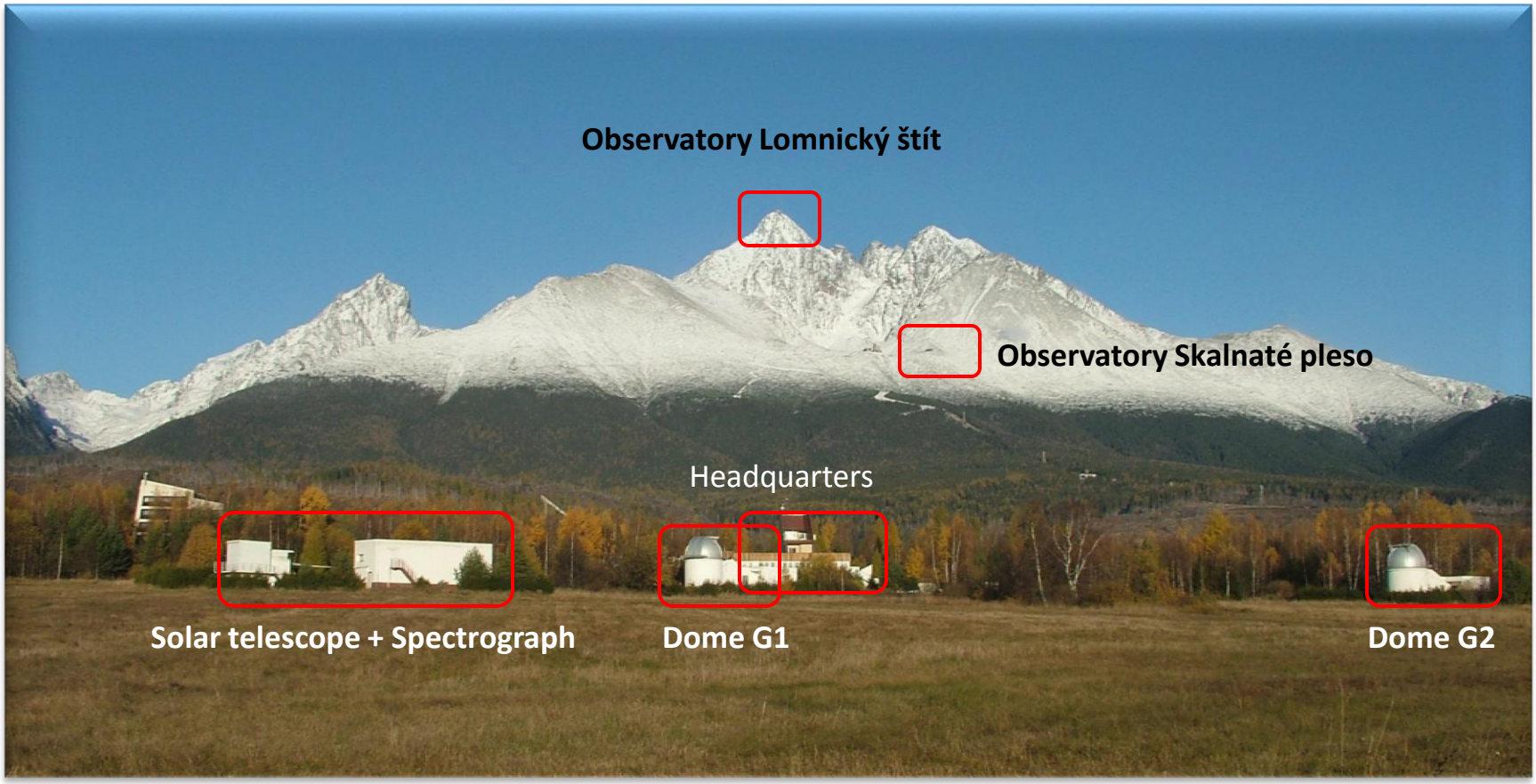
Astronomical Institute
of the Slovak Academy of Sciences
2012-2015

Stará Lesná, November 10, 2016

Infrastructure of the Astronomical Institute



Field office - Bratislava
Department of Interplanetary Matter

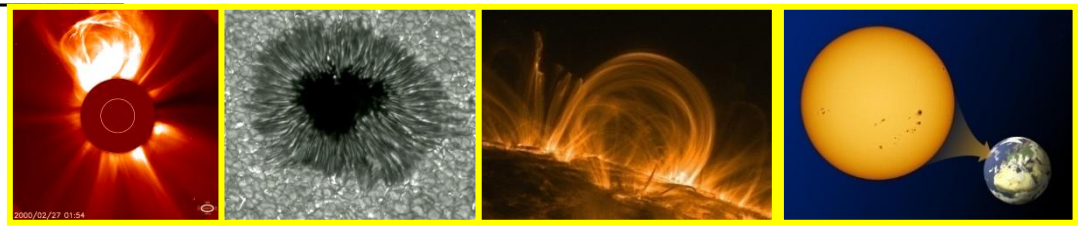
Basic information on the Institute

Director: RNDr. Aleš Kučera, CSc.
Deputy director: Doc. RNDr. Ján Svoreň, DrSc.
Scientific secretary: Mgr. Martin Vaňko, PhD.
Head of the Scientific Board: RNDr. Theodor Pribulla, CSc.

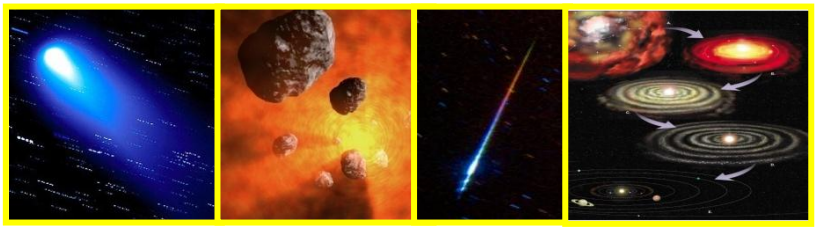
Averaged number (FTE) of scientists in 2012-2015 **32,6850**

Scientific departments:

Solar Physics: FTE **8,7700**
in 2011 (8.13)



Interplanetary matter: FTE **10,6925**
in 2011 (10.88)



Stellar department: FTE **13,2225**
in 2011 (11.13)

Outlook

A. Selected sample of results

B. Results of the Institute according to particular indicators:

1. Research output
2. Responses to the research outputs (citations, etc.)
3. Research status of the institute in both international and national contexts
4. Project structure, research grants and other funding resources
5. PhD studies and educational activities
6. Social impact
7. Popularization of science (outreach activities)
8. Background and management; human resources

C. Implementation of recommendations from the previous assessment

D. Closing remarks

A. Selected sample of results

- Difficult to select a representative sample in this short presentation
- All three departments have many relevant results in the field of interest

My decision:

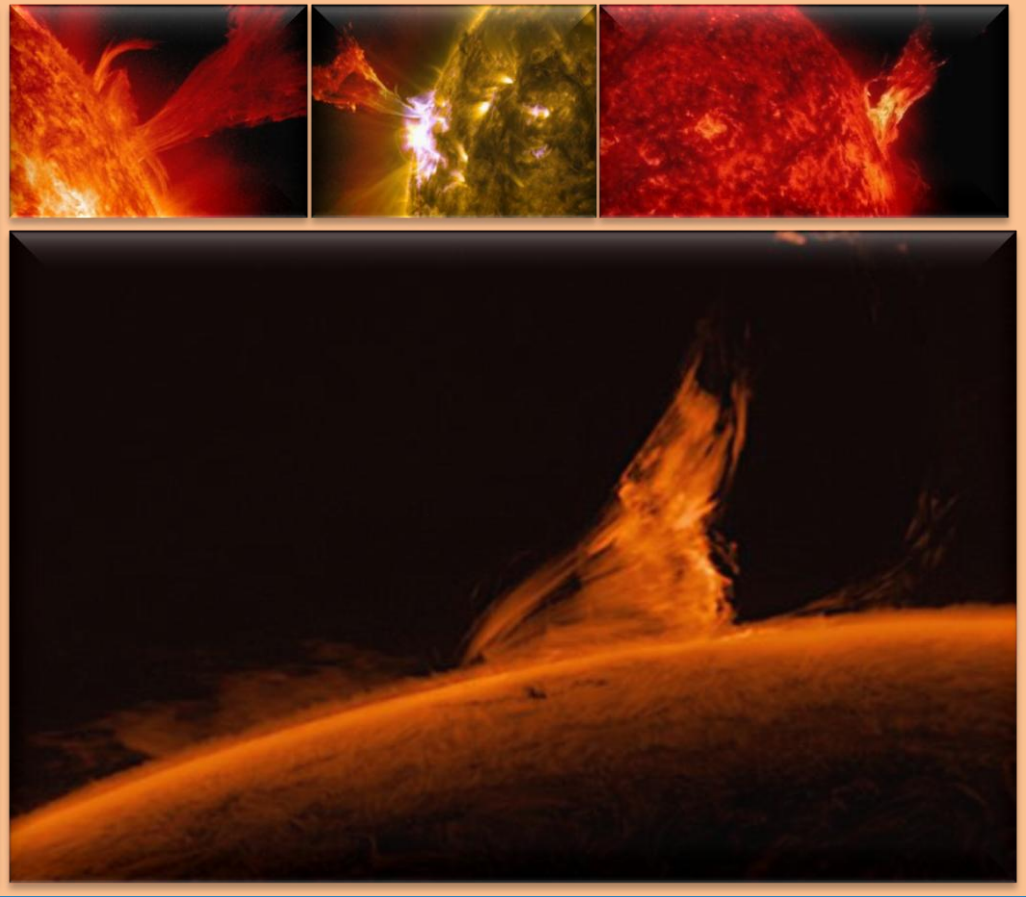
- three results
- one from each department
- preference of high quality results in high impacted journals
- done preferably by younger scientists

1. First time evidence of EUV rotational motions in a tornado-like solar prominence

2. Mass-loss Rate by the Mira in the Symbiotic Binary V1016 Cygni from Raman Scattering

3. Investigation of the outer parts of the Solar System

1. First time evidence of EUV rotational motions in a tornado-like solar prominence



Rotating magnetic structures driven by underlying vortices on the Solar surface were previously proposed as a **new explanation for filament formation and eruption** (tornado-like prominences). They may play a key role as the source of plasma and twist in eruptive filaments, but **observations have not successfully distinguished these rotational motion** from others (oscillation and counter-streaming plasma flows).

Here we report first time evidence of EUV rotational motions in a tornado-like prominence.

1. First time evidence of EUV rotational motions in a tornado-like solar prominence

SU, Yang - GÖMÖRY, Peter - VERONIG, Astrid - TEMMER, Manuela - WANG, Tongjiang - VANNINATHAN, Kamalam - GAN, Weiqun - LI, YouPing.

Solar magnetized tornadoes: rotational motion in a tornado-like prominence.

In The **Astrophysical Journal Letters**, 2014, vol. 785, article no. L2, p. 1-6. (**5.602 - IF2013**. (2014 - Current Contents, SCOPUS, WOS, NASA ADS). ISSN 2041-8205. DOI: 10.1088/2041-8205/785/1/L2

ASTROPHYSICAL JOURNAL LETTERS, 785:L2 (6pp), 2014 April 10 doi:10.1088/2041-8205/785/1/L2

SOLAR MAGNETIZED TORNADOES: ROTATIONAL MOTION IN A TORNADO-LIKE PROMINENCE

YANG SU[1], PETER GÖMÖRY[1], ASTRID VERONIG[1], MANUELA TEMMER[1], TONGJIANG WANG[3,4], KAMALAM VANNINATHAN[1], WEIQUN GAN[5], AND YOUPING LI[5]

[1] IGAM-Kanzelhöhe Observatory, Institute of Physics, University of Graz, Universitätsplatz 5, A-8010 Graz, Austria; yang.su@uni-graz.at
[2] Astronomical Institute of the Slovak Academy of Sciences, SK-05960 Tatranská Lomnica, Slovakia
[3] Department of Physics, the Catholic University of America, Washington, DC 20064, USA
[4] Solar Physics Laboratory (Code 671), Heliophysics Science Division, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA
[5] Key Laboratory of Dark Matter and Space Astronomy, Purple Mountain Observatory, Chinese Academy of Sciences, Nanjing 210008, China
Received 2013 December 18; accepted 2014 February 28; published 2014 March 21

ABSTRACT

Su et al. proposed a new explanation for filament formation and eruption, where filament barbs are rotating magnetic structures driven by underlying vortices on the surface. Such structures have been noticed as tornado-like prominences when they appear above the limb. They may play a key role as the source of plasma and twist in filaments. However, no observations have successfully distinguished rotational motion of the magnetic structures in tornado-like prominences from other motions such as oscillation and counter-streaming plasma flows. Here we report evidence of rotational motions in a tornado-like prominence. The spectroscopic observations in two coronal lines were obtained from a specifically designed *Hinode*/EIS observing program. The data revealed the existence of both cold and million-degree-hot plasma in the prominence leg, supporting the so-called prominence–corona transition region. The opposite velocities at the two sides of the prominence and their persistent time evolution, together with the periodic motions evident in *SDO*/AIA dark structures, indicate a rotational motion of both cold and hot plasma with a speed of ~5 km s^{-1}.

