Electromagnetic and Light Scattering XIII, Taormina, Italy, 26-30. 9. 2011.
- [14] KOZA, Július.: The solar chromosphere. 2011 ISWI-Europe Summer School in Space Science, Tatranská Lomnica, Slovakia, 21.-27.8. 2011.
- [15] KUČERA, Aleš.: Centre of excellence, Centre of Space Research: Space Weather Influences. 2011 ISWI-Europe Summer School in Space Science, Tatranská Lomnica, Slovakia 21.-27.8. 2011.
- [16] NESLUŠAN, Luboš: The problem of too a high mass of Oort Cloud in its cosmogony, International conference: Dynamics and formation of the Oort cloud, Lille, France, 27.-30.9.2011.
- [17] PRIBULLA, Theodor: ROCHE Analysis of Eclipsing Binary Multi-Dataset Observables. IAU Symp. 282 From interacting binaries to exoplanets, Tatranská Lomnica, Slovakia, 18.-22.7.2011

**ii. List of employees who served as members of the organising and/or programme committees for international conferences**

- [1] J. Ambróz, EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes, October 4-7, 2010, Tatranská Lomnica, Slovakia (LOC)

- [2] M. Bodnárová, EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes October 4-7, 2010, Tatranská Lomnica, Slovakia (LOC)
- [3] M. Bodnárová, International school Modern developments in Solar and stellar spectroscopy, May 17-21, 2010, Tatranská Lomnica, Slovakia (LOC)
- [4] J. Budaj, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (SOC, LOC)
- [5] J. Budaj, Conference Successes of stellar astronomy - Bezovec 2011, June 3 - 5, 2011, Bezovec, Slovakia (SOC)
- [6] Z. Cariková, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (LOC)
- [7] Z. Cariková, International school Modern developments in Solar and stellar spectroscopy, May 17-21, 2010, Tatranská Lomnica, Slovakia (LOC)
- [8] Ľ. Hambálek, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (LOC)
- [9] L. Hric, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, Tatranská Lomnica, Slovakia, July 18-22, 2011 (LOC-cochair, SOC)
- [10] L. Hric, International conference Variable Stars – 2010, August 16 - 21, 2010, Odes-sa, Ukraine, (SOC)
- [11] L. Hric, Conference Achievements of Stellar Astronomy - Bezovec 2007, May 25-27, 2007, Bezovec, Slovakia (SOC-chair, LOC)
- [12] L. Hric, International conference Successes of stellar astronomy - Bezovec 2008, May 30-June 1, 2008, Bošáca, Slovakia (SOC-chair)
- [13] L. Hric, International conference Successes of stellar astronomy - Bezovec 2009, May 29-31, 2009, Bošáca, Slovakia (SOC-chair)
- [14] L. Hric, International conference Successes of stellar astronomy - Bezovec 2010, May 28-30, 2010 Modrová, Slovakia (SOC-chair)
- [15] L. Hric, Conference Successes of stellar astronomy - Bezovec 2011, June 3 - 5, 2011, Bezovec, Slovakia (SOC-chair)
- [16] L. Hric, International Workshop in Frame of PEEP Promoting Early European Photography - Project supported by SAAIC: The World in the Photography of Well Known Slovak Personalities, October 17 - 22, 2010, Veľká Lomnica, Slovakia, (SOC-chair)

- [17] D. Chochol, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (LOC)
- [18] D. Chochol, Variable Stars – 2010, August 16-21, 2010, Odessa, Ukraine, (SOC)
- [19] D. Chochol, EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes, October 4-7, 2010, Tatranská Lomnica, Slovakia (LOC)
- [20] D. Chochol, The Third transnational meeting of participants of the multilateral project AURORA POLARIS of the program GRUNDTVIG, September 29 – October 5, 2009, Tatranská Lomnica, Slovakia (LOC)
- [21] Z. Kaňuchová, European Symposium of the Occultation Projects 2007, August 24 - 29, 2007, Tatranská Lomnica, Slovakia, (LOC)
- [22] Z. Kaňuchová, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (LOC)
- [23] M. Kocifaj, XC101-1, Light Scattering: Mie and More, July 3-4, 2008, Karlsruhe, Germany (SOC)
- [24] R. Komžík, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (LOC)
- [25] R. Komžík, EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes, October 4-7, 2010, Tatranská Lomnica, Slovakia (LOC)
- [26] J. Koza, EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes, October 4-7, 2010, Tatranská Lomnica, Slovakia (LOC)
- [27] J. Koza, International school Modern developments in Solar and stellar spectroscopy, May 17-21, 2010, Tatranská Lomnica, Slovakia (LOC)
- [28] J. Koza, 2011 ISWI- Europe Summer School in Space Science, August 21-27, 2011, Astronomical Institute of the SAS, Tatranská Lomnica, Slovakia (LOC)
- [29] J. Koza, The Twentieth National Solar Meeting, May 31 - June 4, 2010, Papradno, Slovakia, (SOC)
- [30] M. Kozák, EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes, October 4-7, 2010, Tatranská Lomnica, Slovakia (LOC)
- [31] A. Kučera, First EAST & ATST Workshop in Solar Physics Science with large Solar Telescopes, 14 - 16 October 2009, Freiburg, Germany, (SOC)
- [32] A. Kučera, IX-th Hvar Astrophysical Colloquium Solar Minimum Meeting, Hvar, Croatia, 22 - 26 September 2008, (SOC)

- [33] A. Kučera, The III-rd Central European Solar Physics Meeting, October 10 - 12, 2007, Bairisch Kölldorf, Austria, (SOC)
- [34] A. Kučera, The IV-th Central European Solar Physics Meeting, September 30 – October 2, 2009, Bairisch Kölldorf, Austria, (SOC)
- [35] A. Kučera, The V-th Central European Solar Physics Meeting, October 9-12, 2011, Bairisch Kölldorf, Austria, (SOC)
- [36] A. Kučera, EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes, October 4-7, 2010, Tatranská Lomnica, Slovakia (SOC-chair, LOC-chair)
- [37] A. Kučera, 2011 ISWI- Europe Summer School in Space Science, August 21-27, 2011, Astronomical Institute of the SAS, Tatranská Lomnica, Slovakia (LOC)
- [38] E. Kundra, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (LOC)
- [39] L. Neslušan, 4-th International Workshop on Grid Computing for Complex Problems, Oct. 27-29, 2008, Bratislava, Slovakia (SOC)
- [40] L. Neslušan, 5-th International Workshop on Grid Computing for Complex Problems, Oct. 26-28, 2009, Bratislava, Slovakia (SOC)
- [41] L. Neslušan, 6-th International Workshop on Grid Computing for Complex Problems, Nov. 8-10, 2010, Bratislava, Slovakia (SOC)
- [42] L. Neslušan, 7-th International Workshop on Grid Computing for Complex Problems, Oct. 24-26, 2011, Bratislava, Slovakia (SOC)
- [43] E. Pittich, Asteroid-Comet Hazard-2009, St. Petersburg, Russia, Sep. 21-25, 2009 (SOC)
- [44] V. Porubčan, Czech and Slovak Workshop on Interplanetary Matter, May 12.-16, 2008, Modra, Slovakia (SOC-chair, LOC)
- [45] V. Porubčan, Czech and Slovak Workshop on Interplanetary Matter, April, 26.-30, 2010, Modra, Slovakia (SOC-chair, LOC)
- [46] T. Pribulla, Binaries – key to comprehension of the Universe, Brno, Czech Republic, June 8-12, 2009 (SOC)
- [47] T. Pribulla, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (SOC, LOC-chair)



- [48] V. Rušin, EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes, October 4-7, 2010, Tatranská Lomnica, Slovakia (LOC)
- [49] V. Rušin, International Solar Meeting, Valašské Meziříčí, October 12-14, 2007, The Czech Republic (SOC)
- [50] J. Rybák, EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes, October 4-7, 2010, Tatranská Lomnica, Slovakia (LOC)
- [51] J. Rybák, International school Modern developments in Solar and stellar spectroscopy, May 17-21, 2010, Tatranská Lomnica, Slovakia (LOC)
- [52] M. Saniga, Finite Projective Geometries in Quantum Theory, August 1-4, 2007, Tatranská Lomnica, Slovak Republic, (SOC, LOC)
- [53] M. Saniga, Astronomy and Civilization, August 10-13, 2009, Budapest, Hungary, (SOC)
- [54] M. Saniga, Symmetry Festival: Symmetry in the History of Science, Art, Technology and Medicine, July 31 - August 4, 2009, Budapest, Hungary, (SOC)
- [55] M. Saniga, Going Beyond Metric: Black Holes, Non-Locality and Cognition, October 3-7, 2010, Tatranská Lomnica, Slovak Republic, (SOC, LOC)
- [56] M. Sekeráš, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (LOC)
- [57] M. Sekeráš, International school Modern developments in solar and stellar spectroscopy, May 17-21, 2010, Tatranská Lomnica, Slovakia (LOC)
- [58] A. Skopal, Binaries – key to comprehension of the Universe, June 8 – 12, 2009, Brno, Czech Republic (SOC)
- [59] A. Skopal, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (LOC)
- [60] Svoreň, European Symposium of the Occultation Projects 2007, August 24 - 29, 2007, Tatranská Lomnica, Slovakia, (SOC)
- [61] J. Svoreň, Center of space research - Objectives and results, October 7-9, 2010, Tatranská Lomnica, Slovakia (SOC, LOC)
- [62] J. Svoreň, EAST Workshop on Solar Physics Science with Synoptic Solar Telescopes, October 4-7, 2010, Tatranská Lomnica, Slovakia (LOC)
- [63] M. Vaňko, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia, (LOC)

- [64] J. Zverko, Magnetic stars, August 27-September 1, 2010, Nizhnij Arkhyz, Russian Federation, (SOC)
- [65] J. Zverko, IAU Symposium 282: From Interacting Binaries to Exoplanets: Essential Modeling Tools, July 18-22, 2011, Tatranská Lomnica, Slovakia (SOC, LOC)
- [66] J. Žižňovský, European Symposium of the Occultation Projects 2007, August 24 - 29, 2007, Tatranská Lomnica, Slovakia, (LOC)
- [67] J. Žižňovský, CP#AP Workshop 2007, September 2007, Vienna, Austria, (SOC)
- [68] J. Žižňovský, Magnetic stars, August 27 - September 1, 2010, N. Arkhyz, Russian Federation, (SOC)

**iii. List of employees who served as members of important international scientific bodies (e.g. boards, committees, editorial boards of scientific journals)**

**a) Editorial boards of international scientific journals**

- [1] D. Chochol, member of the editorial board of the Astronomical and Astrophysical Transactions
- [2] D. Chochol, member of the editorial board of the Contributions of the Astronomical Observatory Skalnaté Pleso
- [3] R. Komžík, executive editor of the Contributions of the Astronomical Observatory Skalnaté Pleso
- [4] J. Koza, member of the editorial board of the Contributions of the Astronomical Observatory Skalnaté Pleso
- [5] A. Kučera, member of the editorial board of the Central European Astrophysical Bulletin
- [6] A. Kučera, member of the editorial board of the Contributions of the Astronomical Observatory Skalnaté Pleso
- [7] V. Porubčan, member of the editorial board of the Earth, Moon, Planets
- [8] V. Porubčan, member of the editorial board of the Contributions of the Astronomical Observatory Skalnaté Pleso

- [9] T. Pribulla, member of the editorial board of the Contributions of the Astronomical Observatory Skalnaté Pleso
- [10] V. Rušin, member of the editorial board of the Pokroky matematiky, fyziky a astronómie
- [11] M. Saniga, member of the editorial board of the Frontier Perspectives
- [12] M. Saniga, member of the editorial board of the Symmetry: Culture and Science
- [13] A. Skopal, member of the editorial board of the Astronomy and Astrophysics
- [14] J. Svoreň, scientific editor of the Contributions of the Astronomical Observatory Skalnaté Pleso
- [15] J. Sýkora, member of the editorial board of the Contributions of the Astronomical Observatory Skalnaté Pleso
- [16] J. Zverko, member of the editorial board of the Contributions of the Astronomical Observatory Skalnaté Pleso

#### **b) Boards, committees**

- [17] J. Budaj member of the IAU – International Astronomical Union
- [18] J. Budaj member of the American Astronomical Society
- [19] M. Hajduková, member of the IAU – International Astronomical Union
- [20] L. Hric, member of the IAU – International Astronomical Union
- [21] L. Hric, member of the EAS- European Astronomical Society
- [22] L. Hric, member of the International board of IOAA (International Olympiad on Astronomy and Astrophysics)
- [23] D. Chochol, member of the IAU – International Astronomical Union
- [24] D. Chochol, representative of the Slovak Republic in commission for the preparation of IYA 2009 (International Year of Astronomy)
- [25] D. Chochol, member of the EAS- European Astronomical Society
- [26] M. Jakubík, member of the IAU – International Astronomical Union
- [27] I. Kapišinský, member of the IAU – International Astronomical Union
- [28] Ľ. Klocok, member of the IAU – International Astronomical Union
- [29] M. Kocifaj, member of the IAU – International Astronomical Union
- [30] M. Kocifaj, member of the Optical Society of America
- [31] M. Kocifaj, member of the International Solar Energy Society
- [32] J. Koza, member of the IAU – International Astronomical Union
- [33] J. Koza, member of the JOSO-Joint Organization for Solar Observations
- [34] A. Kučera, member of the Consortium European Association for Solar Telescopes-EAST
- [35] A. Kučera member of a steering committee for realization of the EST- The large aperture European Solar Telescope

- [36] A. Kučera, expert in Database of the Grant Agency of the Serbia and Montenegro
- [37] A. Kučera, member of the IAU – International Astronomical Union
- [38] A. Kučera, national representative in JOSO-Joint Organization for Solar Observations
- [39] A. Kučera, member of the Attestation Commission for scientists of the Astronomical Institute of the Academy of Sciences of the Czech Republic in Ondřejov.
- [40] R. Komžík, member of the IAU – International Astronomical Union
- [41] M. Minarovjeh, member of the IAU – International Astronomical Union
- [42] M. Minarovjeh, member of the EAS- European Astronomical Society
- [43] L. Neslušan, member of the IAU – International Astronomical Union
- [44] E. Pittich, member of the IAU – International Astronomical Union
- [45] E. Pittich, member of the EAS- European Astronomical Society
- [46] E. Pittich, expert in Database of the Grant Agency of the Serbia and Montenegro
- [47] J. Pittichová, member of the IAU – International Astronomical Union
- [48] J. Pittichová, member of the American Astronomical Society
- [49] J. Pittichová, member of the EAS- European Astronomical Society
- [50] V. Porubčan, member of the IAU – International Astronomical Union
- [51] V. Porubčan, member of the IAU Executive Committee n. 22
- [52] V. Porubčan, member of working Group of the IAU committee n. 22 for the collaboration of professionals with amateur
- [53] V. Porubčan, member of the International Meteor Organization
- [54] T. Pribulla, member of the IAU – International Astronomical Union
- [55] T. Pribulla, member of the organizing committee of the IAU Commission 42 – Close Binary Stars
- [56] V. Rušin, member of the IAU working group Solar Eclipses
- [57] V. Rušin, member of the IAU – International Astronomical Union
- [58] V. Rušin, member of the Czech Astronomical Society
- [59] V. Rušin, member of the American Geophysical Union
- [60] J. Rybák, member of the IAU – International Astronomical Union
- [61] J. Rybák, member of working group WG2 Observing techniques in JOSO Joint Organization for Solar Observations
- [62] J. Rybák, vice-president of the JOSO Joint Organization for Solar Observations
- [63] J. Rybák, national representative in ASTRONET -
- [64] M. Saniga, member of the IAU – International Astronomical Union
- [65] M. Saniga, member of the Center for Frontier Sciences
- [66] M. Saniga, member of the International Symmetry Association
- [67] M. Saniga, member of the American Physical Society/UniPHY
- [68] M. Saniga, reviewer of the American Mathematical Society / Mathematical Reviews
- [69] M. Saniga, reviewer European Mathematical Society/ Zentralblatt MATH.
- [70] M. Saniga, pool of reviewers European Science Foundation

- [71] P. Schwartz, member of the IAU – International Astronomical Union
- [72] A. Skopal, member of the IAU – International Astronomical Union
- [73] A. Skopal, member of the Czech Astronomical Society
- [74] A. Skopal, member of the Royal Astronomical Society
- [75] N. Solovaya, member of the IAU – International Astronomical Union
- [76] N. Solovaya, member of the EAS- European Astronomical Society
- [77] N. Solovaya, member of the Rusina astronomical society
- [78] J. Svoreň, member of the IAU – International Astronomical Union
- [79] J. Svoreň member of the Attestation Commission for scientists of the Astronomical Institute of the Academy of Sciences of the Czech Republic in Ondřejov.
- [80] J. Sýkora, member of the IAU – International Astronomical Union
- [81] J. Tremko, member of the IAU – International Astronomical Union
- [82] J. Tremko, member of the Astronomische Gesellschaft
- [83] M. Vaňko, member of the IAU – International Astronomical Union
- [84] M. Zboril, member of the Astrobiological Society of Britain
- [85] M. Zboril, member of the EAS- European Astronomical Society
- [86] M. Zboril, member of the Royal Astronomical Society
- [87] J. Zverko, member of the IAU – International Astronomical Union
- [88] J. Zverko, consultant of The Inamori Foundation for The Kyoto Prize.
- [89] J. Žižňovský, member of the IAU – International Astronomical Union
- [90] J. Žižňovský, member of the WG IAU – CP and Related Stars
- [91] J. Žižňovský, member of the Czech Astronomical Society
- [92] [M. Kocifaj was invited for the post of guest professor at the University of Vienna with a course Light Scattering by Small Particles: Atmospheric Optics and Astrophysical Applications.

#### iv. List of international scientific awards and distinctions

- [1] M. Saniga - An integer sequence comprising the number of vertices of a Pauli graph of order  $N$ , discovered by M. Saniga in collaboration with Dr. Planat and published in the paper Planat, M., and Saniga, M.: 2007, Pauli Graph and Finite Projective Lines/Geometries, Proc. SPIE 6583, 65830W (quant-ph/0703154), was included into the prestigious international “On-Line Encyclopedia of Integer Sequences” (<http://www.research.att.com/~njas/sequences/>) as the sequence A127069. (2007)
- [2] V. Rušin, J. Svoreň, J. Zverko, - In 2007, a prestigious Stroobant Prize was awarded by the Belgian Royal Academy to the Belgian astronomer A. Heck for compiling and editing a world-wide series of publications entitled Organizations and Strategies in Astronomy. This series also comprises a chapter Astronomy and Astrophysics in the Slovak Republic, written by V. Rušin, J. Svoreň and J. Zverko. (In: Organization and strategies in astronomy III. Dordrecht: Kluwer Academic Publishers, 2002, p. 181-190.) (2007)

[3] M. Saniga - An elliptical model of time of Dr. Saniga was selected for and incorporated into a US video-animation project "Chiros" authored by Melanie Crean (New York). This project was, in the period from December 3, 2008, to January 17, 2009, also part of an exhibition at Longwood Art Gallery (New York). (2008)

[4] J. Budaj - The Innolec Lectureship in Physics was awarded to J. Budaj in recognition of his valuable contribution to the development of the teaching curriculum in the Faculty of Science, Masaryk University, Czech Republic. Award given by: dean, Faculty of Science, Masaryk University, Czech Republic. (2010)

- **National position of the individual researchers**

- i. **List of invited/keynote presentations at national conferences documented by an invitation letter or programme**

[1] P. Gomory, Vývoj vesmíru a jeho budoucnost', National astronomical meeting for teachers – 2008, December 4-6, 2008, Tatranská Lomnica, Slovakia

[2] L. Hric, Galaxie, National astronomical meeting for teachers – 2008, December 4-6, 2008, Tatranská Lomnica, Slovakia

[3] L.Hric, E. Kundra, CCD technika v astronómii, National astronomical meeting for teachers – 2011, April 14-16, 2011, Tatranská Lomnica, Slovakia

[4] M. Husárik, Asteroidy - malé planétky, National astronomical meeting for teachers – 2008, December 4-6, 2008, Tatranská Lomnica, Slovakia, National astronomical meeting for teachers – 2008, December 4-6, 2008, Tatranská Lomnica, Slovakia

[5] M. Husárik, Terestrické planéty, National astronomical meeting for teachers – 2010, April 8-10, 2010, Tatranská Lomnica, Slovakia

[6] M. Husárik, Zrážky asteroidov so Zemou, National astronomical meeting for teachers – 2011, April 14-16, 2011, Tatranská Lomnica, Slovakia

[7] D. Chochol, Hviezdne explózie, National astronomical meeting for teachers – 2009, April 23-25, 2009, Tatranská Lomnica, Slovakia