Key words: Sun: corona – Sun: filaments, prominences – Sun: UV radiation

Online-only material: animation, color figures

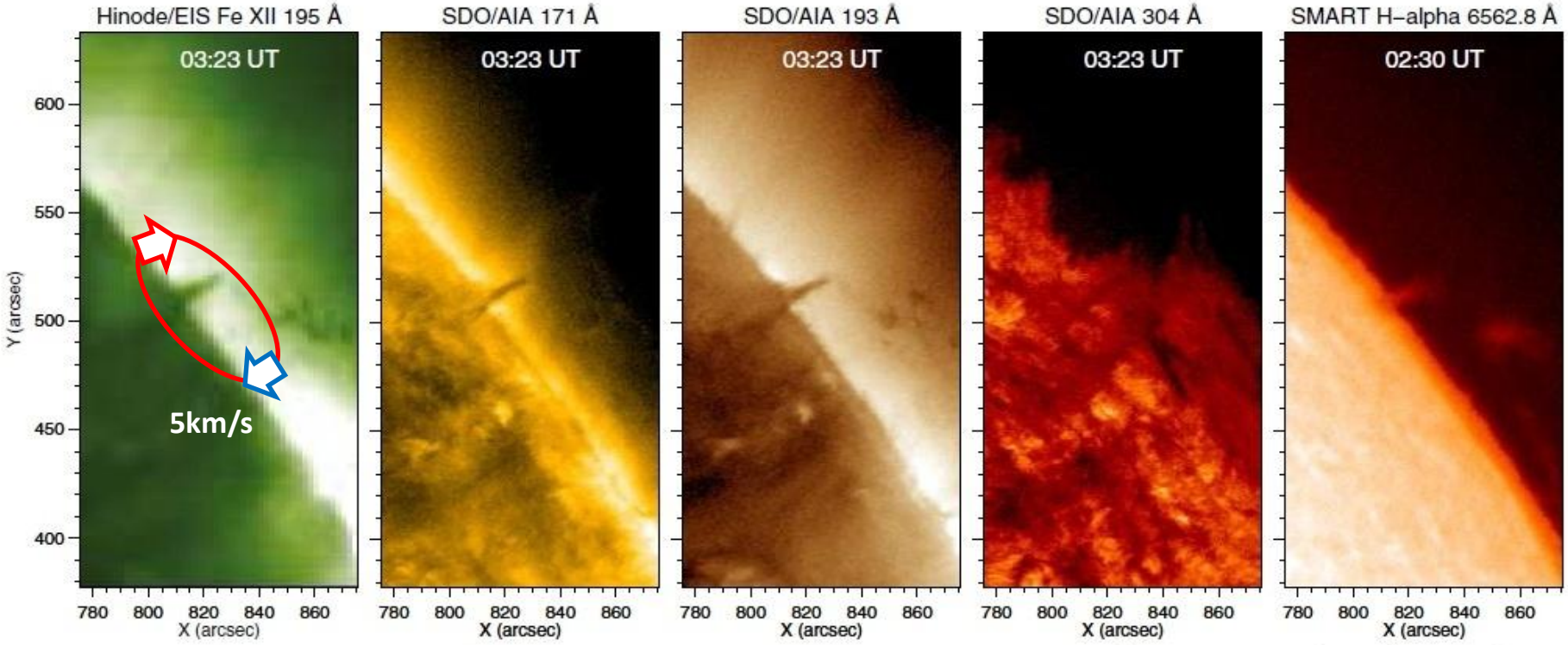
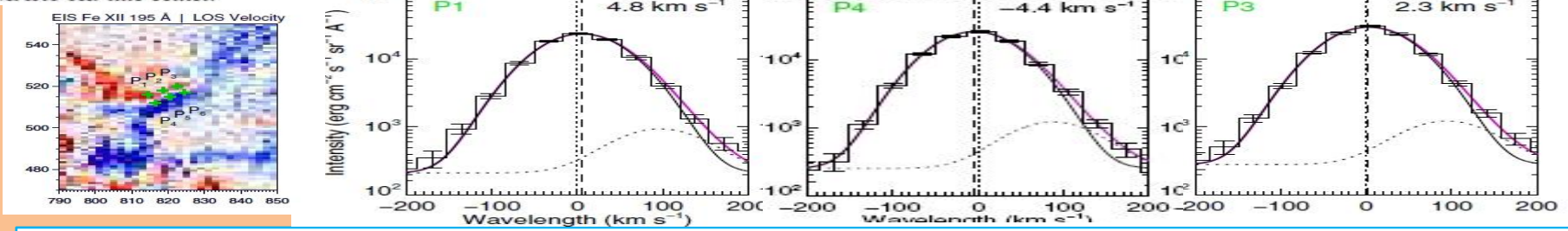
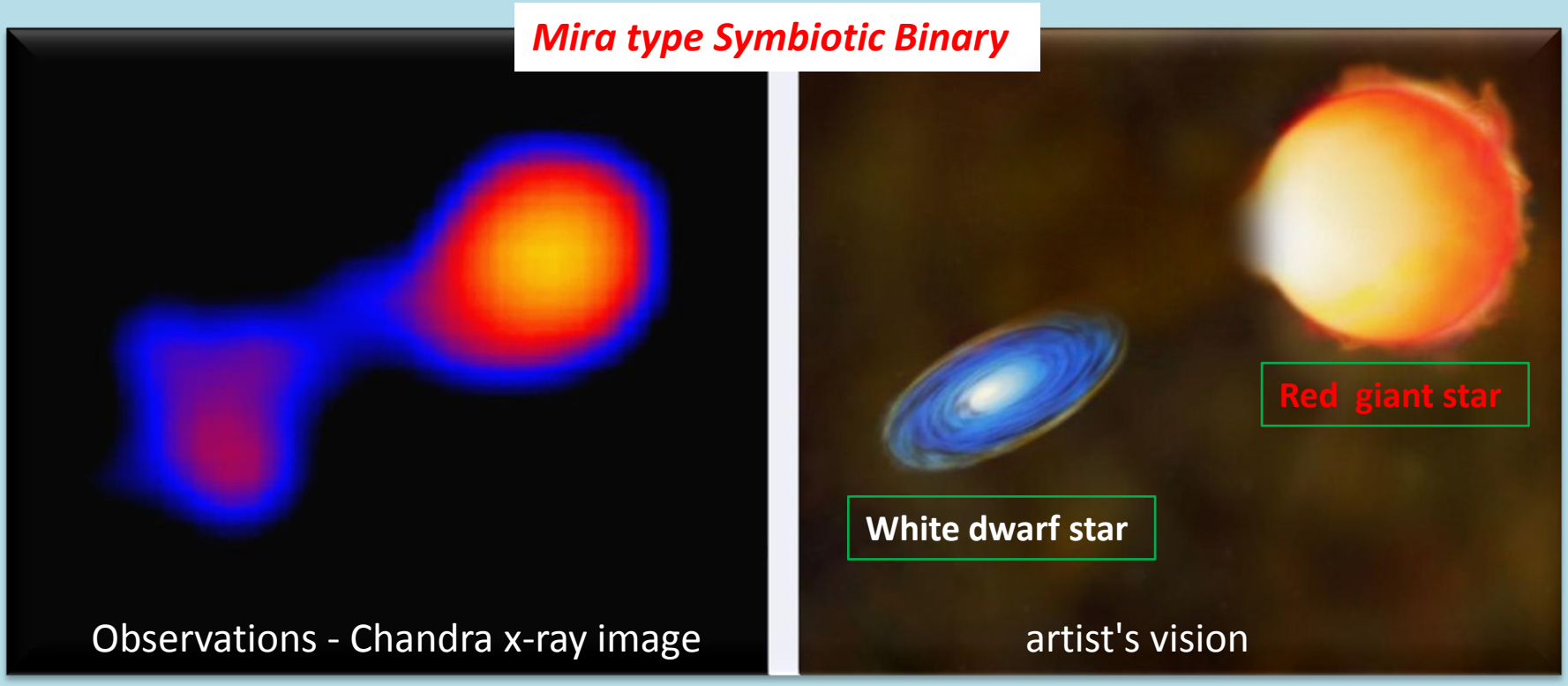


Figure 1. Tornado-like prominence observed above the west limb on 2013 September 14 by *Hinode*/EIS (Fe XII 195 Å), *SDO*/AIA (171 Å, 193 Å and 304 Å), and the SMART Hα line center.



The spectroscopic observations in two coronal lines were obtained from a specifically designed Hinode/EIS observing program. The opposite velocities at the two sides of the prominence and their persistent time evolution, together with the periodic motions evident in SDO/AIA dark structures, indicate a rotational motion of both cold and million-degree-hot plasma with a speed of ~5 km/s.

2. Mass-loss Rate by the Mira in the Symbiotic Binary V1016 Cygni from Raman Scattering



The mass-loss rate from Mira type variables **represents a key parameter** in our understanding of their evolutionary tracks.

We introduced a new method for determining the mass-loss rate from the Mira component in D-type symbiotic binaries. We use the measure of the Raman scattering on atomic Hydrogen in the wind from the red giant.

2. Mass-loss Rate by the Mira in the Symbiotic Binary V1016 Cygni from Raman Scattering

SEKERÁŠ, Matej - SKOPAL, Augustin.
Mass-loss rate by the Mira in the symbiotic binary V1016 Cygni from Raman scattering.
In **The Astrophysical Journal**, 2015, vol. 812, article no. 162, p. 1-8.
(5,993 – IF2014). (2015 – Current Contents, WOS, SCOPUS, NASA ADS). ISSN 0004-637X.

THE ASTROPHYSICAL JOURNAL, 812:162 (8pp), 2015 October 20 doi:10.1088/0004-637X/812/2/162

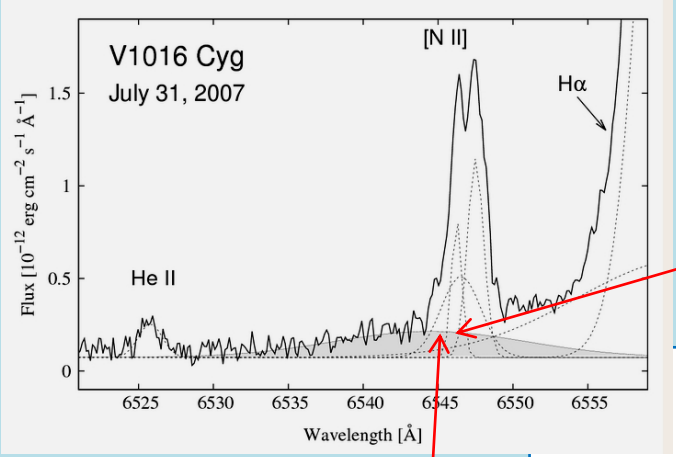
MASS-LOSS RATE BY THE MIRA IN THE SYMBIOTIC BINARY V1016 CYGNI FROM RAMAN SCATTERING

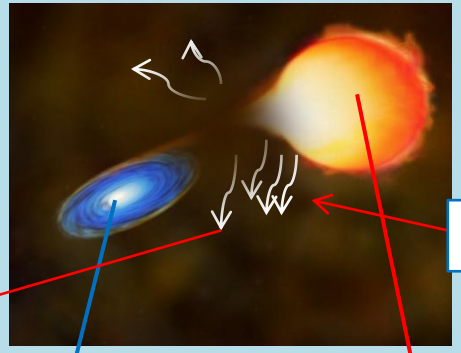
M. SEKERÁŠ AND A. SKOPAL
Astronomical Institute, Slovak Academy of Sciences, 059 60 Tatranská Lomnica, Slovakia; sekeras@ta3.sk (MS), skopal@ta3.sk (AS)
Received 2015 July 2; accepted 2015 September 18; published 2015 October 20

ABSTRACT

The mass-loss rate from Mira variables represents a key parameter in our understanding of their evolutionary tracks. We introduce a method for determining the mass-loss rate from the Mira component in D-type symbiotic binaries via the Raman scattering of atomic hydrogen in the wind from the giant. Using our method, we investigated Raman He II λ1025 $\rightarrow$ λ6545 conversion in the spectrum of the symbiotic Mira V1016 Cyg. We determined its efficiency, $\eta = 0.102, 0.148$, and the corresponding mass-loss rate, $\dot{M} = 2.0^{+0.1}_{-0.2} \times 10^{-6}$, $2.7^{+0.2}_{-0.1} \times 10^{-6}\, M_{\odot}\ \mathrm{yr}^{-1}$, using our spectra from 2006 April and 2007 July, respectively. Our values of $\dot{M}$ that we derived from Raman scattering are comparable with those obtained independently by other methods. Applying the method to other Mira–white dwarf binary systems can provide a necessary constraint in the calculation of asymptotic giant branch (AGB) evolution.

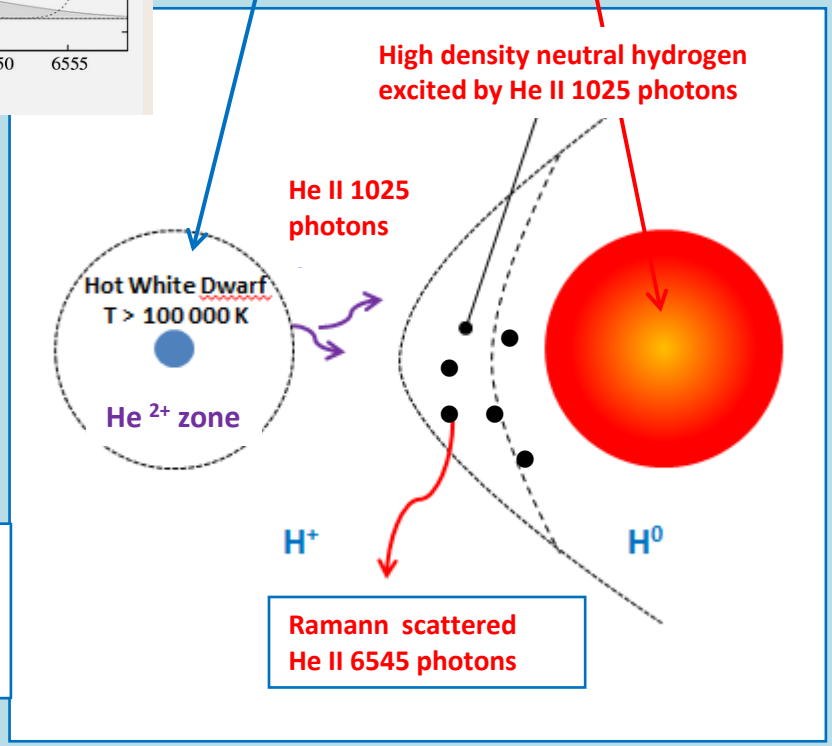
Key words: binaries: symbiotic – scattering – stars: individual (V1016 Cyg) – stars: mass-loss





Raman scattering

White dwarf star

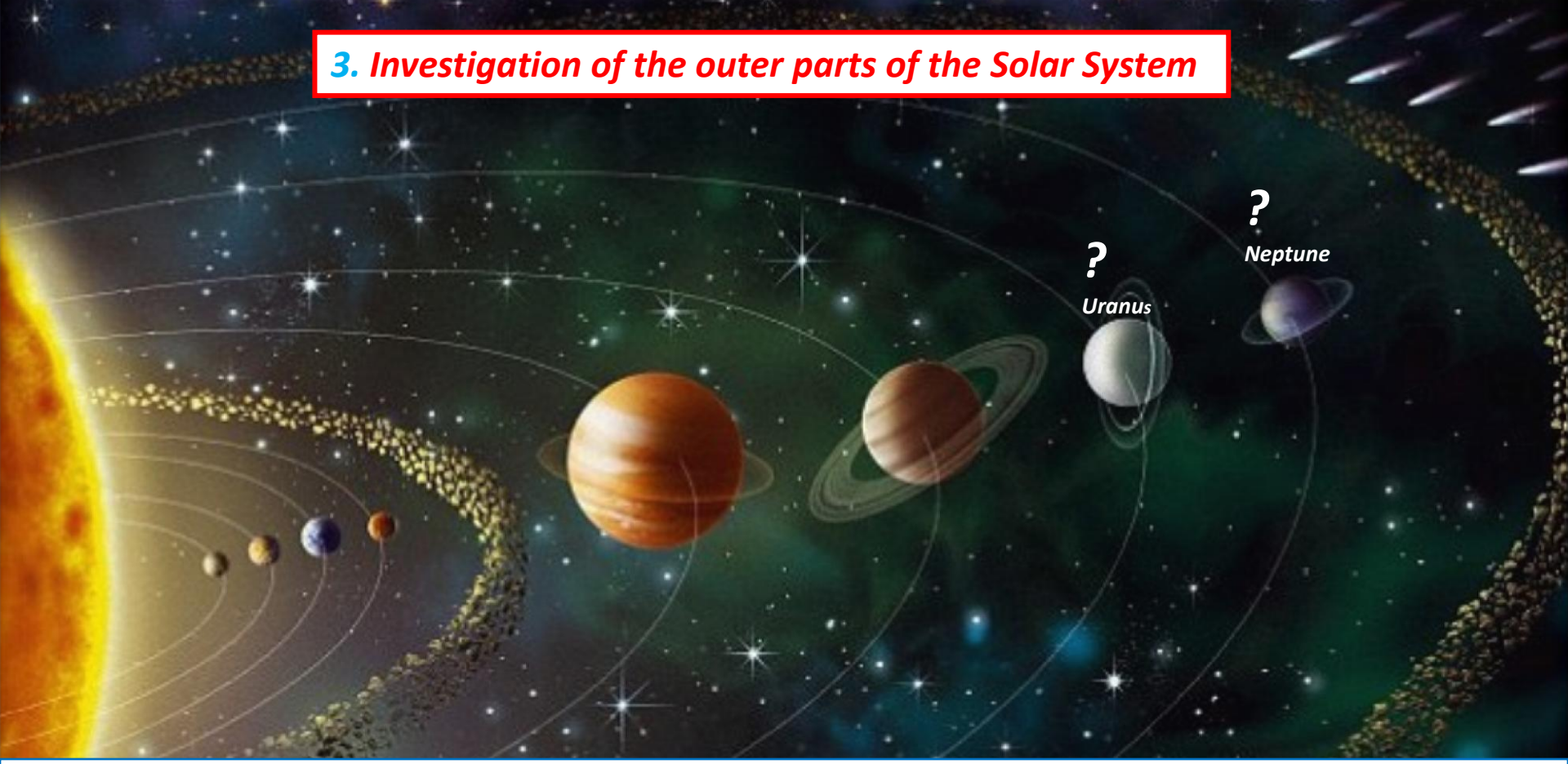


Red giant star

Raman scattered photons on neutral hydrogen are registered

Applying the method to other Mira - white dwarf binary systems, can aid us to estimate mas-loss rate in modelling evolutionary tracks of the cool giants during their late stages of evolution at the asymptotic branch of the H-R diagram.