[8] J. Koza, Moderné astronomické prístroje a metódy, National astronomical meeting for teachers – 2009, April 23-25, 2009, Tatranská Lomnica, Slovakia

[9] A. Kučera, Dynamické Slnko a slnečno-zemské vzťahy, National astronomical meeting for teachers – 2007, October 4-6, 2007, Tatranská Lomnica

[10] A. Kučera, Stavba Slnka a modely jednotlivých vrstiev, National astronomical meeting for teachers – 2011, April 14-16, 2011, Tatranská Lomnica, Slovakia

- [11] V. Porubčan: Meteority, National astronomical meeting for teachers – 2007, October 4-6, 2007, Tatranská Lomnica
- [12] T. Pribulla, Planéty mimo Slnčnej sústavy: extrasolárne planet, National astronomical meeting for teachers – 2007, October 4-6, 2007, Tatranská Lomnica
- [13] V. Rušin, Slnčná koróna a zatmenia Slnka, National astronomical meeting for teachers – 2008, December 4-6, 2008, Tatranská Lomnica, Slovakia
- [14] V. Rušin, Cykly slnečnej činnosti, National astronomical meeting for teachers – 2010, April 8-10, 2010, Tatranská Lomnica, Slovakia
- [15] J. Svoreň, V Slnčnej sústave máme opäť 8 planét, National astronomical meeting for teachers – 2007, October 4-6, 2007, Tatranská Lomnica
- [16] J. Svoreň, Joviánske planéty slnečnej sústavy, National astronomical meeting for teachers – 2008, December 4-6, 2008, Tatranská Lomnica, Slovakia
- [17] J. Svoreň, Kométy, National astronomical meeting for teachers – 2009, April 23-25, 2009, Tatranská Lomnica, Slovakia
- [18] J. Svoreň, Centrum kozmických výskumov: vplyvy kozmického počasia, Meeting "Examples of good practice" of the Agency for EU Structural Funds of the Ministry of Education of the Slovak Republic - 2009, September 17, Bratislava, Slovakia.
- [19] J. Svoreň, Meteory, National astronomical meeting for teachers – 2010, April 8-10, 2010, Tatranská Lomnica, Slovakia
- [20] J. Svoreň, Príbehy jasných komét, National astronomical meeting for teachers – 2011, April 14-16, 2011, Tatranská Lomnica, Slovakia
- [21] J. Žižňovský, Základné fyzikálne parametre hviezd, National astronomical meeting for teachers – 2009, April 23-25, 2009, Tatranská Lomnica, Slovakia
- [22] J. Žižňovský, HR diagram a vývoj hviezd, National astronomical meeting for teachers – 2010, April 8-10, 2010, Tatranská Lomnica, Slovakia

**ii. List of employees who served as members of organising and programme committees of national conferences**

- [1] L. Hric, Congress of young researchers – astronomers, March 4-6, 2010, Stará Lesná, Slovakia (LOC)

- [2] L. Hric, Conference to the 50-th Anniversary of the Slovak Astronomical Society, Observing Astronomy at the Slovak Observatories, November 5 – 7, 2009, Tatranská Lomnica, Slovakia (LOC)
- [3] M. Husárik, National astronomical meeting for teachers – 2010, April 8-10, 2010, Tatranská Lomnica, Slovakia (LOC)
- [4] M. Husárik, National astronomical meeting for teachers – 2011, April 14-16, 2011, Tatranská Lomnica, Slovakia (LOC)
- [5] M. Jakubík, Congress of young researchers – astronomers, March 4-6, 2010, Stará Lesná, Slovakia (LOC)
- [6] J. Rybák, National astronomical meeting for teachers – 2007, October 4-6, 2007, Tatranská Lomnica, Slovakia (LOC)
- [7] J. Rybák, National astronomical meeting for teachers – 2008, December 4-6, 2008, Tatranská Lomnica, Slovakia (LOC)
- [8] J. Rybák, National astronomical meeting for teachers – 2009, April 23-25, 2009, Tatranská Lomnica, Slovakia (LOC)
- [9] J. Zverko, Conference to the 50-th Anniversary of the Slovak Astronomical Society Observing Astronomy at the Slovak Observatories, November 5 – 7, 2009, Tatranská Lomnica, Slovakia (LOC)
- [10] J. Zverko, Congress of young researchers – astronomers, March 4-6, 2010, Stará Lesná, Slovakia (LOC)

**iii. List of employees serving in important national scientific bodies (e.g. boards, committees, editorial boards of scientific journals)**

**a) Editorial boards of national scientific journals**

- [1] L. Neslušan, member of the editorial board of the Meteorické správy Slovak Astronomical society
- [2] V. Porubčan, member of the editorial board of the Acta Astronomica et Geophysica Universitatis Comenianae
- [3] V. Porubčan, chairman of the editorial board and editor of the Meteorické správy Slovak Astronomical society



[4] J. Svoreň, member of the editorial board of the Acta Astronomica et Geophysica Universitatis Comenianae

[5] J. Svoreň, member of the editorial board of the Meteorické správy Slovak Astronomical society

#### **b) Editorial boards of national journals**

[6] L. Hric, member of the editorial board of the Kozmos

[7] M. Husárik, editor of the Astronomical Circular Slovak Astronomical society

[8] D. Chochol, member of the editorial board the Kozmos

[9] E. Pittich, editor of the Astronomical Handbook

[10] J. Svoreň, member of the editorial board of the Kozmos

#### **c) Boards, committees**

[11] J. Ambróz, member of the National team of technical experts to assess the goods and dual-use technologies and military equipments to the Ministry of Economy

[12] P. Gömöry, presidency member and scientific secretary of the Slovak Astronomical Society

[13] M. Hajduková member of the Audit Committee of the Slovak Astronomical Society

[14] L. Hric, scientific secretary of the Slovak Astronomical Society

[15] L. Hric, chairman of the Slovak Astronomical Society

[16] L. Hric, chairman of the Stellar Section of the Slovak Astronomical Society

[17] L. Hric, chairman of the Executive Committee of the Astronomical Olympiad in Slovakia of the Slovak Astronomical Society

[18] D. Chochol, member of the Slovak Astronomical Society

[19] D. Chochol, member of the APVV-Council for Natural Sciences,

[20] D. Chochol member of the APVV Working Group for Natural Sciences no. 1 - mathematics, physics, astronomy and informatics

[21] D. Chochol, member of the Accreditation Commission of SAS for the First Department of Sciences of SAS

[22] D. Chochol, member of the Commission VEGA no. 3 for Earth Sciences and Space:

[23] D. Chochol, chairman of the Commission VEGA no. 2 for Geosciences, Space Sciences, Environmental Sciences and Earth resources

[24] D. Chochol, member of the Scientific College of SAS for Sciences on Earth Science and Space

[25] M. Jakubík, member of the Slovak Astronomical Society

[26] R. Komžík, member of the Slovak Astronomical Society

[27] R. Komžík, member of the Steering Committee of the national project "Slovak Grid infrastructure - SlovakGrid"

[28] R. Komžík, representative of the full member (Astronomical Institute) of the Association SANET - Slovak Academic Data Network

[29] R. Komžík, member of SAS Presidium Commission for information and communication technologies

[30] R. Komžík, member of the Assembly of the Slovak Academy of Sciences

[31] A. Kučera, member of the Slovak Astronomical Society

- [32] A. Kučera, member of the APVV-Council for Natural Science, Working Group for natural sciences 1 - mathematics, physics, astronomy and computer science
- [33] A. Kučera, member of the Scientific College of SAS for Sciences on Earth Science and Space
- [34] A. Kučera, member of the SAS Presidium Commission for Foreign Relations
- [35] E. Kundra, presidency member and economist of the Slovak Astronomical Society
- [36] M. Minarovjeh, member of the Slovak Astronomical Society
- [37] L. Neslušan, member of the Main Committee of the Slovak Astronomical Society
- [38] E. Pittich, chairman of the Terminology Committee of the Slovak Astronomical Society
- [39] E. Pittich, member of the National Committee of the International Astronomical Union
- [40] V. Porubčan, member of the Main Committee of the Slovak Astronomical Society
- [41] V. Porubčan, member of the Learned Society of the Slovak Academy of Sciences
- [42] V. Porubčan, member of the Scientific College of SAS for Sciences on Earth Science and Space
- [43] V. Porubčan, member of the Jury for the award of international prizes of SAS
- [44] V. Porubčan, vice-chairman of the National Committee of the International Astronomical Union
- [45] T. Pribulla, chairman of the Section of the Slovak Astronomical Society
- [46] J. Rybák, chairman of the Solar Section of the Slovak Astronomical Society
- [47] J. Rybák, member of the National Committee of COSPAR – Committee on Space Re-search
- [48] J. Rybák, member of the National Committee of SCOSTEP - Scientific Committee on Solar-Terrestrial Physics of ISCU
- [49] J. Rybák, secretary of the National Committee of the International Astronomical Union
- [50] J. Rybák, member of the Experts group on Departmental coordination group of the Ministry of Education for European Affairs
- [51] J. Rybák, member of the Commission VEGA no. 3 for Earth Sciences and Space
- [52] J. Rybák, secretary of the National Committee of the International Astronomical Union
- [53] V. Rušin, member of the Executive Committee of the Council of the Slovak scientific societies
- [54] V. Rušin, member of the Council Committee of the State Plan of Science and Research, "Comprehensive solution support and effective use of research and development infrastructure".
- [55] V. Rušin member of the SAIA Board
- [56] V. Rušin, member of the SAS Presidium Commission for purchase of expensive equipments
- [57] V. Rušin, member of the SAS Presidium Commission for Foreign Relations
- [58] V. Rušin, member of the National Committee of the International Astronomical Union
- [59] A. Skopal, member of the Experts group on Departmental coordination group of the Ministry of Education for European Affairs
- [60] A. Skopal, member of the Slovak Astronomical Society

- [61] A. Skopal, member of the National Committee of the International Astronomical Union
- [62] J. Svoreň, member of the Advisory Board Conference of Czech and Slovak Physicists
- [63] J. Svoreň, member of the Slovak Astronomical Society
- [64] J. Svoreň, member of the National Committee of the International Astronomical Union
- [65] J. Svoreň, chairman of the Scientific College of SAS for Sciences on Earth Science and Space
- [66] J. Svoreň, member of the SAS Presidium Commission for Promotion of Sciences and Media
- [67] J. Sýkora, member of the Scientific College of Sciences for Earth Science and Space
- [68] J. Tremko, honorable member of the Slovak Astronomical Society
- [69] J. Zverko, chairman of the Slovak Astronomical Society
- [70] J. Zverko, member of the Executive Committee of the Astronomical Olympiad in Slovakia of the Slovak Astronomical Society
- [71] J. Žižňovský, member of the Main Committee of the Slovak Astronomical Society
- [72] J. Žižňovský, chairman of the National Committee of the International Astronomical Union