3. Investigation of the outer parts of the Solar System



Investigation of the outer parts of the Solar System **is essential for a better understanding of the processes** which formed our planetary system. Modelling the **formation of the ice giants Uranus and Neptune has been a challenging problem** for a long time. It persists independently of whether the accretion took place at the current locations of the ice giants or closer to the Sun.

Modern (massive) simulations using a large number of theoretical bodies – points, are performed at AISAS. We simulated the accretion of Uranus and Neptune by collisions among planetary embryos in the vicinity of Jupiter and Saturn.

3. Investigation of the outer parts of the Solar System

JAKUBÍK, Marián - MORBIDELLI, Alessandro - NESLUŠAN, Luboš - BRASSER, Ramon. **The accretion of Uranus and Neptune by collisions among planetary embryos in the vicinity of Jupiter and Saturn**. In **Astronomy and Astrophysics**, 2012, vol. 540, article no. A71, p. 1-16. (**4.587 - IF2011**) (2012 - Current Contents, WOS, SCOPUS, NASA ADS). ISSN 0004-6361

A&A 540, A71 (2012)
DOI: 10.1051/0004-6361/201117687

Astronomy & Astrophysics

The accretion of Uranus and Neptune by collisions among planetary embryos in the vicinity of Jupiter and Saturn⋆

M. Jakubík[1], A. Morbidelli[2], L. Neslušan[1], and R. Brasser[2,3]

[1] Astronomical Institute, Slovak Academy of Science, 05960 Tatranská Lomnica, Slovakia
e-mail: [mjakubik;ne]@ta3.sk
[2] Département Cassiopée, University of Nice – Sophia Antipolis, CNRS, Observatoire de la Côte d'Azur, Nice, France
[3] Institute for Astronomy and Astrophysics, Academia Sinica, PO Box 23-141, Taipei 106, Taiwan
e-mail: morby@oca.eu; brasser_astro@yahoo.com

Received 12 july 2011 / Accepted 9 February 2012

ABSTRACT

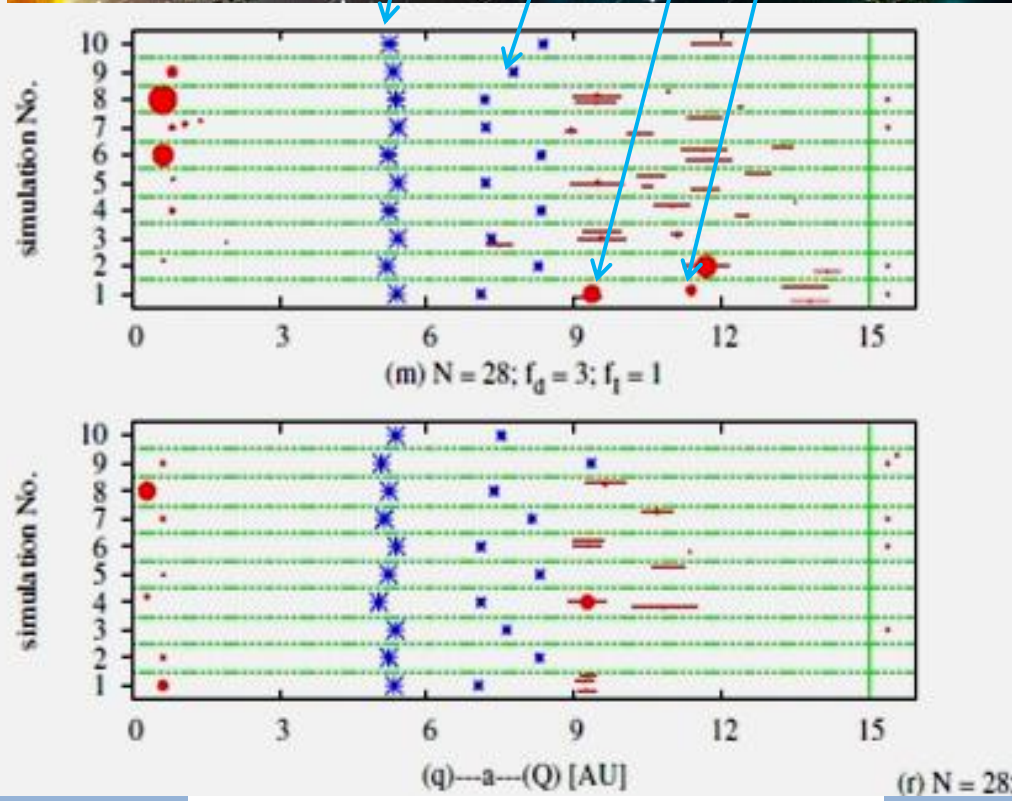
Context. Modeling the formation of the ice giants Uranus and Neptune has been a challenging problem in planetary science for a long time. Owing to gas-drag, collisional damping, and resonant shepherding, the planetary embryos repel the planetesimals from their reach and that is why they stop growing. This problem persists independently of whether the accretion took place at the current locations of the ice giants or closer to the Sun.

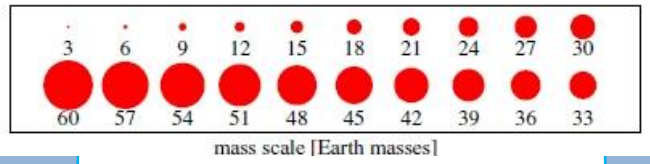
Aims. Instead of trying to push the runaway/oligarchic growth of planetary embryos up to 10–15 Earth masses, we envision the possibility that the planetesimal disk could generate a system of planetary embryos of only 1–3 Earth masses. Then we investigate whether these embryos could have collided with each other and grown enough to reach the masses of current Uranus and Neptune.

We envision the possibility that the planetesimal disk could generate a system of planetary embryos of only 1–3 Earth masses (instead of obvious 10–15 Earth masses). We investigated whether these embryos could have collided with each other and grown enough to reach the masses of current Uranus and Neptune.

Our results point to two major problems.
First: there is typically a large difference in mass between the first-(Uranus) and the second-(Neptune) most massive core formed and retained beyond Saturn.
Second: in many simulations the final planetary system has more than two objects beyond Saturn.

One of our simulations reproduced the structure of the outer Solar System successfully, however, we pointed out that models of formation of Uranus and Neptune have non-trivial problems.





Mass scale [Earth masses]

1. Research output

1. Research output

Principal types of research output of the institute: Basic research 100% International 100%

Statistics publication category: Total number = 351

ABC	Chapters in scientific monographs published abroad	2	In Springer
ADCA	Scientific papers in foreign journals registered in Current Contents Connect with IF (impacted)	133	Preferably in high IF
ADEB	Scientific papers in other foreign journals not registered in Current Contents Connect without IF (non-impacted)	24	- Central European Astrophysical Bulletin. - Memorie della Societa Astronomica Italiana - Information Bulletin on Variable Stars -The Minor Planet Bulletin .....
ADFB	Scientific papers in other domestic journals not registered in Current Contents Connect without IF (non-impacted)	21	
ADMA	Scientific papers in foreign impacted journals registered in Web of Sciences or Scopus	1	
ADMB	Scientific papers in foreign non-impacted journals registered in Web of Sciences or Scopus	5	
ADNA	Scientific papers in domestic **impacted** journals registered in Web of Sciences or Scopus	58	Contributions of the Astronomical Observatory Skalnaté Pleso
AEC	Scientific papers in foreign peer-reviewed proceedings, monographs	35	

Salary cost of one CCC publication = 21 111 EUR = Institute total salaries 2 807 791/133

Total cost of one CCC publication = 23 880 EUR = Institute running costs 3 176 007/133

(including salaries, but not investments)

Very good numbers in the European context,

but question arises

What is the quality of the 133 CCC publications?

Average monthly gross salary of AISAS scientists in 2015

= 906 EUR

IF Publ. CCC **Total 133** | **IF > 4: 53 (40%)** | **IF > 2: 82 (62%)** | **IF > 1: 112 (84%** | **IF < 1: 21 (16%)**

The Astrophysical Journal (* Letters)	IF 5.993, 6.024, 6.280, 6.733, 5.602*,	6+1*	6+1*	6+1*
Space Sci. Review	IF 5.519	1	1	1
Journal of High energy Physics	IF 5.618	1	1	1
Monthly Notic. Royal Astron. Society	IF 4.900, 5,107, 5.226, 5.521	16	17	17
Astronomy and Astrophysics	IF 4,387, 4.479, 4.587, 5.084	24	23	23
Astronomical Journal	IF 4,024, 4.965	4	4	4
		(53) 40%		
Icarus	IF 3,038, 3.385		6	6
J. Quantitative Spectr. & Radiat. Transfer	IF 3.193		1	1
Solar Physics	IF 2.776, 3,256, 3.805		3	3
Meteoritics and Planetary Science	IF 2.800, 2.827, 3,104		5	5
Public.of the Astronomical Soc. of Japan	IF 2.009, 2.066, 2.438 , 2.439		12	12
Astrophysics & Space Sciences	IF 2.263		1	1
EPL Europhysics Letters	IF 2.171		1	1
			(82) 62%	
Experimental Astronomy	IF 1.990			1
Acta Astronomica	IF 1.955	Median of astron. journals		1
Planetary and Space Science	IF 1.875, 1.630			7
Quantum Information Processing	IF 1.748			1
Astrophysics Space Sciences	IF 1.686			1
Quantum Information and Computation	IF 1.659			1
Phys. L. A:Gen. Atomic & Solid State Phys.	IF 1.632			1
J. Physics A: Mathematical & Theoretical	IF 1.564			1
Astronomy Letters	IF 1,432			1
New Astronomy	IF 1,146			3
Symmetry, Integrability & Geometry: M & A	IF 1.071, 1.299			2
Astronomische Nachrichten	IF 0.922, 1.012, 1.119, 1.399			11
				(113) 84%

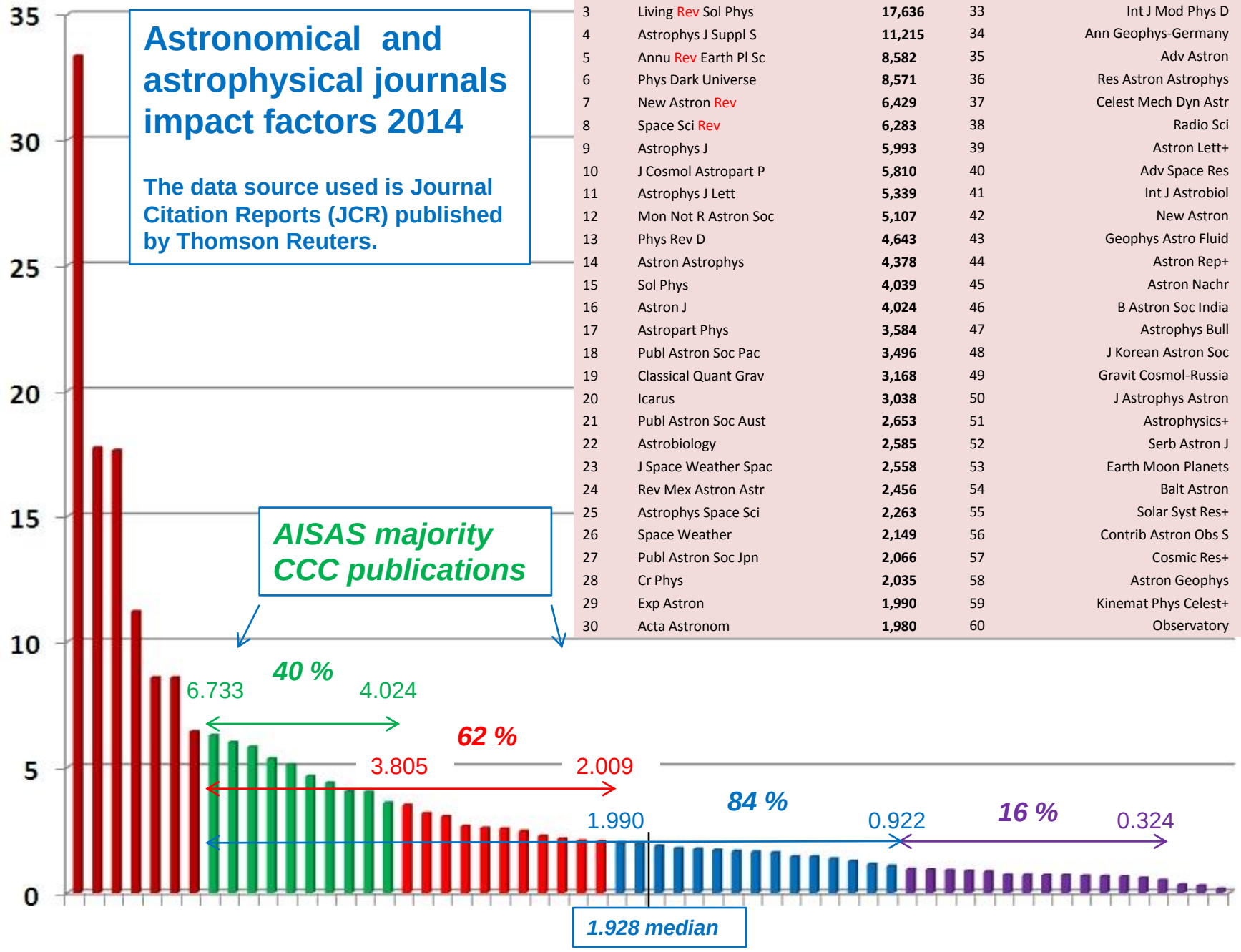
CCC publication/FTE scientist/year
(133/ 32,6850/4)
1.018

1. Research output

Astronomical and astrophysical journals impact factors 2014

The data source used is Journal Citation Reports (JCR) published by Thomson Reuters.