#### iv. List of national awards and distinctions

- [1] V. Rušin, **State honors Pribina's Cross II. Grade** for "Exceptional contributions to the development of the Slovak Republic, especially research on the Solar corona and prominences".  
**Awarded by: President of the Slovak Republic (2008)**
- [2] V. Rušin, Price of the Slovak Physical Society.  
Awarded by: Slovak Physical Society, Bratislava (2007)
- [3] V. Rušin, Honorable Mention with a plaque.  
Awarded by: Slovak Astronomical Society, Tatranská Lomnica (2009)
- [4] V. Rušin, Price High Tatras Town for lifetime achievement.  
Awarded by: Mayor of the High Tatras Town (2009)
- [5] V. Porubčan Gold Medal of the Faculty of Mathematics, Physics and Informatics.  
Awarded by: Comenius University, Bratislava (2010)
- [6] V. Rušin Honorary member of the Society M.R. Štefánik.  
Awarded by: Society M.R. Štefánik, Brezová pod Bradlom (2011)

v. **Supplementary information and/or comments documenting international and national status of the Organisation**

- [1] A High international status of AISAS is documented also by the fact, that there were identified **two top scientific teams of AISAS** in the project *“Identification of the top scientific teams and their members at Slovak Academy of Sciences”* organised by ARRA (Academic Ranking and Rating Agency). One team was ranked as the **top** and one as an **outstanding** in comparison with the world top in the particular scientific field.
- [2] AISAS registered during the assessed period visits of scientists from 14 countries over the world for 2585 days in total (15 days to one our scientist in average) and stays of our scientists abroad in 27 countries for 2539 days in total (15 days to one our scientist in average). This document rich international collaboration of AISAS.

4. **Project structure, research grants and other funding resources**

• **International projects and funding**

- i. **List of major projects within the European Research Area – 6th and 7th Framework Programme of the EU, European Science Foundation, NATO, COST, INTAS, CERN, ESA etc. (here and in items below please specify: type of project, title, grant number, duration, total funding and funding for the Organisation, responsible person in the Organisation and his/her status in the project, e.g. coordinator, work package leader, investigator)**

[1] type of project: SP4-Capacities, Collaborative project FP7  
INFRASTRUCTURES- 2007-1

title: **EST: The large aperture European Solar Telescope**

grant number: No: 212482

duration: 02/2008 – 06/2011

total funding: 21011,00 EUR (7RP EU + MVTS-SAV)

funding for AISAS: 21011,00 EUR ( All through AISAS account)

resp. person in AISAS: A. Kučera

status in the project: Partner

[2] type of project: Project FP6-2002-Mobility-5 (6RP EU)

title: **Solar fibrils and spicules at high resolution**

grant number: N° 011379-MULTIDOT

duration: 07/2005 – 06/2007

total funding: 36115, 00 EUR (EU)  
 funding for AISAS 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 36115,00 EUR (EU) (\*)  
 resp. person in AISAS: J. Koza  
 status in the project: investigator

(\*) the funding was paid for J. Koza (AISAS) directly by EU for performance of the project abroad. It has NOT gone through the account of AISAS

[3] type of project: OPTICON Trans-national Access Programme (6RP EU)  
 title: **Spectroscopy and imaging tomography of the solar fibrils: photospheric drivers and coronal consequences – Swedish solar telescope**

grant number: 7E1404/ 2005/ 028 N° 2007/017  
 duration: 05/2007  
 total funding: 41127, 00 EUR (EU)  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 41127,00 EUR (EU) (\*)  
 resp. person in AISAS: A. Kučera  
 status in the project: Principal investigator

(\*) the funding was paid for AISAS directly by EU for performance of the project abroad at Swedish solar telescope – it has NOT gone through the account of AISAS

[4] type of project: OPTICON Trans-national Access Programme (6RP EU)  
 title: **Spectroscopy and imaging tomography of the solar fibrils: photospheric drivers and coronal consequences – Dutch Open Telescope**

grant number: 7E1404/ 2005/ 029 N° 2007/017  
 duration: 05/2007  
 total funding: 38073, 00 EUR  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 38073,00 EUR (EU) (\*)  
 resp. person in AISAS: A. Kučera  
 status in the project: Principal investigator

(\*) the funding was paid for AISAS directly by EU for performance of the project abroad at Dutch Open Telescope – it has NOT gone through the account of AISAS)

[5] type of project: EU FP6-MERG (6RP EU)

title: **Solar network dynamics.**  
 grant number: MERG-CT-2007-046475  
 duration: 07/2007 – 06/2008  
 total funding: 41164,00 EUR (6RP EU + MVTS-SAV)  
 funding for AISAS: 41164,00 EUR (All through AISAS account)  
 resp. person in AISAS: A. Kučera  
 status in the project: Coordinator

[6] type of project: EU FP7-2007-MIRG (7RP EU)

title: **Brown dwarfs and extrasolar planets**  
 grant number: MIRG-CT-2007-200297  
 duration: 10/2007 – 09/2010  
 total funding: 75000,00 EUR (7RP EU + MVTS-SAV)  
 funding for AISAS: 75000,00 EUR ( All through AISAS account)  
 resp. person in AISAS: J. Zverko  
 status in the project: Coordinator

[7] type of project: OPTICON Trans-national Access Programme (7RP EU)

title: **Dynamic fibrils in the upper photosphere, chromosphere and above**  
 grant number: 7E1404/2008/020  
 duration: 05/2008-06/2008  
 total funding: 22174, 00 EUR (EU)  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 22174,00 EUR (EU) (\*)  
 resp. person in AISAS: A. Kučera  
 status in the project: Principal investigator

(\*) the funding was paid for AISAS directly by EU for performance of the project abroad at German Vacuum Tower Telescope – it has NOT gone through the account of AISAS

[8] type of project: OPTICON Trans-national Access Programme (7RP EU)

title: **Spectroscopy of the quiet solar photosphere: properties of the shocks and the acoustic flux generation**  
 grant number: 7E1404/2008/055  
 duration: 06/2008  
 total funding: 22174, 00 EUR (EU)

funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 22174,00 EUR (EU) (\*)  
 resp. person in AISAS: J. Rybák  
 status in the project: Principal investigator

(\*) the funding was paid for AISAS directly by EU for performance of the project abroad at German Vacuum Tower Telescope – it has NOT gone through the account of AISAS

[9] type of project: OPTICON Trans-national Access Programme (7RP EU)  
 title: **Mmechanisms driving solar microflares and net-work dynamics fibrils - relevance for coronal heating and mass supply-DOT Telescope**

grant number: 7E1404/2008/055  
 duration: 10/2008  
 total funding: 36215, 00 EUR (EU)  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 36215,00 EUR (EU) (\*)  
 resp. person in AISAS: J. Rybák  
 status in the project: Principal investigator

(\*) the funding was paid for AISAS directly by EU for performance of the project abroad at German Vacuum Tower Telescope – it has NOT gone through the account of AISAS

[10] type of project: OPTICON Trans-national Access Programme (7RP EU)  
 title: **Photospheric oscillations as drivers of chromospheric dynamic fibrils - THEMIS Telescope**

grant number: EU-7RP - OPTICON  
 duration: 05/2011  
 total funding: 33000, 00 EUR (EU)  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 33000,00 EUR (EU) (\*)  
 resp. person in AISAS: J. Koza  
 status in the project: Principal investigator

(\*) the funding was paid for AISAS directly by EU for performance of the project abroad at THEMIS Telescope – it has NOT gone through the account of AISAS

ii. **List of other international projects incl. total funding and funding for the Organisation**

[1] type of project: Project-Science and Technology Cooperation NSF USA  
 title: **Space weather: numerical MHD study of CMEs inicialization and propagation**  
 grant number: NSF USA 0407375  
 duration: 04/2004-03/2008  
 total funding: 6506,00 EUR (NSF USA + Min. of Educ. SR)  
 funding for AISAS: 2324,00 EUR (ME SR through AISAS account)  
 resp. person in AISAS: J. Rybák  
 status in the project: Coordinator

[2] type of project: Collaborative Slovakia-Greece MVTs project  
 title: **International Greek-Slovak on-line network of selected astronomical observatories.**  
 grant number: 1/2005  
 duration: 01/2005 –12/2007  
 total funding: 2821,00 EUR (Univ. of Athens)  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 2821,00 EUR (Univ. of Athens) (\*)  
 resp. person in AISAS: L. Hric  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by Univ.of Athens for performance of the project abroad in Greece – it has NOT gone through the account of AISAS.

[3] type of project: Intergovernmental project of Science and Technology Cooperation – MVTs, Slovakia-Austria  
 title: **Solar flares: trigerring mechanism and consequences for space weather**  
 grant number: APVV SK-AT-00706  
 duration: 01/2006-12/2007  
 total funding: 3618, 00 EUR (APVV+ ÖAW)  
 funding for AISAS: 1992,00 EUR (APVV through AISAS account)



funding for AISAS abroad 1626,00 EUR (ÖAW) (\*)  
 resp. person in AISAS: J. Rybák  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by Österreichische Akademie der Wissenschaften for performance of the project abroad in Austria - it has NOT gone through the account of AISAS.

[4] type of project: Intergovernmental project of Science and Technology  
 Cooperation – MVTs Slovakia-Czech Republic

title: **The variability of chemically peculiar stars of the Main Sequence**  
 grant number: APVV SR-ČR 01506  
 duration: 01/2006 –12/2007  
 total funding: 963,00 EUR (APVV)  
 funding for AISAS: 963,00 EUR (APVV through AISAS account)  
 resp. person in AISAS: J. Zverko  
 status in the project: Coordinator

[5] type of project: Slovak-German DFG project

title: **Temporal evolution of the photosphere and chromo-sphere in a quiet and active regions**  
 grant number: DFG 436 SLK 13/70-1  
 duration: 5/2006-12/2009  
 total funding: 10333,00 EUR (DFG)  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 10333,00 EUR (DFG) (\*)  
 resp. person in AISAS: A. Kučera, J. Rybák  
 status in the project: Investigators

(\*) the funding was paid for AISAS directly by Deutsche Forschungsgemeinschaft for performance of the project abroad in Germany - it has NOT gone through the account of AISAS.