1	Annu Rev Astron Astr	**33,346**	31	Planet Space Sci	**1,875**
2	Astron Astrophys Rev	**17,737**	32	Gen Relat Gravit	**1,771**
3	Living Rev Sol Phys	**17,636**	33	Int J Mod Phys D	**1,741**
4	Astrophys J Suppl S	**11,215**	34	Ann Geophys-Germany	**1,709**
5	Annu Rev Earth Pl Sc	**8,582**	35	Adv Astron	**1,657**
6	Phys Dark Universe	**8,571**	36	Res Astron Astrophys	**1,640**
7	New Astron Rev	**6,429**	37	Celest Mech Dyn Astr	**1,600**
8	Space Sci Rev	**6,283**	38	Radio Sci	**1,439**
9	Astrophys J	**5,993**	39	Astron Lett+	**1,432**
10	J Cosmol Astropart P	**5,810**	40	Adv Space Res	**1,358**
11	Astrophys J Lett	**5,339**	41	Int J Astrobiol	**1,256**
12	Mon Not R Astron Soc	**5,107**	42	New Astron	**1,146**
13	Phys Rev D	**4,643**	43	Geophys Astro Fluid	**1,062**
14	Astron Astrophys	**4,378**	44	Astron Rep+	**0,943**
15	Sol Phys	**4,039**	45	Astron Nachr	**0,922**
16	Astron J	**4,024**	46	B Astron Soc India	**0,894**
17	Astropart Phys	**3,584**	47	Astrophys Bull	**0,873**
18	Publ Astron Soc Pac	**3,496**	48	J Korean Astron Soc	**0,837**
19	Classical Quant Grav	**3,168**	49	Gravit Cosmol-Russia	**0,716**
20	Icarus	**3,038**	50	J Astrophys Astron	**0,711**
21	Publ Astron Soc Aust	**2,653**	51	Astrophysics+	**0,707**
22	Astrobiology	**2,585**	52	Serb Astron J	**0,704**
23	J Space Weather Spac	**2,558**	53	Earth Moon Planets	**0,667**
24	Rev Mex Astron Astr	**2,456**	54	Balt Astron	**0,654**
25	Astrophys Space Sci	**2,263**	55	Solar Syst Res+	**0,647**
26	Space Weather	**2,149**	56	Contrib Astron Obs S	**0,591**
27	Publ Astron Soc Jpn	**2,066**	57	Cosmic Res+	**0,510**
28	Cr Phys	**2,035**	58	Astron Geophys	**0,324**
29	Exp Astron	**1,990**	59	Kinemat Phys Celest+	**0,282**
30	Acta Astronom	**1,980**	60	Observatory	**0,156**

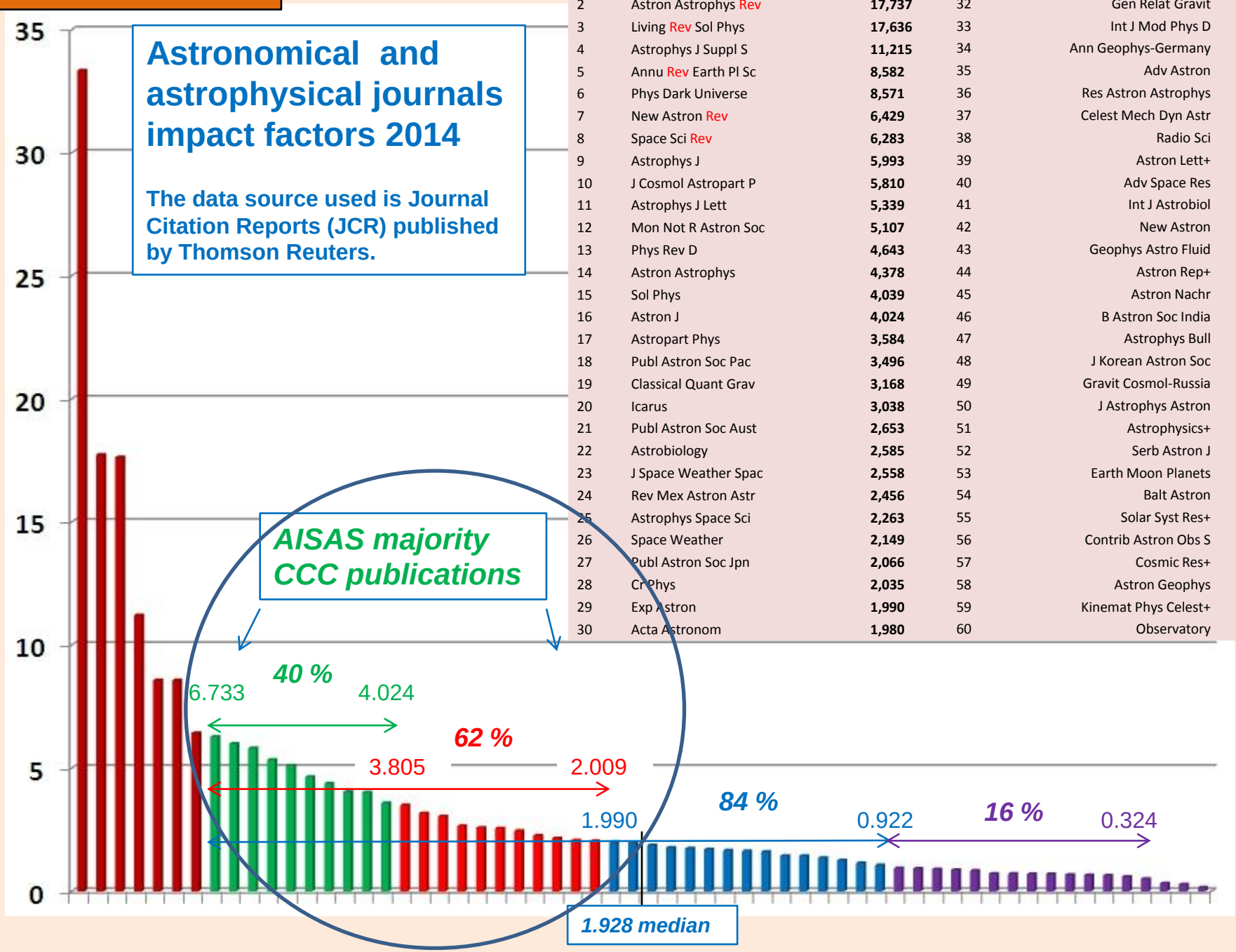


1. Research output

Astronomical and astrophysical journals impact factors 2014

The data source used is Journal Citation Reports (JCR) published by Thomson Reuters.

1	Annu Rev Astron Astr	**33,346**	31	Planet Space Sci	**1,875**
2	Astron Astrophys Rev	**17,737**	32	Gen Relat Gravit	**1,771**
3	Living Rev Sol Phys	**17,636**	33	Int J Mod Phys D	**1,741**
4	Astrophys J Suppl S	**11,215**	34	Ann Geophys-Germany	**1,709**
5	Annu Rev Earth Pl Sc	**8,582**	35	Adv Astron	**1,657**
6	Phys Dark Universe	**8,571**	36	Res Astron Astrophys	**1,640**
7	New Astron Rev	**6,429**	37	Celest Mech Dyn Astr	**1,600**
8	Space Sci Rev	**6,283**	38	Radio Sci	**1,439**
9	Astrophys J	**5,993**	39	Astron Lett+	**1,432**
10	J Cosmol Astropart P	**5,810**	40	Adv Space Res	**1,358**
11	Astrophys J Lett	**5,339**	41	Int J Astrobiol	**1,256**
12	Mon Not R Astron Soc	**5,107**	42	New Astron	**1,146**
13	Phys Rev D	**4,643**	43	Geophys Astro Fluid	**1,062**
14	Astron Astrophys	**4,378**	44	Astron Rep+	**0,943**
15	Sol Phys	**4,039**	45	Astron Nachr	**0,922**
16	Astron J	**4,024**	46	B Astron Soc India	**0,894**
17	Astropart Phys	**3,584**	47	Astrophys Bull	**0,873**
18	Publ Astron Soc Pac	**3,496**	48	J Korean Astron Soc	**0,837**
19	Classical Quant Grav	**3,168**	49	Gravit Cosmol-Russia	**0,716**
20	Icarus	**3,038**	50	J Astrophys Astron	**0,711**
21	Publ Astron Soc Aust	**2,653**	51	Astrophysics+	**0,707**
22	Astrobiology	**2,585**	52	Serb Astron J	**0,704**
23	J Space Weather Spac	**2,558**	53	Earth Moon Planets	**0,667**
24	Rev Mex Astron Astr	**2,456**	54	Balt Astron	**0,654**
25	Astrophys Space Sci	**2,263**	55	Solar Syst Res+	**0,647**
26	Space Weather	**2,149**	56	Contrib Astron Obs S	**0,591**
27	Publ Astron Soc Jpn	**2,066**	57	Cosmic Res+	**0,510**
28	Cr Phys	**2,035**	58	Astron Geophys	**0,324**
29	Exp Astron	**1,990**	59	Kinemat Phys Celest+	**0,282**
30	Acta Astronom	**1,980**	60	Observatory	**0,156**



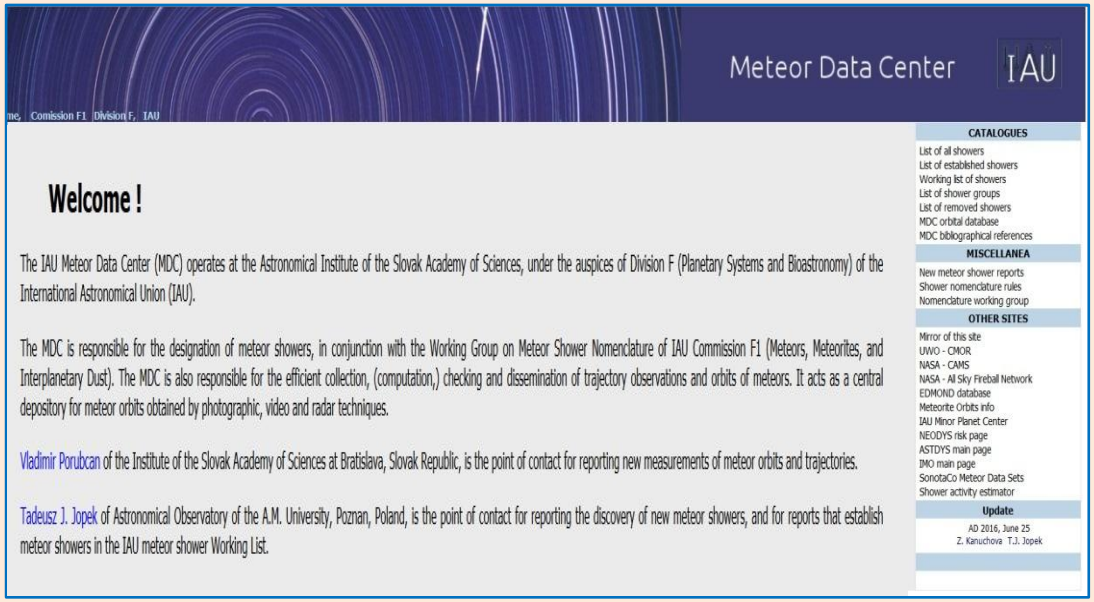
1. Research output

Other scientific outputs specifically important for the institute

AISAS longterm coordinates for IAU the IAU MDC database of precise meteor orbits

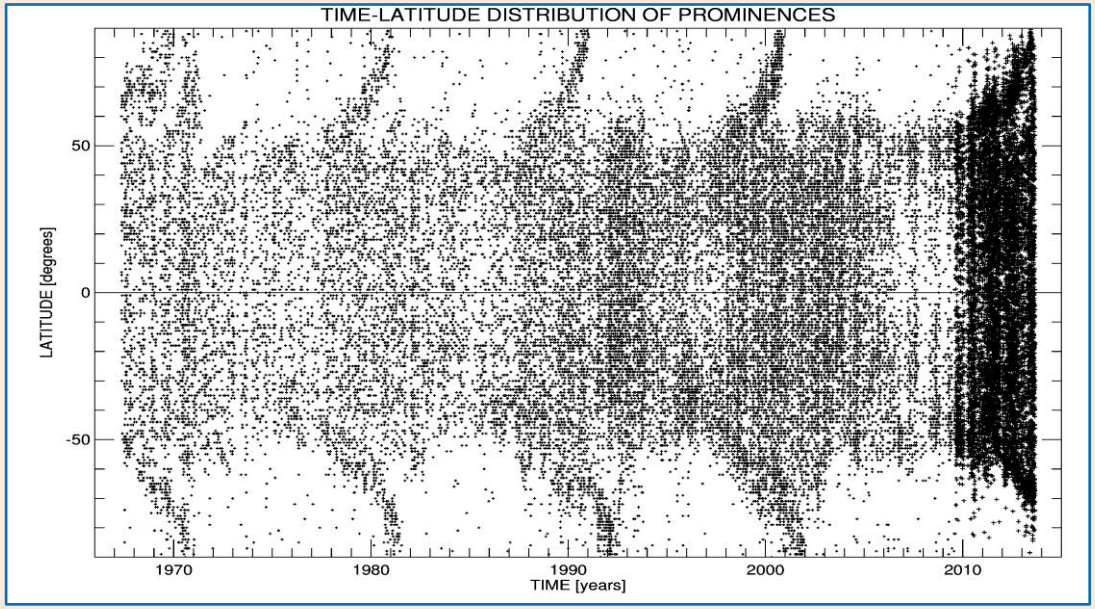
In the assesment period it was complemented by the database of meteor showers. This part of the database is also handled by AAS (in collaboration with the University of Poznan, Poland).

http://www.ta3.sk/IAUC22DB/MDC2007/



AISAS provides a long term "Catalogue of H-alpha prominences" made from observations performed at the Lomnicky Peak Observatory and the Kanzelhöhe Observatory, Austria.

https://www.astro.sk/~choc/open/lso_kso_h_alpha_promimence_catalogue/lso_kso_h_alpha_promimence_catalogue.html



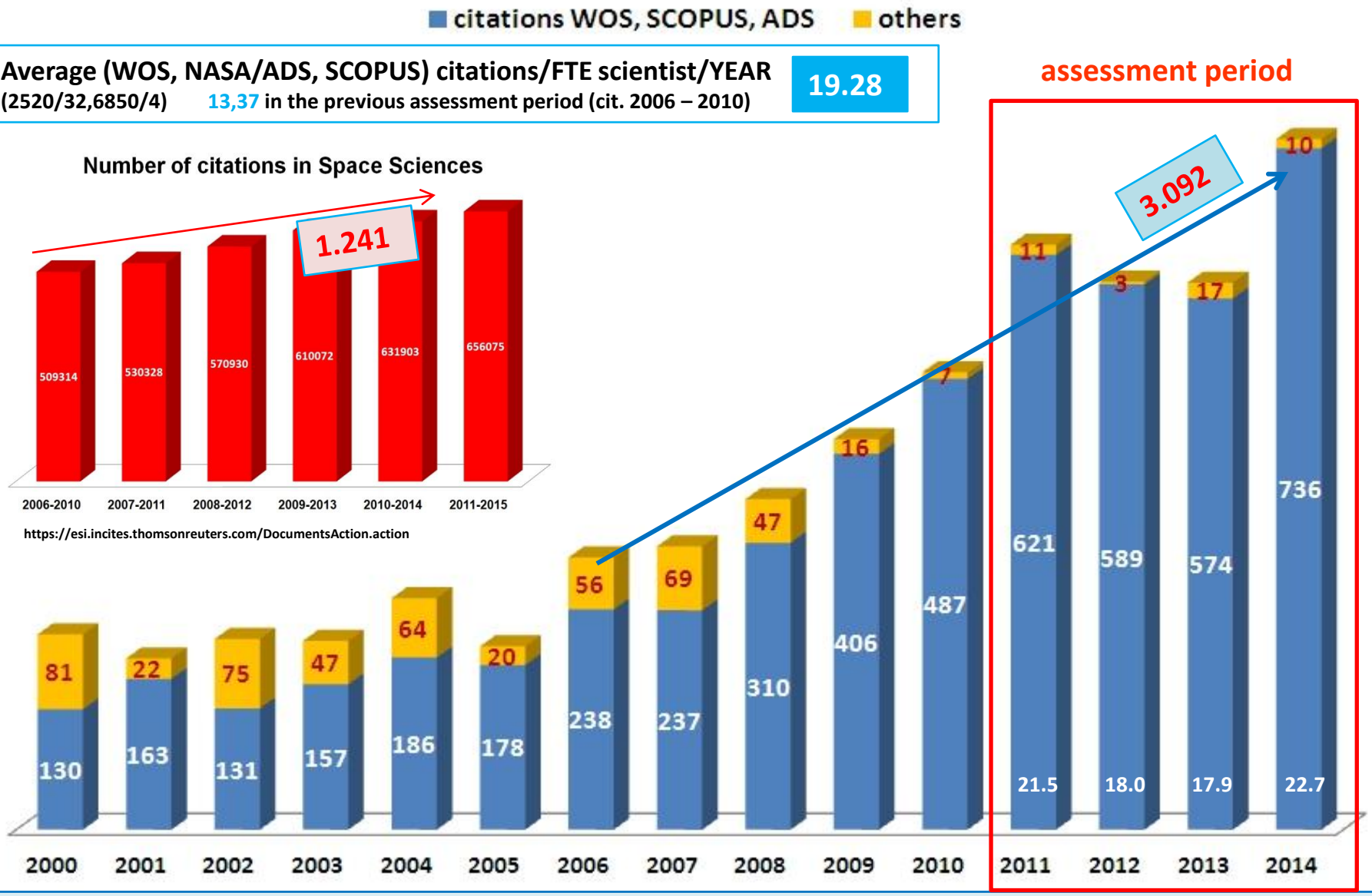
2. Responses to the research outputs (citations, etc.)

2. Responses to the research outputs (citations, etc.)

Citations (WOS, NASA/ADS, SCOPUS) **2520** 2 016 in the previous assessment period (cit. 2006 – 2010)

A majority of citations in WOS Core Collection **2167** 1 659 in the previous assessment period (cit. 2006 – 2010)

Average (WOS, NASA/ADS, SCOPUS) citations/FTE scientist/YEAR **19.28**
(2520/32,6850/4) 13,37 in the previous assessment period (cit. 2006 – 2010)



2. Responses to the research outputs (citations, etc.)

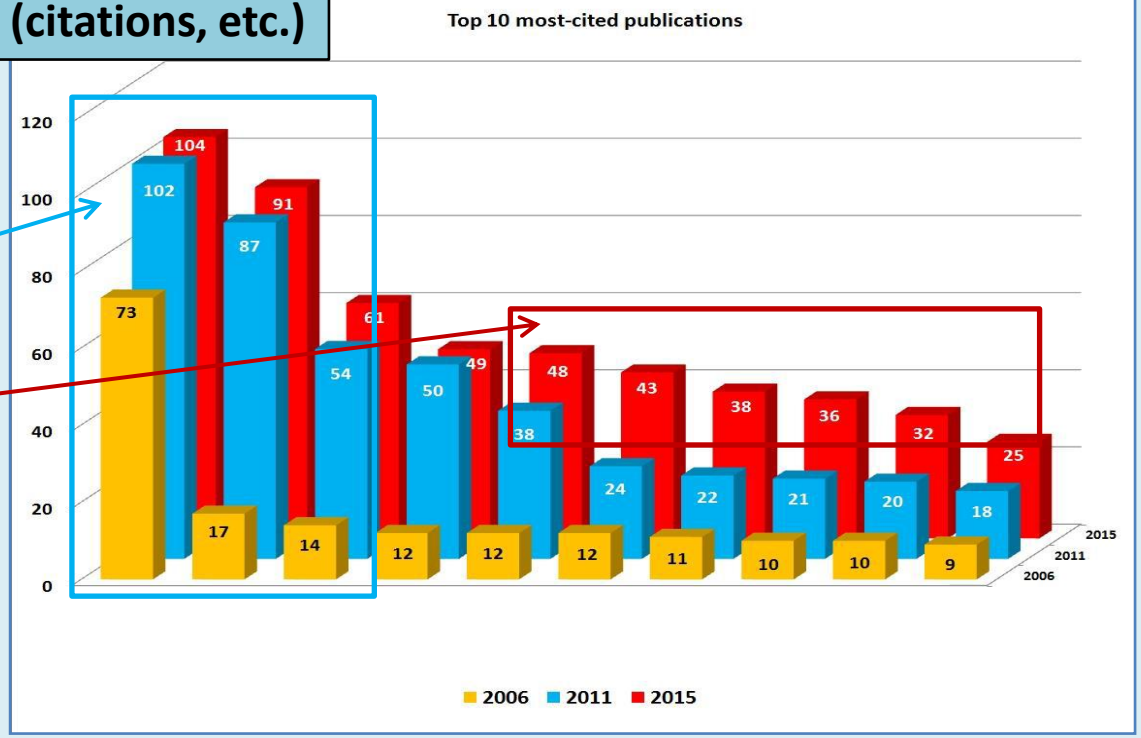
Trend: *The 10 most-cited publications*

Very positive trends in both:

higher number of citations of the three most cited publications

An enhanced and better distributed sample of remaining most cited publications.

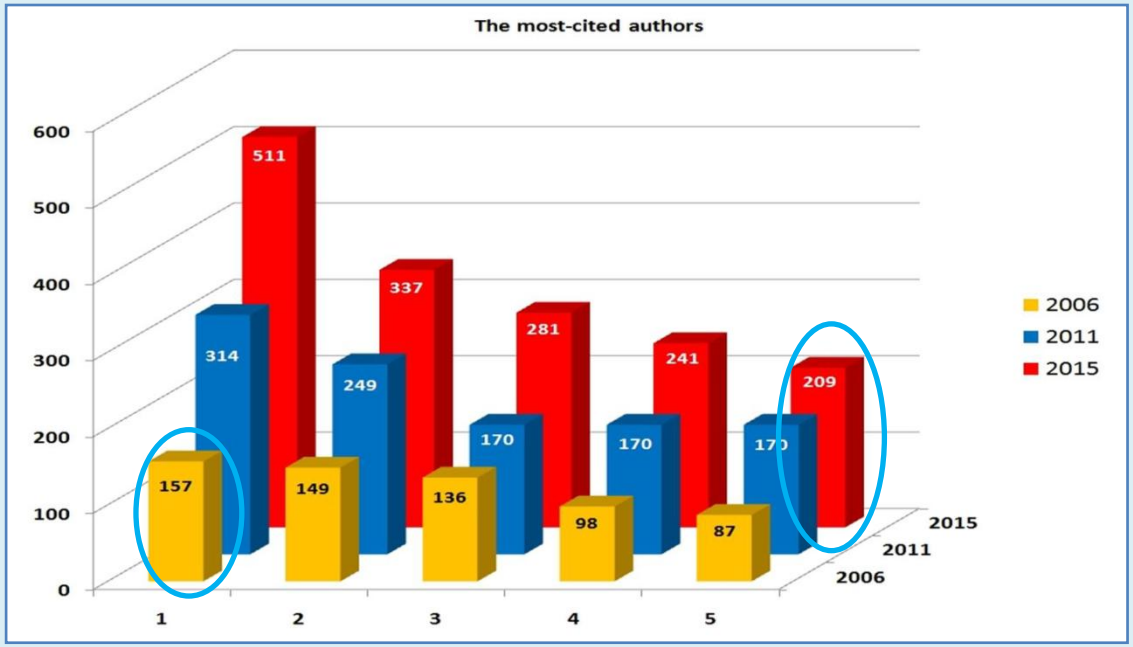
While there was only one publication in 2006 cited more than 20 times, now even the last one of the ten is cited 25 times.



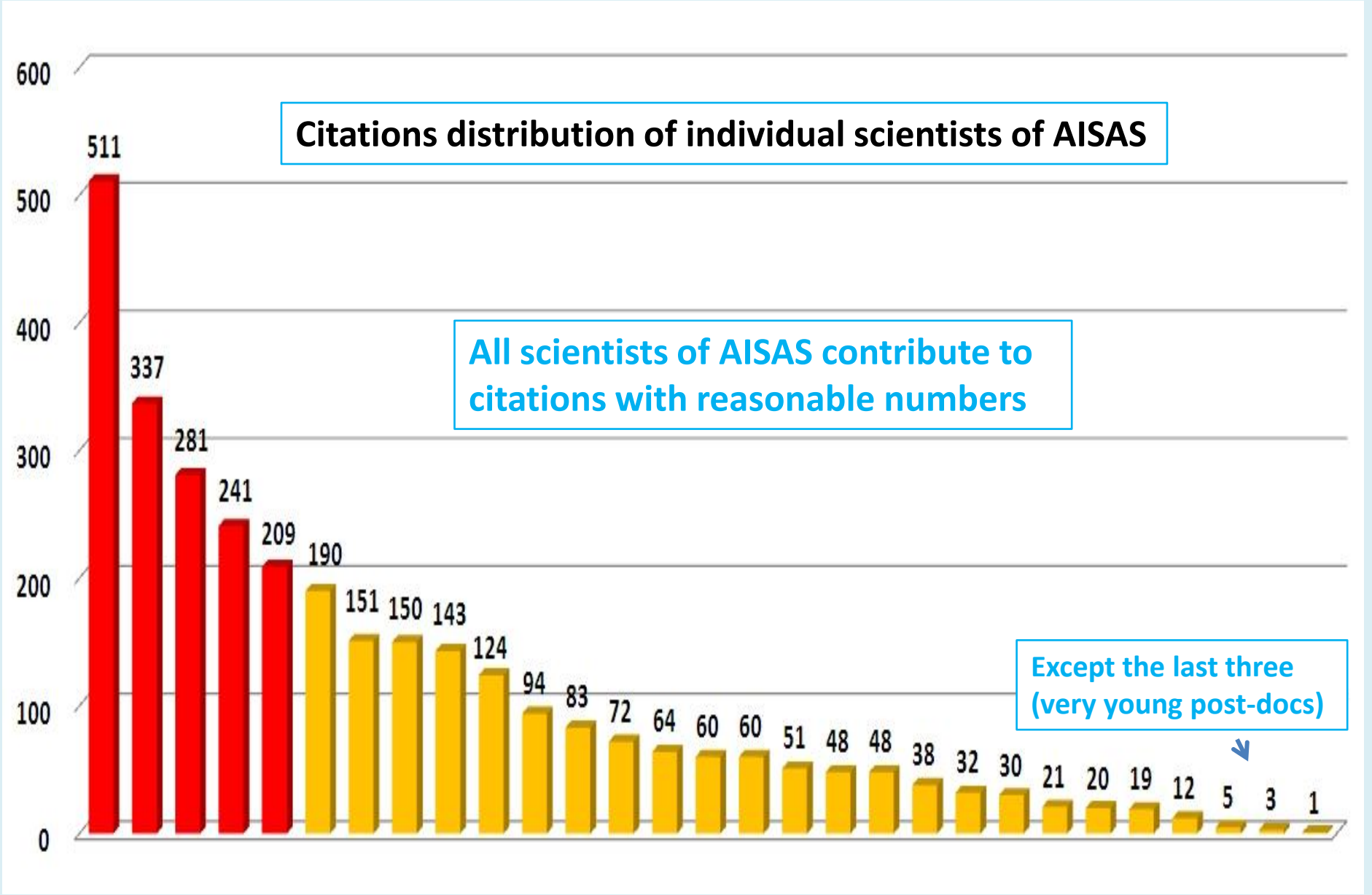
Trend: *The most-cited authors of AISAS*

A sharp increase of citations of the most-cited authors of AISAS.

The fifth most-cited author (209) reached more citations comparing to the first one (157) in the accreditation in 2006.



2. Responses to the research outputs (citations, etc.)



3. Research status of the Institute in both international and national contexts

3. Research status of the Institute in both international and national contexts

A) International/European position of the Institute

There are in the Questionnaire many indicators to evaluate the International/European position of the institute

Namely:

- **the most important research activities**
- **international conferences (co)organised by the institute**
- **edited proceedings from international conferences**
- **international journals published by the institute**
- **International projects**
- **invited presentations at international conferences**
- **members of SOC, LOC**
- **Membership of Editorial boards**
- **Memberships in scientific committees and boards**
- **Participation in international conferences**
- **Refereeing of articles, evaluation of international grants**

I will speak about them soon, but almost all of them significantly depends on:

THE NUMBER OF PEOPLE WHO WORKED
FOR A LONGER TIME AT SCIENTIFIC INSTITUTIONS ABROAD
(and Thank God returned)

and on

WHERE THEY WERE, (concerning the quality of the host institution)

LIST OF MAJOR LONG-TERM STAYS ABROAD OF THE PRESENT STAFF OF THE INSTITUTE

45 years in total spent the present staff in the following countries: UK, USA, Australia, Austria, The Netherlands, Germany, Italy, Japan, Libya, France, Spain, Canada, Czech Republic, Belgium.

Younger scientists in the table are highlighted by ◯

Many more short-term (1-3 week) stays abroad were/are realised regularly by people every year.

Name	Age	Institution	Town	Country	Duration
Budaj	50	University College London	London	UK	1 year
		Pennsylvania State University	State College	USA	3 years
		University of Arizona	Tucson	USA	1 year
		Australia National University	Canberra	Australia	2 years
Gömöry	37	University Graz	Graz	Austria	2 years
		Utrecht University	Utrecht	The Netherlands	10 months
		AIP Potsdam	Potsdam	Germany	6 months
Chochol	69	Capodimonte Astron. Obs.	Napoli	Italy	11 months
		Tohoku University	Sendai	Japan	6 months
		Garyounis University	Benghazi	Libya	2.5 years
Jakubík	38	Universite de Franche-Comte	Besancon	France	4 months
Kaňuchová	36	INAF Catania Astrophysical Observatory	Catania	Italy	4 years
		L'Observatoire de Paris	Meudon	France	6 months
Koza	46	Instit. de Atrofís. de Canarias	La Laguna	Spain	3 months
		Astron. Inst., Utrecht Uni. (Marie Curie)	Utrecht	The Netherlands	2 years
Kučera	61	Kiepenheuer Institut für Sonnenphysik	Freiburg	Germany	2years
Neslušan	56	Queen Mary Coll. Uni. London	London	UK	1 year
Pribulla	45	University of Toronto	Toronto	Canada	2 years
		Astrophysikalisches Inst. Jena	Jena	Germany	2 years
		Capodimonte Astron. Obs	Napoli	Italy	5 months

Name	Age	Institution	Town	Country	Duration
Rybák	56	Kiepenheuer Institut für Sonnenphysik	Freiburg	Germany	2 months
Schwartz	42	Astron. Insti. Acad. Sci. Czech Rep.	Ondřejov	Czech Republic	7 years
		Max-Planck-Inst.ut für Sonnensystem Forschung	Katlenburg-Lindau	Germany	3 months
Saniga	57	University of Tokyo	Tokyo	Japan	3 months
		Iowa State University	Ames	USA	3 months
		Inst. of Cosmic Physics, CNR	Palermo	Italy	4 months
		Elizabethtown College	Elizabethtown	USA	3 months
		ULB/VUB	Brussels	Belgium	1 year
		FEMTO-ST, CNRS	Besancon	France	6 months
		ZiF, Bielefeld University	Bielefeld	Germany	3 months
		Vienna Univ. of Technology	Vienna	Austria	1.33 year
		UTBM Belfort	Belfort	France	4 months
Skopal	59	Capodimonte Astron. Obs.	Napoli	Italy	5 months
		Astr. Research Institute, John Moores Univ.	Liverpool	UK	1.4 year
		Tohoku University	Sendai	Japan	1 month
		Astr. Inst.Erlangen-Nürnberg Univ. (Humboldt-Stiftung)	Nürnberg	Germany	2.1years
Vaňko	39	Astrophysikalisches Inst. Jena	Jena	Germany	2 years
		Tautenburg Observatory	Tautenburg	Germany	3 months

3. Research status of the institute in both international and national contexts

A) International/European position of the Institute - Most important research activities

AISAS is a member of the EST project (European Solar 4m Telescope) introduced as The pan-European infrastructure in the ESFRI ROAD MAP
Approved in 2015, and at the beginning of 2016 (among new infrastructures) included to the Road Map
This guarantee to AISAS access to the top solar physics infrastructure in future

ESFRI PROJECTS

PHYSICAL SCIENCES & ENGINEERING

NAME	FULL NAME	ROADMAP ENTRY (YEAR)	OPERATION (YEAR)	CONSTRUCTION COSTS (M€)	OPERATIONAL ANNUAL BUDGET (M€/YEAR)
CTA	Cherenkov Telescope Array	2008	2023*	297	20
EST	European Solar Telescope	2016	2026*	200	9
KM3NeT 2.0	KM3 Neutrino Telescope 2.0: Astroparticle & Oscillations Research with Cosmics in the Abyss	2016	2020*	92	3

Remark: Participation in the ESFRI EST project already generated a new HORIZON 2020 project "PRO-EST" approved this year - 2016.