[6] type of project: Project France-Slovakia CNRS-SAV

title: **Projective and related geometries for quantum information**  
 grant number: MAD  
 duration: 01/2007 –12/2008  
 total funding: 4912,00 EUR (CNRS)  
 funding for AISAS: 0,00 EUR (through AISAS account)

funding for AISAS abroad 4912,00 EUR (CNRS) (\*)  
 resp. person in AISAS: M. Saniga  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by CNRS-France for performance of the project abroad in France - it has NOT gone through the account of AISAS.

[7] type of project: Project Italy-Slovakia CNR-SAV

title: **Meteoroids and space debris: an important component of the near-earth space environment**

grant number: MAD  
 duration: 01/2007 –12/2009  
 total funding: 3448,00 EUR (CNR + SAV)  
 funding for AISAS: 262,00 EUR (SAV through AISAS account)  
 funding for AISAS abroad 3186,00 EUR (CNR) (\*)  
 resp. person in AISAS: V. Porubčan  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by CNR-Italy for performance of the project abroad in Italy - it has NOT gone through the account of AISAS.

[8] type of project: Bilateral Slovakia-Croatia project

title: **Time evolution of active processes in the solar atmosphere**

grant number: -  
 duration: 01/2007 –12/2009  
 total funding: 365,00 EUR (Univ. Zagreb)  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 365,00 EUR (Univ. Zagreb) (\*)  
 resp. person in AISAS: A. Kučera  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by University of Zagreb for performance of the project abroad in Croatia - it has NOT gone through the account of AISAS.

[9] type of project: Multilateral Slovak-Czech-French project ECO-NET

title: **Geometries over finite rings and the properties of mutually unbiased bases**

grant number: No. 12651NJ  
 duration: 01/2006 –12/2007  
 total funding: 30000,00 EUR (FMFA)

funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 12082,00 EUR (FMFA) (\*)  
 resp. person in AISAS: M. Saniga  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by French Min. of Foreign Affairs for performance of the project abroad in France and Czech Republic - it has NOT gone through the account of AISAS.

[10] type of project: Bilateral Action Austria-Slovakia

title: **Adaptation of astrophysical light scattering techniques for environmental aerosol research**

grant number: No. 57s02 (SAIA)  
 duration: 02/2007 –12/2007  
 total funding: 4083,00 EUR (SAIA + ÖAD)  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 4083,00 EUR (SAIA + ÖAD) (\*)  
 resp. person in AISAS: M. Kocifaj  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by SAIA + Österreichischer Austauschdienst for performance of the project abroad in Austria and in Slovakia - it has NOT gone through the account of AISAS.

[11] type of project: Bilateral Action Austria-Slovakia

title: **Finite geometries behind Hilbert spaces**

grant number: No. 58s02 (SAIA)  
 duration: 07/2007 - 06/2008  
 total funding: 2587,00 EUR (SAIA + ÖAD)  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 2587,00 EUR (SAIA + ÖAD) (\*)  
 resp. person in AISAS: M. Saniga  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by SAIA + Österreichischer Austauschdienst (ÖAD) for performance of the project in Austria and Slovakia - it has NOT gone through the account of AISAS.

[12] type of project: Slovak-German DAAD project

title: **Radiation pressure on nonspherical particles**

grant number: D/07/01266 (SAV 350/OMS/Fun/07)

duration: 01/2008-12/2009

total funding: 6307,00 EUR (DAAD + APVV)

funding for AISAS: 3154,00 EUR (APVV through AISAS account)

funding for AISAS abroad 3154,00 EUR (DAAD) (\*)

resp. person in AISAS: M. Kocifaj

status in the project: Coordinator

(\*) the funding was paid for AISAS directly by Deutscher Akademischer Austausch Dienst for performance of the project abroad in Germany - it has NOT gone through the account of AISAS.

[13] type of project: Project Slovakia-Czech Republic APVV

title: **Characteristics of interplanetary objects in the close proximity of the Earth**

grant number: APVV SK-CZ-0011-07

duration: 02/2008-12/2009

total funding: 4208,00 EUR (APVV)

funding for AISAS: 2854,00 EUR (APVV through AISAS account)

funding for AISAS abroad 1354,00 EUR (AV ČR) (\*)

resp. person in AISAS: J. Svoreň

status in the project: Coordinator

(\*) the funding was paid for AISAS directly by Academy of Sciences of Czech Republic for performance of the project abroad in Czech Republic - it has NOT gone through the account of AISAS.

[14] type of project: Project Slovakia-Czech Republic APVV

title: **Light pollution in Slovakia and Czech Republic**

grant number: APVV SK-CZ-0019-07

duration: 02/2008-12/2009

total funding: 2788,00 EUR (APVV)

funding for AISAS: 2788,00 EUR (APVV through AISAS account)

resp. person in AISAS: M. Kocifaj

status in the project: Coordinator

[15] type of project: Project Slovakia-Czech Republic APVV

title: **Energy distribution in the spectra of chemically peculiar stars and its variability.**

grant number: APVV SK-CZ-0090-07  
 duration: 02/2008-12/2009  
 total funding: 2960,00 EUR (APVV + AV ČR)  
 funding for AISAS: 2106,00 EUR (APVV through AISAS account)  
 funding for AISAS abroad 854,00 EUR (AV ČR) (\*)  
 resp. person in AISAS: J. Žižňovský  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by Ministry of Education of Czech Republic for performance of the project abroad in Czech Republic - it has NOT gone through the account of AISAS.

[16] type of project: Academic agreement Project Slovak-Ukraine MAD

title: **Physical processes in active binaries and chromospheric activity of stars with planets**

grant number: -  
 duration: 01/2008 – 12/2010  
 total funding: 1038,00 EUR (SAV)  
 funding for AISAS: 1038,00 EUR (through AISAS account)  
 resp. person in AISAS: D. Chochol  
 status in the project: Coordinator

[17] type of project: Alexander von Humboldt Foundation project

title: **Symbiotic stars: on the nature of the RS Oph outburst**

grant number: SLA/1039115  
 duration: 10/2008  
 total funding: 2300,00 EUR (AHF))  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 funding for AISAS abroad 2300,00 EUR (AHF) (\*)  
 resp. person in AISAS: A. Skopal  
 status in the project: Investigator

(\*) the funding was paid for AISAS directly by Alexander von Humboldt Foundation for performance of the project abroad in Germany - it has NOT gone through the account of AISAS

[18] type of project: Multilateral EU project AURORA POLARIS of the pro-gram GRUNDTVIG,

title: **Aurora polaris (Partnership Opportunity for Learning: As-tronomy Resources for Inspiring Seniors)**

grant number: GRUNDTVIG – 84100468/p-PO  
 duration: 8/2008 – 7/2010  
 total funding: 21000,00 EUR (EU-SAICC + MVTs)  
 funding for AISAS: 21000 00 EUR (through AISAS account)  
 resp. person in AISAS: D. Chochol  
 status in the project: Partner

[19] type of project: Project Czech Republic - Slovakia MAD-SAV

title: **Impulsively generated waves in radio and X-ray ranges of the electromagnetic spectrum detected in the solar corona**

grant number: MAD 470/OMS/wek/08 (vlly)  
 duration: 01/2009 –12/2011  
 total funding: 928,00 EUR (SAV)  
 funding for AISAS: 820,00 EUR (SAV through AISAS account)  
 funding for AISAS abroad 108,00 EUR (AV ČR) (\*)  
 resp. person in AISAS: J. Rybák  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by Academy of Sciences of Czech Republic for performance of the project abroad in Czech Republic - it has NOT gone through the account of AISAS.

[20] type of project: Intergovernmental project of Science and Technology Cooperation – MVTs, Slovakia-Austria

title: **Diagnostics of solar flares and microflares by combined spectroscopy and imaging**

grant number: APVV SK-AT-0004-08  
 duration: 01/2009-12/2010  
 total funding: 5497,00 EUR (APVV + ÖAW)  
 funding for AISAS: 2577,00 EUR (APVV through AISAS account)  
 funding for AISAS abroad 2920,00 EUR (ÖAW) (\*)  
 resp. person in AISAS: J. Rybák  
 status in the project: Coordinator

(\*) the funding was paid for AISAS directly by Österreichische Akademie der Wissenschaften for performance of the project abroad in Austria - it has NOT gone through the account of AISAS.

[21] type of project: Intergovernmental project of Science and Technology Cooperation – MVTs, Slovakia-Austria

title: **Finite (Ring) Geometries: Where Qudits Meet Black Holes**

grant number: APVV SK-AT-0001-08/ SK 07-2009

duration: 01/2009-11/2010

total funding: 6620, 00 EUR (APVV)

funding for AISAS: 3540,00 EUR (APVV through AISAS account)

funding for AISAS abroad 2880,00 EUR (ÖAD) (\*)

resp. person in AISAS: M. Saniga

status in the project: Coordinator

(\*) the funding was paid for AISAS directly by Österreichischer Austauschdienst (ÖAD) for performance of the project in Austria - it has NOT gone through the account of AISAS.

[22] type of project: Intergovernmental project of Science and Technology Cooperation – MVTs, Slovakia-Czech Republic

title: **Ground-based light sources, luminance and radiance of night sky: spectral and integral characteristics**

grant number: APVV SK-CZ-0014-09

duration: 01/2010-12/2011

total funding: 977, 00 EUR (APVV)

funding for AISAS: 977,00 EUR (APVV through AISAS account)

resp. person in AISAS: M. Kocifaj

status in the project: Coordinator

[23] type of project: Intergovernmental project of Science and Technology Cooperation – MVTs, Slovakia-France

title: **Last stage of the Solar System formation**

grant number: APVV SK-FR-0004-09

duration: 01/2010-12/2011

total funding: 5225, 00 EUR (APVV + Franc)

funding for AISAS: 2145,00 EUR (APVV through AISAS account)

funding for AISAS abroad 3080,00 EUR (France) (\*)

resp. person in AISAS: L. Neslušan

status in the project: Coordinator

(\*) the funding was paid for AISAS directly by France for performance of the project abroad in France - it has NOT gone through the account of AISAS.