Costs 200 Millions €
Operation 9 Millions €/year

3. Research status of the institute in both international and national contexts

A) International/European position of the Institute - Most important research activities

AISAS is the only Institute in Europe running ground-based solar coronal observations and one of the leading institutes in solar corona research

AISAS coordinates the world wide IAU Meteor Data Centre

In addition, AISAS :

- is a founding member of the "Consortium EAST – European Association for Solar Telescopes"
- is an associate member of ASTRONET
- is a coordinator of a multi-site observing campaign Dwarf
- participated in major international scientific Solar eclipses expeditions
- extended examined scientific topics to experimental laboratory astrophysics.
  Examination of surfaces asteroids and comets

AISAS organized important international events

a) Workshop "Observing techniques, instrumentation and science for metre-class telescopes",
b) International School "2nd SOLARNET School: "Ground- and space- based solar instruments",
c) International workshop "2nd SOLARNET Workshop: "Methods in high resolution and synoptic solar physics",
d) Conference "Light Pollution: Theory, Modelling, and Measurements"
e) Meeting "2nd SPRING (Solar Physics Research Integrated Network Group)"

(and 9 other international ones of "regional importance")

Edited proceedings from an international scientific conference: T. Pribulla, R. Komžík: "Observing techniques, instrumentation, and science for metre-class telescopes", proceedings of the workshop held on September 23-26, 2013 at Tatranská Lomnica, Slovakia, (in Contributions of the Astronomical Observatory Skalnaté Pleso, vol. 43, Number 3, 384 pages)

3. Research status of the institute in both international and national contexts

A) International/European position of the Institute - Position of individual researchers

a) Invited presentations at international conferences 8

b) Members in SOC/LOC at international conferences 16/19

c) Membership of international Editorial boards 10

- Astronomy and Astrophysics
- Earth, Moon, Planets
- Journal of Astrophysics
- American Journal of Space Science
- Central European Astrophysical Bulletin
- Astronomical and Astrophysical Transactions
- Journal of Solar Energy
- Frontier Perspectives
- ISRN Geometry
- Symmetry: Culture and Science

d) Membership of 26 scientists of AISAS in the IAU - International Astronomical Union

d) International awards: T. Pribulla
Award of: "Canadian Space Agency", Given by: Gilles Leclerc, Director General Space Exploration
Description: Award for outstanding contribution and scientific results to cosmic mission "Microvariability and Oscillation of Stars"

made 194 visits lasting in total 1853 days in Europe, Australia, USA, Indonesia, Africa, Asia and South America
hosted 94 scientists for 2349 days from 16 countries (USA, Europe, Japan, Africa).

attendance- 108 scientific events in Europe Asia, Africa, and USA
Presentation- 274 contributions to scientific conferences, meetings, schools ...
refereeing- 172 articles, evaluation - 47 grants and projects

3. Research status of the institute in both international and national contexts

A) International/European position of the Institute - Position of individual researchers

g) Selected memberships in international scientific committees and boards 24

- IAU - Vice-president of IAU Commission n. 42 Close Binary stars
- IAU - board Meteor Shower Nomenclature of IAU Commission 22
- IAU - board of the IAU Commission n. 42 Close Binary stars
- IAU - board of WG „CP and Related Stars“
- IAU - board WG Solar Eclipses
- The Royal Astronomical Society
- American Astronomical Society
- American Geophysical Union
- American Mathematical Society / Mathematical Reviews
- American Physical Society/UniPHY
- Optical Society of America
- Consortium EAST- European Association for Solar Telescopes
- Steering Committee - COSMO Project (NSF, NCAR, HAO Boulder, Uni. of Hawaii, Uni. of Michigan)
- European Astronomical Society
- representative in ASTRONET
- European Mathematical Society / Zentralblatt MATH
- European Science Foundation (Pool of Reviewers, by invitation)
- International Symmetry Association
- International Solar Energy Society
- Board of International Olympiad for Astronomy and Astrophysics
- Management committee COST Action TD 1308
- Česká astronomická společnost

3. Research status of the institute in both international and national contexts

A) International/European position of the Institute - Journal published by the institute

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 generally 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:

[1] by WOS: covered all individual articles published since 2007 (and a significant number of previous papers).

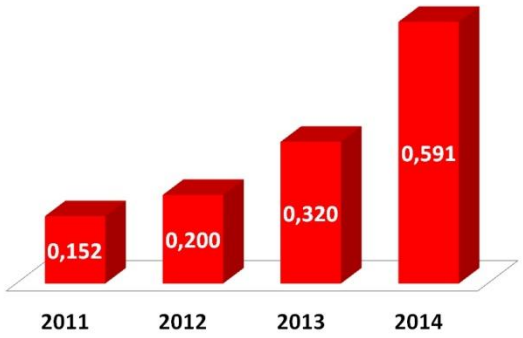
In the assessment period the impact factor was as follows:

2011	**IF 0,152**
2012	**IF 0,200**
2013	**IF 0,312**
2014	**IF 0,591**

[2] by SCOPUS: indexed since 2008

[3] by ISI

[4] by NASA ADS



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

3. Research status of the institute in both international and national contexts

B) National position of the Institute

AISAS is a leading organization in Slovakia concerning science and organizational tasks in astronomy and astrophysics

Scientists of AISAS are members of important governmental bodies including those at Slovak Academy of Sciences, play a crucial role in editing and publishing national journals and act in national committees of international unions and in the Slovak Astronomical Society.

National journals edited by the AISAS: Meteorické správy (Meteor News)
Journal fully edited by AISAS. Scientific articles in Slovak language are supplemented by extended English abstracts.

Invited presentations at national conferences 7
Members of SOC/LOC at national conferences 7/9

Eighteen members and the president of the Slovak Astronomical Society from AISAS.
Six members and the president of the Slovak National Committee of IAU from AISAS

Evaluation of 12 national grants and projects

Slovak Academy of Sciences award "Development of infrastructure" was given to AISAS members

Medal for two "Top science teams at the Slovak Academy of Sciences" was given to AISAS members

Awards "Outstanding scientists at 60-th anniversary of Slovak Academy of Sciences" was given to two AISAS members

Numerous memberships and functions in national boards and commissions (SAS, VEGA, APVV SAIA, SANET, most of them elected ....)

4. Project structure, research grants and other funding resources

4. Project structure, research grants and other funding resources

A) International

RP EU and COST projects	7
Other major international projects	8
International projects	8
International projects without finances	3

International projects in total 26

RP EU and COST projects (7)

SOLARNET- High-Resolution Solar Physics Network.
7 RP/ FP7-INFRA-312495

Dynamics and magnetic field topology of small-scale loops.
7 RP SOLARNET Trans-nat. access programe: VTT - Ref. nr.: 13-05

Topology and physical parameter of the magnetic fields in solar filaments.
7 RP SOLARNET Trans-nat. access programe: VTT - Ref. nr.: 14-08

Coordinated three-site observations of quiescent prominencess.
7 RP SOLARNET Trans-nat. access programe: Ref. nr.: 14-07

Topology and physical parameter of the magnetic fields in solar filaments.
7 RP SOLARNET Trans-nat. access programe: GREGOR - Ref. nr.: 15-07

Polarization as a tool to study the Solar System and beyond.
MPNS COST Action MP1104

Origins and evolution of life on Earth and in the Universe.
COST Action TD 1308

4. Project structure, research grants and other funding resources

A) International

Other major international projects (8)

Multiwavelength modeling the spectral energy distribution of the supersoft X-ray sources
Alexander von Humboldt Foundation SLA/1039115

Mapping the fireball stage of the Nova Del 2013 (V339 Del) by the method of multiwavelength modelling its SED
Alexander von Humboldt Foundation SLA/1039115

Exploring the accretion process in the symbiotic system CH Cygni during its transition from quiescence to the present (2014-15) active phase
Alexander von Humboldt Foundation SLA/1039115

Investigation of emerging magnetic flux in the quiet photosphere of the Sun
DFG - Germany BA 1875/7

Understanding the evolution of the very young stars -- multiple data sets solution of the young eclipsing binary TY CrA
DFG - Germany AM 158/3-1 12 01/2012-12/2012

Two suns in the sky: search for circumbinary planets with the TEST telescope
DFG/ DFGHA 3279/9-1

Multifaceted observations of the solar corona during the 13 November 2012 total eclipse in Australia
National Geographic Society NGS-3139-12

Total Solar Eclipse in Gabon at Sunspot-Cycle maximum
National Geographic Society NGS-9312-13 3 10/2013-12/2013

4. Project structure, research grants and other funding resources

A) International

International projects (8)

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

MAD SK-CZ

Studying the nature of outbursts of symbiotic stars

MAD SK-BG-0015-10

Plasma diagnostics of EIT waves and flares on the Sun

MVD APVV SK-AT-0003-12 SK

Finite Geometries Behind the Black–Hole–Qubit Correspondence

MFO-RiP-2013-LPS

Study of stellar explosions in interacting binaries

MAD SK-UA n:1/2014

The magnetic vector field in solar filaments

MAD-DAAD n:DAAD 57065721

The Dwarf project: Eclipsing binaries – precise clocks to discover exoplanets

MAD SK-UA n: 2/2014

The study of interplanetary matter in the Earth's vicinity

MAD SAV-AV ČR 15-17

4. Project structure, research grants and other funding resources

A) International

International projects without finances (3)

Observing Coronal Eruptions and Spectra at the 2015 Arctic Solar Eclipse
Bilateral
Nat.Geographic's Committee on Research and Exploration, USA 9616-14

Finite-Geometrical Aspects of Quantum Theory
Bilateral
FWF-M1564-N27

Exploring the Geometry of Generalized Pauli Groups
Bilateral
RECH-MOB15-000007

4. Project structure, research grants and other funding resources

B) National

National project are described in detail in Questionnaire, here we show only statistics of them

Projects supported by EU Structural Funds 3
"Center of space research: Influences of the space weather"
"Center of space research: Influences of the space weather – the second phase"
"Center of space research – building of technical infrastructure"

Projects supported by the Slovak Research and Development Agency (APVV) 4 (2 "C", 2 "I")
Projects supported by the Scientific Grant Agency of the Slovak Academy of Sciences and the Ministry of Education (VEGA) 9

National projects in total 16

Projects funding resources

Resources gained by international and national projects (except of Structural funds) 802 213 €

Resources gained by Structural funds projects 4 834 139 €
(Equivalent of roughly 100 years of "regular" institutional investments)

Total funding resources from projects in 2012-2015 **5 636 361 €**

5. PhD studies and educational activities

5. PhD studies and educational activities

Accredited programmes of doctoral studies

Title of study programme	Title of study field (SF)	Number (SF)	University	Duration
Astronomy and astrophysics	astronomy	4.1.7	Comenius University, Bratislava	Unlimited
	astrophysics	4.1.8		

Summary table on doctoral studies

The number of PhD. students of astronomy and astrophysics at AISAS (and at universities) fully covers the needs of Slovakia concerning a new generation of astronomers and astrophysicists in praxis

PhD study	31.12.2012			31.12.2013			31.12.2014			31.12.2015		
Number of potential PhD supervisors	17			16			17			17		
PhD students	number	defended thesis	students quitted	number	defended thesis	students quitted	number	defended thesis	students quitted	number	defended thesis	students quitted
Internal	6,0	1,0	0,0	4,0	2,0	0,0	5,0	0,0	0,0	4,0	1,0	0,0
External	1,0	0,0	0,0	0,0	1,0	0,0	0,0	0,0	0,0	1,0	0,0	0,0
Other supervised by the research employees of the institute	2,0	0,0	0,0	2,0	1,0	0,0	2,0	0,0	0,0	1,0	1,0	0,0

Teaching	2012	2013	2014	2015	Total
Lectures (hours/year)[2]	129	106	83	317	635
Practicum courses (hours/year)[2]	82	30	103	75	290
Supervised bachelor theses (in total)	1	1	1	0	
Supervised diploma theses (in total)	2	2	2	2	
Supervised PhD theses (in total)	7	5	5	6	
Members in PhD committees (in total)	10	10	10	10	
Members in DrSc. committees (in total)	3	3	3	3	
Members in university/faculty councils (in total)	0	0	0	0	
Members in habilitation/inauguration committees (in total)	0	1	1	0	

5. PhD studies and educational activities

AISAS cooperate with the following universities:

Faculty of mathematics, physics and informatics, Comenius University, Bratislava, Slovakia
Faculty of natural sciences, UPJŠ, Košice , Slovakia
Charles University, Faculty of mathematics and physics, Prague, Czech republic
Université de Franche-Comté, Besançon, France
Technische Universität Wien, Wien, Austria
Budapest University of Technology and Economics, Budapest, Hungary,
Uniwersytet Marii Curie-Sklodowskiej, Lublin, Poland

Visits of PhD students at institutions abroad:

Visits in total 12

2015: J. Kavka, Czech Republic; J. Kavka, Spain; R. Vašková, Spain; Z. Garai, Italy
2014: Z. Garai, Hungary; Z. Garai, Germany; J. Nedoroščík, Germany; J. Nedoroščík, Spain; J. Kavka, Austria
2013: Z. Garai, Germany; J. Nedoroščík, Germany; J. Nedoroščík, Spain

Participation of PhD students in international conferences and schools:

2015: Garai, Hungary, *14-th International conference on application of natural-, technological and economics sciences*
N. Shagatova, France, *The physics of evolved stars: a conference dedicated to the memory of Olivier Chesneau*
R. Vašková, Spain, *1st CASSDA School: A week above the clouds*
R. Vašková, Slovakia, *2nd SOLARNET School: "Ground- and space- based solar instruments", 2nd SOLARNET Workshop: "Methods in high resolution and synoptic solar physics" and 2nd SPRING (Solar Physics Research Integrated Network Group) meeting*
2014: R. Vašková, Poland, *1-st SOLARNET Spring School: "Introduction to Solar Physics" and 1st SOLARNET Workshop: "Radiative Processes in the Sun and Stars",*
Z. Garai, Czech Republic, *Planets, Stars, Binaries - Living Together: Planets, Host Stars and Binaries*
Z. Kreibikova, Czech Republic, *Planets, Stars, Binaries - Living Together: Planets, Host Stars and Binaries*
N, Shagatova, Czech Republic, *Planets, Stars, Binaries - Living Together: Planets, Host Stars and Binaries*
Z. Garai, Hungary, *3-rd Scientific Writing for Young Astronomers*
2013: Z. Garai, *Poland, Scientific applications of Small Telescopes 2013*
J. Nedoroščík, *Poland, Scientific applications of Small Telescopes 2013*