[24] type of project: Intergovernmental project of Science and Technology Cooperation – MVTs, Slovakia-Poland

**title: Detection of the high-frequency MHD oscillations in the solar corona**

grant number: APVV SK-PL-0043-09

duration: 01/2010-12/2011

total funding: 473, 00 EUR (APVV)

funding for AISAS: 473,00 EUR (APVV through AISAS account)

resp. person in AISAS: J. Rybák

status in the project: Coordinator

[25] type of project: Intergovernmental project of Science and Technology Cooperation – MVTs, Slovakia-Czech Republic

**title: Study of solid part of interplanetary matter**

grant number: APVV SK-CZ-0107-09

duration: 01/2010-12/2011

total funding: 4950, 00 EUR (APVV)

funding for AISAS: 3240,00 EUR (APVV through AISAS account)

funding for AISAS abroad 1710,00 EUR (AV ČR) (\*)

resp. person in AISAS: J. Svoreň

status in the project: Coordinator

(\*) the funding was paid for AISAS directly by Academy of Sciences of Czech Republic for performance of the project abroad in Czech Republic - it has NOT gone through the account of AISAS

[26] type of project: Intergovernmental project of Science and Technology Cooperation – MVTs, Slovakia-Czech Republic

**title: New trends in extrinsic variable stars research**

grant number: APVV SK-CZ-0032-09

duration: 01/2010-12/2011

total funding: 3114, 00 EUR (APVV)

funding for AISAS: 1858,00 EUR (APVV through AISAS account)

funding for AISAS abroad 1256,00 EUR (AV ČR) (\*)



resp. person in AISAS: J. Žižňovský

status in the project: Coordinator

(\*) the funding was paid for AISAS directly by Ministry of Education of Czech Republic for performance of the project abroad in Czech Republic - it has NOT gone through the account of AISAS.

[27] type of project: Slovak-German DFG project

**title: Investigation of emerging magnetic flux in the quiet photosphere of the Sun**

grant number: DFG BA 1875/7-1

duration: 07/2011-06/2012

total funding: 2100,00 EUR (DFG)

funding for AISAS: 0,00 EUR (through AISAS account)

funding for AISAS abroad 2100,00 EUR (DFG) (\*)

resp. person in AISAS: P. Gömöry

status in the project: Investigators

(\*) the funding was paid for AISAS directly by Deutsche Forschungsgemeinschaft for performance of the project abroad in Germany - it has NOT gone through the account of AISAS.

[28] type of project: Multilateral project ZiF

**title: Finite Projective Ring Geometries: An Intriguing Emerging Link Between Quantum Information Theory, Black-Hole Physics, and Chemistry of Coupling**

grant number: ZiF CG 1/2009

duration: 04/2009 - 05/2011

total funding: 36000,00 EUR (Uni. of Bielefeld)

funding for AISAS: 0,00 EUR (through AISAS account)

funding for AISAS abroad 8600,00 EUR (Uni. of Bielefeld) (\*)

resp. person in AISAS: M. Saniga

status in the project: Coordinator

(\*) the funding was paid for AISAS directly by University of Bielefeld, Germany for performance of the project abroad in Germany - it has NOT gone through the account of AISAS.

### iii. List of other important projects and collaborations without direct funding

[1] type of project: Academic agreement Project Czech-Slovak MAD  
 title: **Research of cataclysmic variables – INTEGRAL and Gaia projects**  
 grant number: MAD 470/OMS/wek/08 (INTEGRAL)  
 duration: 01/2009 - 12/2011  
 total funding: 0,00 EUR  
 funding for AISAS: 0,00 EUR (through AISAS account)  
 resp. person in AISAS: L. Hric  
 status in the project: Coordinator

- **National projects and funding**

#### i. List of projects supported by the European Social Funds (ESF) and Structural Funds of EU and the role of the Organisation

##### Structural Funds of EU

[1] Project title: **Center of space research: Influences of the space weather**  
 Project number: ITMS 26220120009  
 Duration: 04/2009 – 08/2012  
 Funding for Organisation: 1 075 174 EUR  
 Role of the Organisation: Coordinator (J. Svoreň)

[2] Project title: **Center of space research: Influences of the space weather – the second phase**  
 Project number: ITMS 26220120029  
 Duration: 1.3.2010 / 28.2.2013  
 Funding for Organisation: 217 979 EUR  
 Role of the Organisation: Coordinator (J. Svoreň)

#### ii. List of projects supported by APVV and the role of the Organisation

##### a) Regular Calls (VV)

[1] Project title: **The solar emission corona and prominences: solar activity and space weather indicators**  
 Project number: APVT-51-012704  
 Duration: 01/2005 - 12/2007  
 Funding for Organisation: 19 286 EUR  
 Role of the Organisation: Coordinator (V. Rušin)

[2] Project title: **Heating of the solar corona: observational verification of the physical mechanisms**

Project number: APVT-0066-06  
 Duration: 02/2007 – 12/2009  
 Funding for Organisation: 103 298 EUR  
 Role of the Organisation: Coordinator (J. Rybák)

[3] Project title: **Investigation of Slovak meteorites**

Project number: APVV-0516-10  
 Duration: 05/2011 - 10/2014  
 Funding for Organisation: 2 200 EUR  
 Role of the Organisation: Partner (J. Svoreň)

**b) Calls LPP Programs**

[4] Project title: **Olympiad for astronomy for scholars**

Project number: APVV LPP-0172-06  
 Duration: 10/2006 – 10/2010  
 Funding for Organisation: 0 EUR  
 Role of the Organisation: Partner (L. Hric)

[5] Project title: **Astronomy – science for teachers and pupils.**

Project number: APVV-LPP-0068  
 Duration: 01/2007 – 10/2009  
 Funding for Organisation: 29 201 EUR  
 Role of the Organisation: Coordinator (A. Kučera)

*(Total budged of the project 42328 EUR)*

[6] Project title: **Meetings with Universe.**

Project number: APVV-LPP-0146  
 Duration: 01/2007 – 10/2009  
 Funding for Organisation: 88 793 EUR  
 Role of the Organisation: Coordinator (V. Rušin)

[7] Project title: **Explore universe, your home.**

Project number: APVV- LPP-0078-09  
 Duration: 09/2009 – 08/2012  
 Funding for Organisation: 66 735 EUR  
 Role of the Organisation: Coordinator (V. Rušin)

**c) Calls - Reimbursement of expenses 7RP**[8] Project title: **Reimbursement of expenses associated with the preparation of FP7 project**

Project number: PP7RP-0053-10  
 Duration: 01/2011 – 12/2011  
 Funding for Organisation: 2 493 EUR  
 Role of the Organisation: Coordinator (J. Budaj)

**iii. Number of projects supported by the Scientific Grant Agency of the Slovak Academy of Sciences and the Ministry of Education (VEGA) for each year, and their funding**

VEGA	2007	2008	2009	2010	2011
number	11	11	11	10	11
funding in the year (EUR)	37493	39302	44624	70871	63336

• **Summary of funding from external resources (based on annual financial report of the Organisation)**

External resources	2007	2008	2009	2010	2011	total	average
external resources (milions of EUR)	0,189	0,159	0,153	0,596	0,851	1,950	0,390
external resources transfered to cooperating research organisations (milions of EUR)	0,009	0,004	0,000	0,038	0,016	0,067	0,013
ratio between external resources and total salary budget	0,409	0,322	0,291	1,116	1,632	–	0,754
overall expenditures from external as well as institutional resources (milions of EUR)	0,969	1,036	1,082	1,555	1,728	6,369	1,274

#### iv. Supplementary information and/or comments on research projects and funding resources

During the assessment period AISAS successfully gained funding resources of EU through the OPTICON Trans-national Access Programs of the 6FP and 7FP EU. An amount of **192 763 EUR** have been allocated by OPTICON for AISAS and paid directly to owners of the telescopes to cover of AISAS observational time costs at the world-class solar telescopes located at the Canary Islands

### 5. Organisation of PhD studies, other pedagogical activities

#### ii. List of accredited programmes of doctoral studies (as stipulated in the previously effective legislation as well as in the recently amended Act on the Universities)

##### [1] in the previously effective legislation

AISAS was accredited for 2 programmes of doctoral studies **11- 40-9 Astronomy** and **11- 41-9 Astrophysics**.

##### [2] in the recently amended Act on the Universities

AISAS is now accredited for 2 programmes of doctoral studies **4.1.7. Astronomy** and **4.1.8. Astrophysics**. Study is organised in collaboration with the Faculty of mathematics, physics, and informatics of Comenius University in Bratislava.

#### iii. Summary table on doctoral studies (number of internal/external PhD students; number of students who completed their study by a successful thesis defence; number of PhD students who quitted the programme)

PhD study	31.12.2007			31.12.2008			31.12.2009			31.12.2010			31.12.2011		
number of potential PhD supervisors	14			14			14			7			8		
PhD students	number	defended thesis	students quitted	number	defended thesis	students quitted	number	defended thesis	students quitted	number	defended thesis	students quitted	number	defended thesis	students quitted
internal	4	1	0	6	0	0	6	0	0	6	1	0	5	1	0
external	2	0	2	1	2	0	2	1	0	0	2	0	0	0	0
supervised at external institution by the research employees of the assessed organisation	0	0	0	5	0	0	5	0	0	5	3	0	2	0	0

**iv. Postdoctoral positions supported by**

**a) external funding (specify the source)**

There were at AISAS 2 postdoctoral positions supported by SAIA – Slovak Academic Information Agency in the assessed period.

**b) internal funding - the Slovak Academy of Sciences Supporting Fund of Stefan Schwarz**

There were 2 postdoctoral position supported by Supporting Fund of Stefan Schwarz during the assessment period. (M. Vaňko, L. Hambálek)

**v. Summary table on pedagogical activities in undergraduate programmes for each year**

Teaching	2007	2008	2009	2010	2011
lectures (hours/year)	165	202	277	140	258
practicum courses (hours/year)	141	56	238	127	426
supervised diploma works (in total)	7	4	2	0	4
members in PhD committees (in total)	8	10	10	6	8
members in DrSc. committees (in total)	6	6	6	3	3
members in university/faculty councils (in total)	1	1	1	1	1
members in habilitation/inauguration committees (in total)	1	0	3	1	1

**vi. List of published university textbooks**

no

**vii. Number of published academic course books**

No

### viii. List of joint research laboratories/facilities with the universities

[1] AISAS has established a receiving station of the forward scatter meteor radar at the Astronomical and Geophysical Observatory of Comenius University in Modra. The instrument is used by both the institutions for a research of the activity and structure of the meteoroid population in the near-Earth surroundings.

### ix. Supplementary information and/or comments on doctoral studies and pedagogical activities

Generally, the number of students of astronomy and astrophysics in Slovakia is of about 3-4 per year. This number is sufficient for needs in society. Therefore the number of potential PhD students is also limited and objectively much less than *potential PhD supervisors* at AISAS. Real needs on doctoral study in Astronomy and Astrophysics are fully covered by AISAS together with the Faculty of Mathematics, Physics and Informatics of Comenius University in Bratislava .

[1] Research employees - members of joint commission for PhD studies:

D. Chochol, A. Kučera, L. Neslušán, E. Pittich, V. Porubčan, V. Rušin, A. Skopal, J. Svoreň, J. Zverko, J. Žižňovský,

[2] Research employees - members of joint commission for defending of DrSc.

J. Svoreň (chair), D. Chochol, A. Skopal

[3] Research employees - members of the commission for state exams in Astronomy and Astrophysics:

- Kučera, J. Svoreň, J. Zverko at Faculty of Science of Pavol Jozef Šafárik University in Košice.
- J. Svoreň, J. Žižňovský at Faculty of Mathematics Physics and Informatics of Comenius University in Bratislava
- J. Zverko at Faculty of Science of Masaryk University in Brno

[4] There were supervised 5 PhD students at

- Comenius University in Bratislava,
- Masaryk University in Brno,
- University Claude Bernard in Lyon (France),
- University de Franche-Comté in Besançon (France)

[5] In the assessment period the AISAS has collaborated with following universities:

- Faculty of Mathematics, Physics and Informatics of Comenius University in Bratislava

- Faculty of Science of Pavel Jozef Šafárik University in Košice
- Faculty of Natural Sciences of Masaryk University in Brno, Czech Republic
- Pedagogical Faculty of Trnava University in Trnava
- Faculty of Mathematics and Physics of Charles University in Prague, Czech Republic
- Faculty of Natural Sciences of Saint Cyril and Method University in Trnava
- Claude Bernard University in Lyon, France
- University de Franche-Comté in Besançon, France

[6] V. Rušin served as an external member of the Scientific Council of University in Žilina

## 6. Applied research

### ii. List of the most important results of applied research projects and their socio-economic impact

AISAS is the organisation exclusively aimed at a basic research and it, therefore, does not have any results of applied research projects.

### iii. List of the most important studies commissioned for the decision-making authorities, the government and NGOs, international and foreign organizations

AISAS can hardly serve directly for decision sphere. It is also very sporadically asked by decision sphere for studies and expertise. Some of activities in this sphere are listed below.

[1] Selected observational solar data are regularly distributed to SGD (Solar Geophysical Data) and other databases for forecasting of Space Weather – the influence of near Earth environment. These databases are frequently used by variety of users. (navigation, GPS systems, military, air companies, telecommunication operators, NASA and ESA space agencies and energetic sector - electricity, gas). (continually)

[2] AISAS participated in 2008 in the preparation of materials for the Ministry of Education for the negotiations of entry of Slovakia into the European Space Agency

[3] AISAS together with the Institute of Experimental Physics prepared a presentation „Space Sciences in Slovakia: Space Physics“, for representatives of the Division of Science and Technology of Ministry of Education, for representatives of the Slovak



R&D organizations and for selected ministries to negotiating process with a delegation of the European Space Agency (ESA), (2008).

[4] AISAS refereed textbook and workbook for primary schools “Prírodoveda pre 4 ročník základných škôl” for Ministry of Education (Orbis Pictus Istropolitana. Bratislava, (2011)

[5] AISAS, cooperated with Ministry of Defense during the meeting of Chiefs of Defense of North Atlantic Treaty Organisation (NATO) in Slovakia and organized programme for that at the Observatory Lomnický štít (2010).

[6] AISAS prepared 70 catchwords on astronomy and astrophysics for primary and secondary schools. <http://www.astro.sk/~zkanuch/apvv/wwwheslar/> (2009)

[7] AISAS is involved in SADOS – connection of secondary schools to Internet in the frame of project of informatics of schools, under supervision of SANET and supervise one SANET node in Poprad. (continually)

[8] AISAS supervise one node of SANET in High Tatras.

[9] AISAS reviewed textbook “Basic planetary geography” for Pedagogic faculty of Catholic University, Ružomberok. (2009)

[10] AISAS provided expertise of astronomical conditions for reconstruction of a car accident for the police in Stará Ľubovňa (2011)

[11] AISAS provided exact calculations of daily sunrise and sunset in the village Stará Bystrica for calendar 2010.

[12] In 2007 and 2010 AISAS contributed to Encyclopedia Beliana (42 and 33 catchwords).

[13] AISAS prepared in 2007 material on the basis of associate membership of the Slovak Academy of Sciences in the program ASTRONET. The leading astronomical institutions and agencies in Europe prepared material on the direction and financing of major astronomy projects on a European scale. Presidium of SAS approved the draft and signed the Treaty. Thus, Slovakia joined the ASTRONET as an associate member.

[14] AISAS prepared comments on the material "Long-term plan of the state science and technology policy by 2015". (2009)

[15] AISAS commented Statutes of the Grant Agency of the Ministry of Education and SAS. (2007)

[16] AISAS provided text to official FDC card information to issue a postage stamp EUROPA 2009 – Astronomy.

[17] AISAS designed and implemented the panel titled "Science in the High Tatra Mountains" for Educational Trail at Skalnaté Pleso asked by TANAP.

**iv. List of patents issued abroad, incl. revenues**

AISAS is the organisation exclusively aimed at a basic research and it, therefore, does not have any patents.

**v. List of the patents issued in Slovakia, incl. revenues**

AISAS is the organisation exclusively aimed at a basic research and it, therefore, does not have any patents

**vi. List of licences sold abroad, incl. revenues**

AISAS is the organisation exclusively aimed at a basic research and it, therefore, does not have any licences.

**vii. List of licences sold in Slovakia, incl. revenues**

AISAS is the organisation exclusively aimed at a basic research and it, therefore, does not have any licences.

**viii. List of contracts with industrial partners, incl. revenues**

AISAS is the organisation exclusively aimed at a basic research and it, therefore, does not have any contracts with industrial partners.

**ix. List of research projects with industrial partners, incl. revenues**

AISAS is the organisation exclusively aimed at a basic research and it, therefore, does not have any research projects with industrial partners.

**x.**

Outreach activities	2007	2008	2009	2010	2011	total
studies for the decision sphere, government and NGOs, international and foreign organisations	3	4	3	6	3	19

## 7. Popularisation of Science

### i. List of the most important popularisation activities

[1] AISAS recognizes **more than 1560** particular popularization actions organized/performed during the assessment period, including articles, lectures, telecommunication appearances, internet popularizing, exhibitions, multimedia films, excursions and press conferences.

Thus, there is unrealistic to list all of them in this Questionnaire. They are summarized in the table and accessible in full details in the annual reports of AISAS. We list here only the top most important actions/items.

[2] AISAS have run **four** popularization grants APVV-LPP, (see in sect. 4.) granted with **184 729 EUR** in total. There were organized in frame of these projects among other:

- 5 teacher training seminars for astronomy education at primary and secondary schools with printing of proceedings given to participants,
- 20 open doors actions at observatories of AISAS,
- 5 series of six public lectures on astronomy in Košice, Banská Bystrica, Prešov, Žilina and Nitra.
- 27 actions in frame of International Year of Astronomy,
- 15 excursions of pupils and teachers to observatories at Lomnický štít and Skalnaté pleso,
- built educational trail with 13 panels in areal of Stará Lesná,
- co-organised Astronomical Olympiads,
- printed in total **180 000 pieces** of **45 different postcards** with astronomical motives which are distributed free of charge to public.

[3] AISAS produced in cooperation with Slovak Television **multimedia film – Spectrum of Science**, 30 minutes document on the research at AISAS

[4] AISAS organized or participated at **8 exhibitions** namely:

- 1) *Exhibition: Antikythera Mechanism. Exhibition of 8 panels of description and piece of unique replica Antikythera Mechanism - a mechanical computer, the oldest in the world, constructed around 150 BC. The replica was lent us by University of Athens in the frame of European Project Aurora Polaris GRUNDTVIG, Venue: AISAS and Slovak Central Observatory, Hurbanovo.*
- 2) *Exhibition: The exhibition centers of excellence, Venue: Exhibition Grounds INCHEBA, Bratislava. Exhibition focuses on the presentation of centers of excellence within the EU Structural Funds*
- 3) *Exhibition: The world of photography major Slovak personalities: 110 anniversary of the birth of Dr. Antonín Bečvář, Venue: AISAS*
- 4) *Exhibition: The world of photography major Slovak personalities: 130 anniversary of the birth of M.R. Štefánik, Venue: AISAS*

- 5) *Exhibition: Space - an adventure of discovery. Venue: Main Street, Košice. Outdoor exhibition, written by prof. Palouš. The exhibition was lent by Czech Republic and installed in a frame of the action IYA 2009 - International Year of Astronomy.(cooperation with the Institute of Experimental Physics and town Košice)*
- 6) *Exhibition: Remembering M.R.Stefánik - 90 years after death. Venue: AISAS*
- 7) *Exhibitions: World through Photo-objectives of researchers of the SAS, Venues: AVION Bratislava, SAV Košice, SAV Bratislava. The exhibitions were held on the occasion of the event "Night of the researcher", (2x).*

## ii. Summary of outreach activities

Popularisation of science	2007	2008	2009	2010	2011	total
articles in press media/internet popularising results of science, in particular those achieved by the Organization	106	109	59	70	76	420
appearances in telecommunication media popularising results of science, in particular those achieved by the Organization	65	46	57	74	63	305
public popularisation lectures	138	117	177	128	135	695

## iii. Supplementary information and/or comments on popularisation activities

## 8. Background and management. Staffing policy and implementation of findings from previous assessments

### i. Summary table of personnel

Personnel	2007	2008	2009	2010	2011
all personnel	61	63	71	65	63
research employees from Tab. Research staff	36	36	32	38	34
FTE from Tab. Research staff	32,05	29	27,67	31,78	30,24
average age of research employees with university degree	50,7	51,1	52,5	51,2	45,7

## ii. Professional qualification structure

Number of	2007	2008	2009	2010	2011
vedúci vedecký pracovník DrSc./ research professor DrSc.	9	9	8	8	6
Vedúci vedecký pracovník CSc., PhD/research professor CSc., PhD	2	2	2	2	1
samostatný vedecký pracovník/ senior scientist	11	12	12	11	8
vedecký pracovník/research scientist	11	12	10	13	14
profesor/professor	1	1	1	1	1
docent/assoc. prof.	1	1	1	1	1

*Vyplňte podľa prílohy A, správy o činnosti organizácie.*

## iii. Status and development of research infrastructure incl. experimental, computing and technical base (description of the present infrastructure, premises, and material and technical resources. Infrastructure, instrumentation and major technical equipment necessary for the achievement of the objectives specified in the research Concept)

There were unprecedented improvements of research infrastructure of AISAS in the assessed period. The most significant investments to the infrastructure came from Structural funds of EU. They were roughly equal to **60 regular annual investments** of AISAS. Thus AISAS is now, and in near future will be even more, equipped with modern observational, computational and technical infrastructure. We will list here only important infrastructure and there are pointed out by bold the most important improvements which were (or will be) added to the older infrastructure of AISAS.