Attendances at events in total 11

5. PhD studies and educational activities

Organization of three schools on astronomy and astrophysics

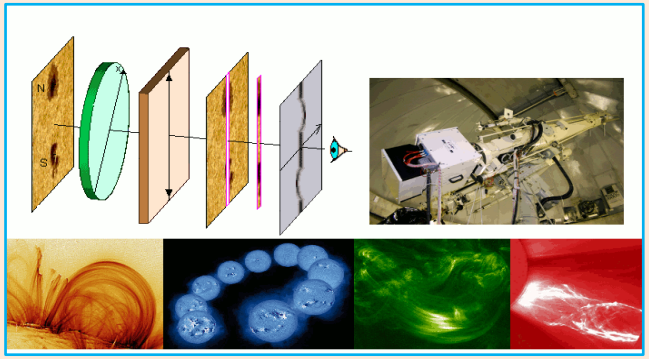
2-nd SOLARNET School: "Ground- and space-based solar instruments", October 5-16, 2014 Tatranska Lomnica (Slovakia)

https://www.astro.sk/SOLARNET_2ND_SCHOOL/

Summer School "Magnetohydrodynamics in astrophysics", given by Dr. Petr Jelinek (Jihočeská univerzita, České Budějovice, Czech Republic 18-22 August 2014, Tatranska Lomnica, Slovakia https://www.ta3.sk/~koza/mhd/mhd.htm

"Solar Spectro-Polarimetry lecture course" given by Dr. Horst Balthasar (AIP - Leibniz-Institut für Astrophysik Potsdam, Germany), June 3 - 7, 2013, Tatranska Lomnica, Slovakia

https://www.astro.sk/~gomory/SPECTRO/



The main challenge to PhD studies and educational activities is:
Trying to obtain additional resources (eg. SAIA, Marie Curie Actions - Research Fellowship Programme) to doctoral studies, especially for stays for interested students from abroad

6. Social impact

6. Social impact

Althoug the AISAS is an organisation exclusively aimed at basic research it also provides expertise and studies for Society authorities and the civil sphere, has membership in the Advisory Forums of public institutions, gives consultation and advisory, etc. Social impact of AISAS activities is essential in expertise, enlightenment, edification, education and motivation of the young generation for science as well as in transmitting scientific knowledge to the society.

Selected expertise and services for civil bodies:

Expertise for the Department of data analysis and forensic documentation, sector of forensic photography and video, Institute of Forensic Science Police Force (Sklabinská 1, 812 72 Bratislava) for judicial analyses. (Consultations in evaluation of photographic images, where it was necessary to specify the time interval of the slide from lighting conditions, angles, shadows and location.)

Expertise for the Court hearing of "Okresný súd Trenčín" on the "The term and the time difference between the perception of the sunset and civil twilight". (M. Jakubík)

Expertise for the Council of "Mestský úrad Poprad" for the use in Court legal issues concerning the definition of "Night" (Nautical, astronomical and civil.) (M. Jakubík)

Expertise on the paper of Mr. Štefkovič for decisions at the Ministry of Culture and the Slovak Academy of Sciences. (L. Neslušan)

J. Ambróz acts as an expert member of "The national team of technical experts to assess the goods and dual-use technologies and military equipment" to the Ministry of Economy".

L. Hric refereed a University text-book "Základy astronómie a astrofyziky", Author: RNDr. Rudolf Gális, PhD. Issued. University of P. J. Šafárik, Košice, 2014, ISBN 978-80-8152-089-1.

6. Social impact

Selected expertise and services for civil bodies:

R. Komžík is a representative of a full member of AISAS in the "SANET – Slovak Academy Data Network", the strategic State consortium for development of Internet and network activities in Slovakia.

R. Komžík is an expert member of The Steering Committee of the national project "Slovak grid infrastructure SlovakGrid".

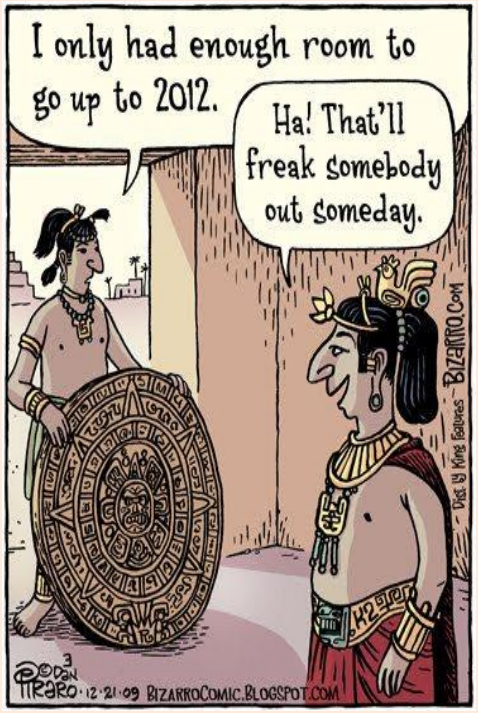
V. Rušin acts as a vice-chairman of the board of councils of "State program for science and research - Complex solution of support and the efficient use of infrastructure, research and development".

D. Chochol act as a member of the "APVV - Council for Natural Science, Working Group 1 science - mathematics, physics, astronomy and informatics".

One of the most important social discourses led by AISAS in 2012 was the enlightenment concerning the "prediction" of "End of world" which caused panic in the society.

We prepared an expertise for the media and the Slovak Academy of Sciences, see www:

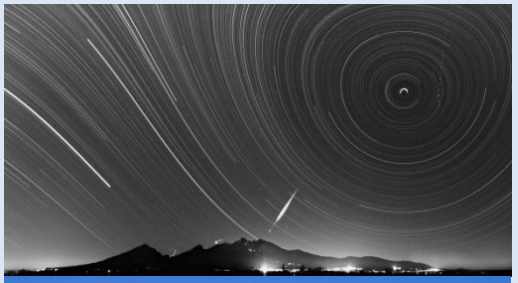
http://www.sav.sk/index.php?doc=services-news&source_no=20&news_no=4760 which enormously helped people as documented by hundreds of emails thanking us for the explanation of the situation. Enormous interest in the expertise is also illustrated by the number of visits of the above given www page at Slovak Academy of Sciences (25 359) at that time.

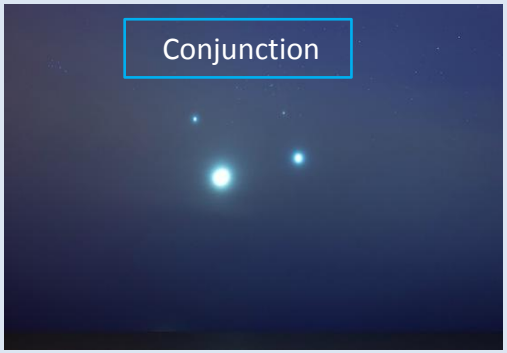


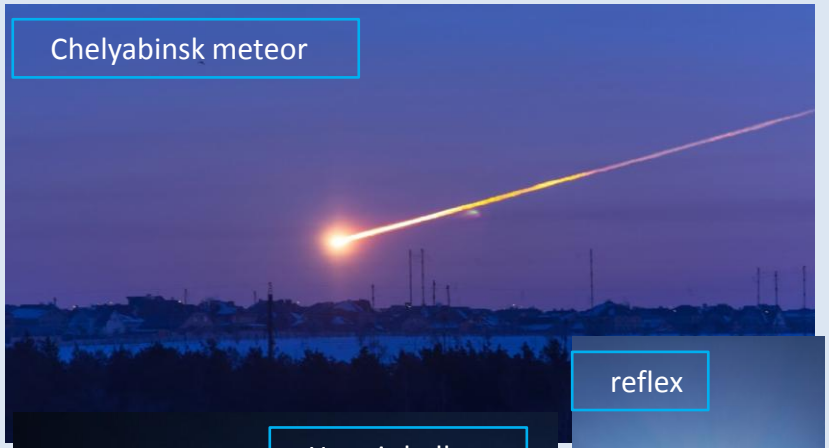
6. Social impact

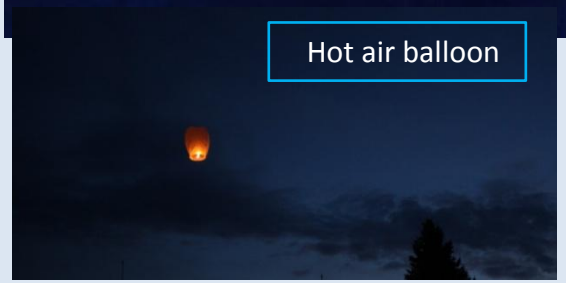
Selected expertise and services for civil bodies:

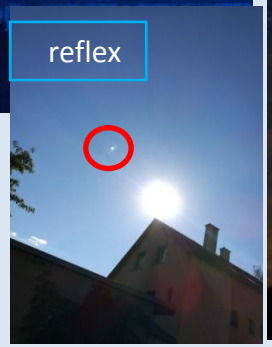
V. Porubčan and J. Svoreň serve as experts for "Assessment of findings "meteorites" and records of special flying bodies in the atmosphere". They provided also enlightenment and clarifying comments to the public on some extraordinary events, e.g. the Chelyabinsk meteor which was a superbolide caused by a near-Earth asteroid. We use also our bolid cameras to compare the reported events in the sky. Overall 124 events in the assessment period.

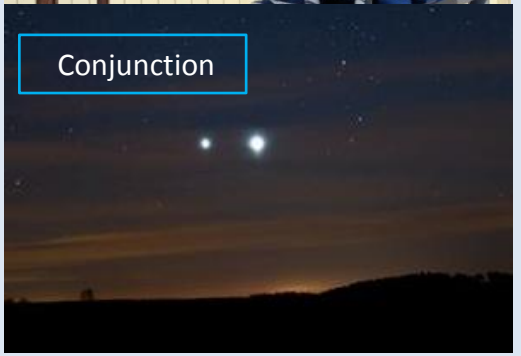












7. Popularization of Science (outreach activities)

7. Popularization of Science (outreach activities)

AISAS is a leader in popularization at the Slovak Academy of Sciences

Overall **1158** activities in popularization in Slovakia and abroad.
All are described in detail in the Annual reports of the Institute and statistics of the most important events is in the table

5	participations in documentary films,
8	big exhibitions,
136	appearances in TVs,
87	appearances in radio,
147	excursions at our observatories,

Outreach activities	2012	2013	2014	2015	total
Articles in press media/internet popularising results of science, in particular those achieved by the Institute	72	95	43	128	338
Appearances in telecommunication media popularising results of science, in particular those achieved by the Institute	60	55	43	70	228
Public popularisation lectures	92	107	104	88	391

AISAS has **a well-established cooperation** with the media based **on professional contacts with journalists** and enough **scientists** (also from the **young generation**) who are **willing to popularize** the science, work and achievements of AISAS. Systematic work in this field has led to high professionalism and effectiveness in popularization.

7. Popularization of Science (outreach activities)

Main activity

Project APVV on popularization of astronomy "Discover Universe, your Home".

Funding: 89 659 EUR
People: Coordinator V. Rušin, other 14 members of AISAS
Events:
Slovak workshop for teachers with proceedings
four times open doors/ house at the Lomnicky Peak Observatory
46 lectures
numerous excursions
two night observations
issued 45 000 postcards with astronomical themes
building of an educational trail with 13 panels in the vicinity of AISAS
preparation of presentations and posters
Production of 30 large format photographs
Impact on thousands of students and the public

Popularization Awards

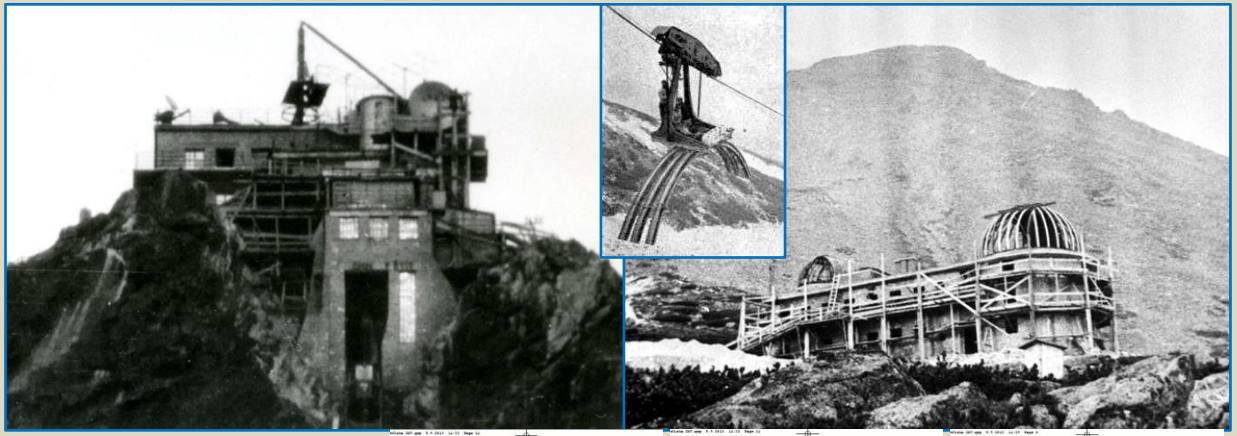
Award of the Slovak Academy of Sciences for "Popularization of science" given to J. Svoreň.

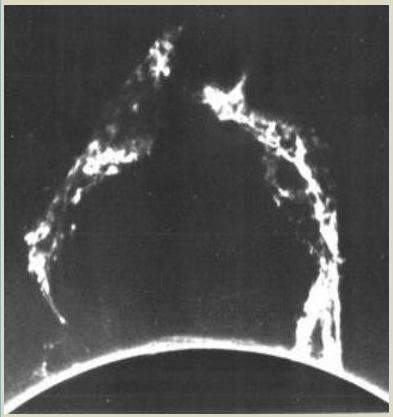
7. Popularization of Science (outreach activities)

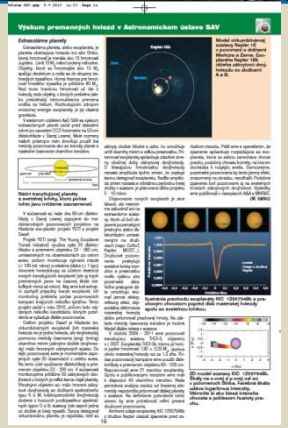
A sample of a few important popularization events.(More, and more details are given in Questionnaire)

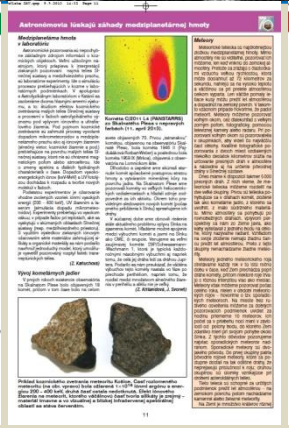
The 70-th anniversary of the founding of the Institute

AISAS issued a **special supplement of the popularization journal Kozmos** consisting of 16 pages of articles written by scientists of AISAS on history, people, scientific achievements and instrumentation of AISAS in the 70-year history. A **press conference in Bratislava**, presentations and interviews for the media.









7. Popularization of Science (outreach activities)

Two exhibitions "Colourful Universe" and "Universe around us”

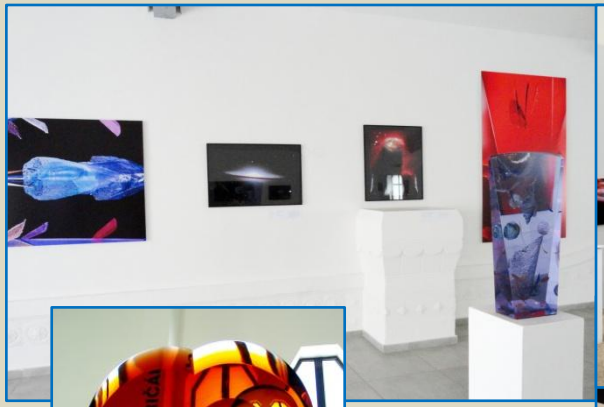
They were presented in the frame of events **"Researchers’ night"** in the ZOC MAX shopping centre in Poprad. The exhibition "Colourful Universe" was seen by **5 000 visitors** including **His Excellence President of Slovakia Andrej Kiska**.

The exhibition "Universe around us“ consisted of 17 large format panels and introduced also a new 1.3 m mirror telescope of AISAS. The exhibition was seen by **6 000 visitors.**

7. Popularization of Science (outreach activities)

Series of three exhibitions on the theme "art and science“

There were made three exhibitions „Glass art and its similarity with the Universe“. Exhibitions **"Poetry of Universe" 2012 in Pporad**, Slovakia, **"Mysteries of Life" 2013 in Riihimäki**, Finland and **"Big Bang Paradis retrouvé" 2013 in Paris**, France combined images of astronomical objects (prepared by AISAS) with full scientific information (given by AISAS), with astro-glass art made by the maestro Zoričák especially for these events. (**Thousands of visitors at each.**)



7. Popularization of Science (outreach activities)

A visit of the United Nations Secretary-General Ban Ki-moon and a visit of presidents of Czech Republic, Poland and Slovakia at the Lomnicky Peak Observatory gave us a unique opportunity to introduce our Institute as well as the Slovak Academy of Science.

A partial eclipse of the Sun on March 20, 2015.

There was a **big event** organised at AISAS in Stara Lesna connected with **total eclipse of the Sun observed from Norway** - the place of the AISAS expedition. **Hundreds of visitors,** including media and pupils, **saw directly the partial eclipse** using telescopes of AISAS, learned on lectures and **followed the total eclipse on-line** via live stream from Norway.

Many responses in TVs and newspapers appeared.

8. Background and management. Human resources

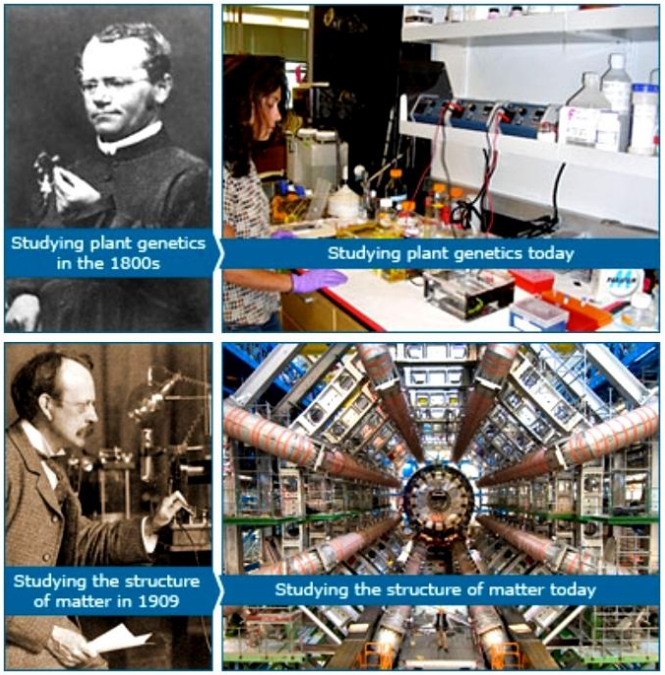
8. Background and management. Human resources

Understanding Science
how science *really* works

UNDERSTANDING SCIENCE 101 | FOR TEACHERS | RESOURCE LIBRARY

Modern science: What's changing?

When Gregor Mendel began his investigations of plant genetics in the 1800s, he worked alone — a middle-aged European monk counting peas in the abbey garden. One hundred and fifty years later, modern plant genetics laboratories, like Chelsea Specht's below, look a lot more diverse and employ the latest DNA sequencing techniques. When J.J. Thomson discovered a new particle of matter — the electron — at the turn of the century, his lab equipment mainly consisted of vacuum tubes, magnets, and some simple wiring. One hundred years later, scientists searching for new particles like the Higgs boson use a supercollider — a 17-mile-long machine that costs several billion dollars and will produce data to be analyzed by the most powerful supercomputer in the world. Science has come a long way in the last 150 years! We now have more powerful data analysis techniques, more sophisticated equipment for making observations and running experiments, and a much greater breadth and depth of scientific knowledge. And as the attitudes of the broader society have progressed, science has benefited from the expanding diversity of perspectives offered by its participants. But what about the *process* of science itself? Has this fundamental aspect of the scientific enterprise changed over time?



From Gregor Mendel's experiments with peas to the work on plant evolution in a modern lab, and from J.J. Thomson's primitive equipment to today's Large Hadron Collider — science has indeed come a long way.

Management of modern scientific institution

There are several attributes which dramatically changed in science during the last decades:

There are in science:

- more powerful data analysis techniques,
- more sophisticated equipment for making observations and running experiments, (and much more expensive)
- much greater breadth and depth of scientific knowledge.
- expanding diversity of perspectives offered by science participants
- competitive system for financing (grants projects)
- much higher expectations from society
- everything is “faster” due to INTERNET
- necessity of much wider collaboration
- scientific information flow doesn't stop in science community. Journalists can also quickly access the latest scientific findings and begin to publicize them to the broader population

What did NOT changed in science?

- science is still about finding explanations for phenomena in the natural world
- science still needs well skilled and intelligent people

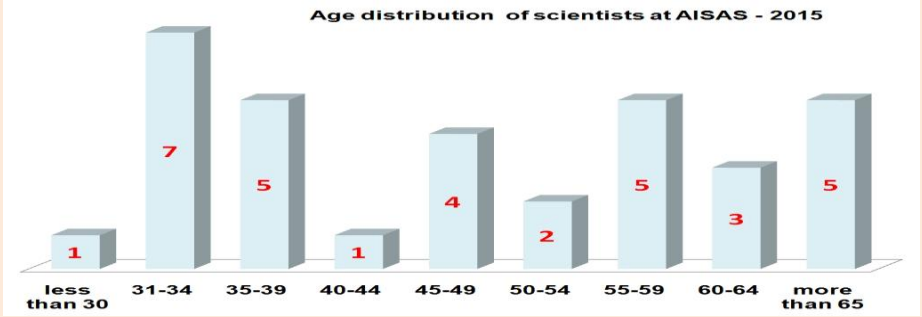
These attributes are taken into account in management of the Institute in:

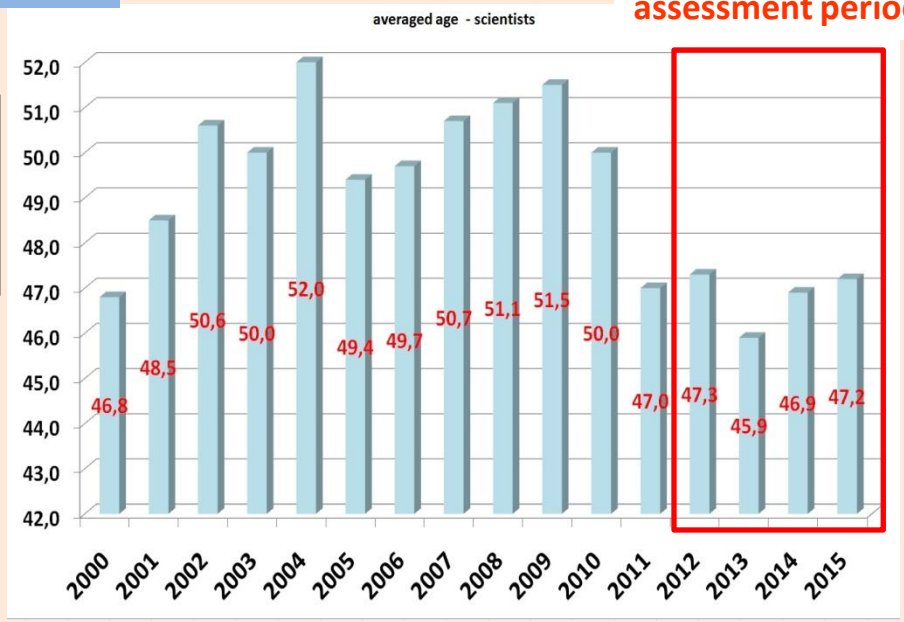
- Personnel development
- Institute scientific visions
- Internal instruments for an effective work
- Infrastructure development, management of access to top infrastructure
- National, International and pan-European project strategy
- International collaboration - scientists exchange
- Public outreach - popularization

8. Background and management. Human resources

Summary table of the personnel

AISAS had very good personnel development in the assessment period. There was a big replacement of generations at AISAS which led to radical rejuvenation, but did not affect the quality of science at the Institute.





Internal management instruments

1) Each scientist - minimum output (one article in a high ranked journal per year) is required to get an additional part of her/his salary.
2) PhD. students and young scientists (<35 years) - financial bonuses for publications in journals with a high impact factor (higher than 2) in case that the scientist is the leading author of the paper.
3) Every five years all scientists are evaluated to get prolongation of their working contract or prove the existing one.
4) A regular system of scientific visions of the Institute.
   There are supported (by Scientific board) only high quality research visions approved periodically (every 5 years). The last evaluation was made in 2011.

Post-doc positions

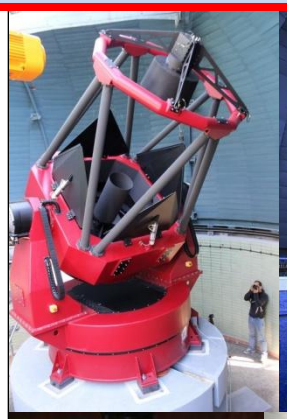
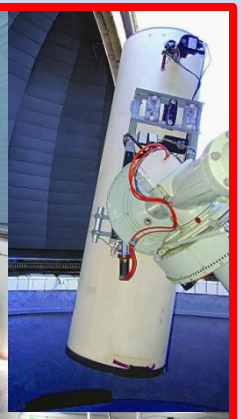
Support from *national* SAIA 10 from *external* resources 2

8. Background and management. Human resources

Infrastructure

Top infrastructure from Structural funds 4 834 139 €
(Roughly 100 years of "regular" institutional investments)
Thus AISAS has very good own infrastructure, comparable to the European level and good contacts and international cooperation to get access to the top infrastructure worldwide.
Important: an optical fibre link between Stara Lesná and the Skalnaté Pleso Observatory to SANET was built.

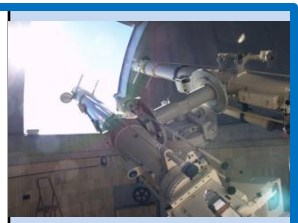
Skalnaté Pleso Observatory
A 1.3 meter telescope equipped with a large CCD camera
A 61 cm photometric and astrometric reflector with a CCD camera
Two video-cameras - system for observing of faint meteors
A CCD camera 4K x 4K to the 1.3m telescope,
A device for vacuum metal coating of astronomical mirrors,
An echelle spectrograph to 1.3-m telescope,
A near Infrared camera to the 1.3-m telescope. (Teledyne)

Lomnicky Peak Observatory

Two 20/300 ZEISS coronagraphs with Coronal multi-channel polarimeter, one of two worldwide instruments for spectro-polarimetry of the solar corona

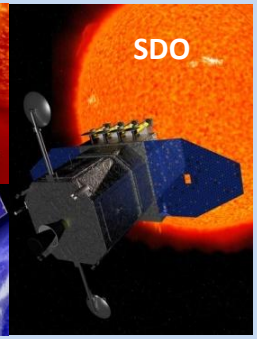
A new postfocus detector for corona and prominences observations with four cameras (two high new cameras sensitive in the visible range and two in near infrared)
A Solar Chromospheric Detector for observations of magnetic fields in the solar chromosphere, equipped with a tunable birefringent filter and polarimeter.



Access to international Instrum. and databases
Solar (VTT, SST, THEMIS, GREGOR) Canary Islands,
VLTI Chile, CHARA
Zelenchuk 6m
satellites, Hinode, SoHO, Goes, SDO, Hubble.
VSO, Hipparchos, TYCHO ...


Stara Lesna Observatory
two 60 cm photometric reflectors.
two digital bolide cameras

An all-sky automatic bolide camera.




C. Implementation of recommendations from previous assessment

Description of how the results and suggestions of the previous assessment were taken into account

There was only one suggestion of the previous assessment:

“To continue in outlined strategy of a development of the Institute”.

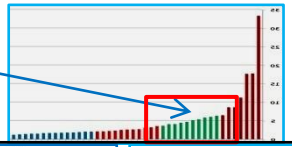
This suggestion has been fully fulfilled.

The main particular achievements in all 8 indicators have been listed in this presentation.

D. Closing remarks

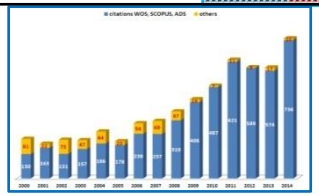
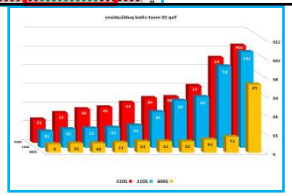
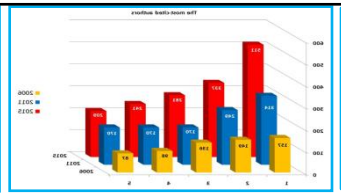
Astronomical Institute in the assessment period:

(1) An increased number of publications in high ranked (impacted) journals



CCC publication/FTE scientist/year
1.018

(2) A substantially increased number of high ranked citations (WOS, NASA/ADS, SCOPUS)

citations/FTE scientist/YEAR
19.28

(3) Achieved high credibility in both international and national contexts


(4) Obtained important international and national projects with extreme resources

5 636 361 €

Operačný program VÝSKUM a VÝVOJ
Európska únia
SOLARNET
COST
EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY
Unterstützt von / Supported by
Alexander von Humboldt Stiftung/Foundation

(5) Played important role in PhD studies and educational activities

Title of study programme	Title of study field (SF)	Number (SF)	University
Astronomy and astrophysics	astronomy	4.1.7	Comenius University, Bratislava
	astrophysics	4.1.8	

(6) Had social impact as per the character of its Mission - do science (basic research)

essential in enlightenment, edification, popularization, transmitting knowledge to the society and motivation of the young generation for science

(7) Was a leader in popularization at the Slovak Academy of Sciences




Overall 1158

8 big exhibitions,
136 appearances in TVs,
87 appearances in radio,
147 excursions at our observatories,
5 participations in documentary films

(8) Had very good age structure, extreme infrastructure, has visions and internal instruments for motivation