### Solar department:

#### *Lomnický Peak Observatory:*

- Two 20/300 ZEISS coronagraphs with a diffraction grating spectrograph and **CoMP – Coronal multi-channel polarimeter, one of two worldwide instruments for spectro-polarimetry of solar corona.**
- **Post-focus Near Infrared Detectors for Solar Spectrograph (Coronagraph) – equipped with super sensitive infrared cameras for registration of IR radiation from solar corona.**

#### *Stará Lesná Observatory*

- Horizontal solar telescope with spectrograph (d = 50 cm) for teaching purposes,
- Small photospheric refractor for registration of sunspots

Department of interplanetary matter*Skalnáté Pleso Observatory*

- 61 cm photometric and astrometric reflector with CCD camera,
- **1.3 meter class telescope equipped with large CCD camera in construction**
- all sky automatic bolide camera,
- **Two video-cameras - system for observing of faint meteors**
- Modra Observatory - receiver of a forward scatter meteor radar.

Stellar department

- Skalnáté Pleso Observatory - 60 cm photometric reflector,
- Stará Lesná Observatory - 50 cm and 60 cm photometric reflectors.
- **Two medium class spectrographs in construction**
- The department shared in the designing of satellite programmes for stellar astrophysics - the HIPPARCOS and TYCHO databases are frequently used.

AISAS as a whole

- **Computational Cluster for parallel computations**
- **Intel Server Systems**
- **Intel Storage Server System**
- **Radio communications devices for data transfer between Stará Lesná and observatories at Lomnický štít and Skalnáté pleso.**
- **Videoconference system**

Facilities abroad which AISAS has possibility to use regularly in the frame of international cooperation

- GRID computing with collaboration with the Institute of Informatics of the Slovak Academy of Sciences within the project Enabling Grids for E-science II.
- Large worldwide solar telescopes (VTT, SST, DOT, THEMIS) at Canary Islands.

**iv. Status and development of bibliographic resources, activities of the Organisation's library and/or information centre**

Special library of AISAS is a part of the library and information network of SAS and it is managed by the Central Library of SAS. The library employs one full-time worker.

Our collections include 9796 books and 193 CD ROMs. On January 1, 2007 our library had 9208 books and 139 CD ROM in possession. During the years 2007-2011 we got

642 new acquisitions. We received 588 books and 54 CD ROMs. The library receives 32 periodic titles, 30 of them from abroad. There is on-line catalogue of our library on internet. The costs of new acquisition and costs of subscription of journal was 19 802 EUR in the years 2007-2001.

Our library mainly offered services in the form of both the local and interlibrary loans; our catalogue of the books and electronic media is also accessible on-line.

We distributed worldwide issues of our journal Contributions of the Astronomical Observatory Skalnaté Pleso (Vol.37, No. 1 – Vol 41, No. 2). The executive editor of our journal made accessible on-line (as postscript or pdf files) all the issues; these can be downloaded from the address: <http://www.astro.sk/caosp.html>. The electronic version of the journal is also accessible from the ADS database (Harvard, U.S.A.) at the URL [http://adsabs.harvard.edu\\_service.html](http://adsabs.harvard.edu_service.html).

Thanks to the membership of our librarian in the worldwide web-based discussion list PAMnet (worldwide net of special libraries – physical, astronomical and mathematical) and other donations we could acquired free of charge 469 new acquisitions.

**v. Describe how the results and suggestions of the previous assessment were taken into account**

The suggestions of the previous assessment were as follows:

a) *“to focus on topics which are at the forefront of research in an international context in order to have chances to participate in international projects of highest level”.*

AISAS developed activities in modern topics of research, namely:

- in solar physics we are focused on spectro-polarimetry methods of investigation which are at the forefront of research. We were a member of the highest level FP7 project EST mentioned in Sect. 4.i.
- in stellar physics a new modern field of research – Exoplanets was adopted at AISAS

b) *“to support an active research teams which achieve internationally competitive results”.*

- Within the plans of projects of Structural funds of EU a new infrastructure was planned for top teams of Solar Physics department and Department of interplanetary matter.
- The management of AISAS has a special budget which is used exactly to motivate researchers at AISAS to publish internationally competitive results in high impacted journals.

c) “to seek and implement measures for the full incorporation the journal CAOSP into ISI Current Contents database”

- We achieved incorporation of the CAOSP into SCOPUS and WOS database and get an impact factor for CAOSP.
- We introduced a financial system for supporting quality papers published in CAOSP

d) “to devote efforts to education and stable involvement of young staff in research projects. To seek to obtain funds from sources available to support postdocs (Schwarz fund, APVV programs, Marie Curie Fellowships)”

- We obtained Schwarz fund for two postdocs of AISAS,
- All young scientists and postdocs at AISAS are involved in a variety of scientific projects. Some of them are even deputy heads in the projects and they have also their own bilateral projects (two young scientists)
- One postdoc obtained a prestigious Marie Curie Fellowship and FP6 Reintegrations grant.
- One young scientist has recently returned from a two year stay in Austria fully supported by Austrian Academy of Sciences,
- Two postdocs at AISAS obtained support from the SAIA Agency.

e) “further to develop very good popularization activities”

- It was fully fulfilled

f) “to pay attention to identifying the possibilities of application of the results of research”

- The only possibilities of our contribution to applications is to provide our data to world databases for Space Weather forecast – important for navigation, air companies, telecommunication and military.
- Application to socio-economic society is education of students and enhance of knowledge of people, especially the young ones.

g) “to solve the problem for further scientific orientation and the concept of a detached branch in Bratislava”

- We gave a complete freedom to the staff in the detached branch in Bratislava to carry out research in the most perspective area and attenuated the rest of research (also by restrictions in the staff number).
- An emphasis on research in the Department of interplanetary matter will be oriented to important observational and computational power available at Stará Lesná and Skalnaté Pleso.

h) “Commission supports the AISAS activities to get membership in ESO and in ESA”

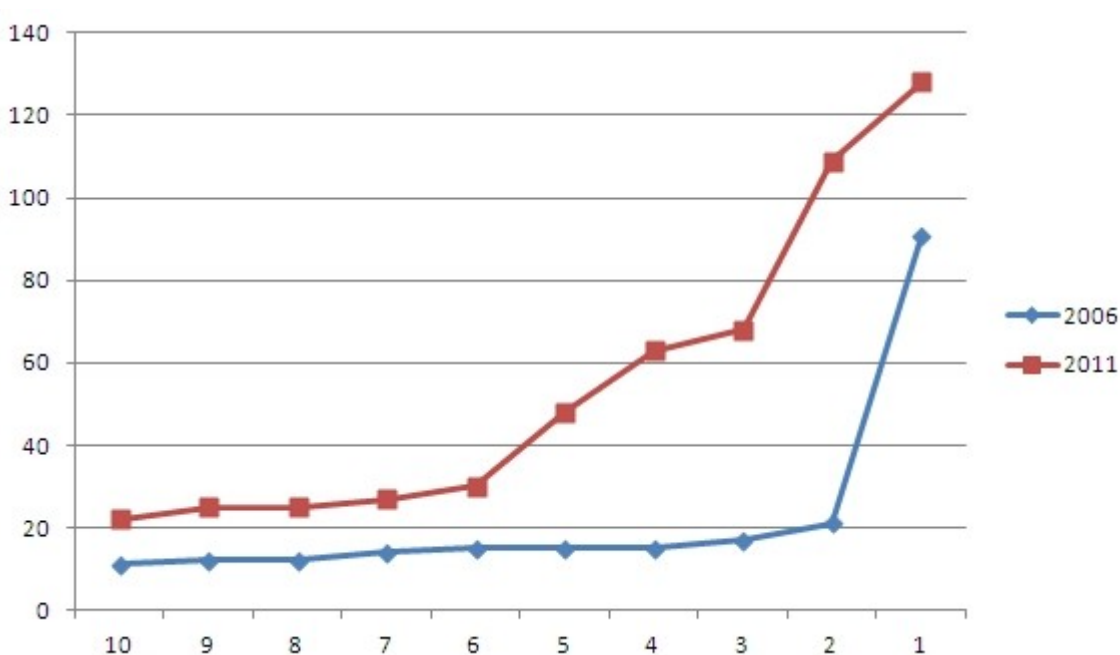
- Unfortunately there is impossible up to now to proceed to be a member of ESO due to a lack of financial support from the government.



- On the other hand the “Center of Excellence – Center of space research: Influences of the space weather” is the first step towards ESA membership as it is clearly stated in the proposal for the project, and all the more the government signed on April 28, 2010 a cooperation agreement with ESA. It is first and essential step to full membership in ESA.

*i) “some shortcomings in response to outputs are an absences of papers with significant numbers of citations. Only one work has more than 20 citations”.*

This dramatically changed in the assessed period. The figure shows clearly that fact.



There are shown in the figure, normalized numbers (to five year long period) of “*top ten cited papers*” for both assessments 2006 and 2011. While in 2006 the second top cited paper would get ~ 20 citations now in 2011 even the tenth cited paper has more citations and there are five highly cited papers in this assessed period.

#### **vi. Supplementary information and/or comments on management, research infrastructure, and trends in personnel development**

- There was good trend in personnel development concerning incorporation of young researches into the teams at AISAS. Many good PhD students obtained positions at AISAS as researchers, either by some extra fund or as a natural exchange of researches. The average age of scientists at AISAS changed significantly to better numbers in the last years.

- There was a generation gap in the structure of researches but it was naturally solved.
- Due to restrictions of salary sources, during the assessed period there were terminated contracts to several scientists, but strictly on an assessment of their scientific merits.

**9. Supplementary information and/or comments important for the assessment of organisation which are not explicitly mentioned in the questionnaire (concerning each previously mentioned evaluation criteria, facts not included, evaluation of research teams by ARRA, etc.)**

- There is every five years at AISAS an overall evaluation of each researcher, and the results of evaluation are seriously taken into account concerning the salary supplementary benefits
- There were already mentioned above, the good evaluation of our teams by ARRA, as well as the strict system of evaluations of scientific visions at AISAS.

**Other information relevant to the assessment**

Tatranská Lomnica, April 30, 2012

RNDr. Aleš Kučera, CSc.  
Director of the institute