

## Public outreach activities and the IYA2009 in Slovakia

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### Abstract

The activities of the professional and amateur astronomical institutes in Slovakia in public outreach are presented. The projects are funded by grants from the Science and Technology Assistance Agency to support our goals for IYA2009.

### Introduction

Astronomical research in Slovakia is carried out at the Astronomical Institute of the Slovak Academy of Sciences<sup>1</sup> (AISAS) Tatranská Lomnica, Comenius University<sup>2</sup> in Bratislava and P.J.Šafárik University<sup>3</sup> in Košice. These institutes, together with a network of 18 Public Observatories<sup>4</sup> (four with planetariums), two planetariums in Košice and many astronomical clubs and observational posts serve as centres for education and the popularisation of astronomy.

The launch of IYA2009 by the IAU stimulated all astronomical institutions in Slovakia to increase their public outreach activities. The coordination of the effort is guaranteed by the Organising Committee of IYA2009, which was officially established at the General Assembly of the Slovak Astronomical Society on 28 September 2007. The committee has 20 members: D. Chochol — Head of the Stellar Department of the AISAS and Single point of Contact (SPoC) of Slovakia, J. Svoreň — Director of the AISAS, J. Zverko — Chairman of the Slovak Astronomical Society, J.Žižňovský — Head of the Slovak Astronomical Committee of the IAU, V. Porubčan — Head of the Department of Astronomy in Faculty of Mathematics, Physics and Informatics of the Comenius University in Bratislava, M. Jaščur — Director of the Institute of Physical Sciences of the P.J.Šafárik University in Košice, P. Rapavý — Manager of the Slovak Union of Amateurs Astronomers, T. Pintér — Director of the Slovak Central Observatory Hurbanovo, representatives of public observatories and astroclubs, covering all regions in Slovakia: P. Hazucha (Hlohovec), D. Jančuškova (Prešov), S. Kaniansky (Žiar nad Hronom), Z. Komárek (Michalovce), P. Kráčalik (Bratislava), I. Kudzej (Humenné), V. Mešter (Partizánske), J. Mäsiar (Kysucké Nové Mesto), R. Ondíková (Levice), M. Schmögner (Medzev), S. Štefeček (Sobotište), M. Znášik (Žilina).

### **Astronomical Institute of the Slovak Academy of Sciences and its public outreach activities**

AISAS is a professional astronomical institute established in 1953. The Observatory Skalnaté Plešo (1786 m a.s.l.), was built in 1943 and equipped with a 60-cm reflector for stellar photography

<sup>1</sup> <http://www.ta3.sk/homepage.php>

<sup>2</sup> [http://cyril.fmph.uniba.sk/mffuk/pracoviska/katedry/kafzm/kafzm\\_en.html](http://cyril.fmph.uniba.sk/mffuk/pracoviska/katedry/kafzm/kafzm_en.html)

<sup>3</sup> <http://www.science.upjs.sk/uk/>

<sup>4</sup> <http://www.vesmir.sk/index.php?id=linky&PHPESSID>

and photometry. It has been an integral part of the AISAS from the very beginning. In 1978, the old telescope was replaced by a new 60-cm reflector, used for photoelectric photometry of variable stars. In 1961, a 30-cm astrograph was installed in the small dome of the observatory, used for observations of asteroids and comets. In 2001, it was replaced by a 61-cm reflector with a CCD camera. In 1962, the Coronal Station at the top of Lomnický štít (2634 m a.s.l.) was built, where a 20-cm coronagraph was installed. In 1987, the new headquarters of the AISAS was established at Stará Lesná (2 km from Tatranská Lomnica), together with three pavilions (810 m a.s.l.), where a 50-cm horizontal spectrograph for spectral observations of the solar surface, 60-cm and 50-cm reflectors for photoelectric and CCD photometry of variable stars, are placed. In the vicinity of the headquarters, the Congress Center Academia<sup>5</sup> (a hall with 160 seats) is located, where the both scientific and public outreach meetings take place.



Credit: Slovak Union of Amateur Astronomers (SUA4)

Figure 1 – Astronomical institutions in Slovakia.



Credit: V. Rušín

Figure 2 – Headquarters of the AISAS and observatory at Stará Lesná.



Credit: V. Rušín

Figure 3 – Observatory Lomnický štít.



Credit: V. Rušín

Figure 4 – Observatory Skalnaté Pleso.

The research in the Department of Solar Physics is focused mainly on solar magnetism, the dynamics of the photosphere, chromosphere, transition region and corona (based on data from the Canary Islands telescopes, SOHO spacecraft, TRACE and Hinode satellites); the connection between cosmic ray modulation and solar flares, open magnetic flux and coronal mass ejections; magnetic fields in specific coronal structures (own solar eclipse observations — 18 expeditions of the AISAS); coronal holes and their relation to the background and local magnetic fields; a time-latitudinal distribution and large-scale development of the solar prominences, the green coronal

<sup>5</sup> <http://www.hotelacademia.sk/>

line (530.3 nm) and the white-light corona over the solar cycles; a homogeneous coronal data set of the green coronal line intensity based on the Lomnický štít photometric scale and coronal index of solar activity was prepared for the period 1939–2007.

The main topics of research in the Department of Interplanetary Matter are: the CCD photometry and astrometry of asteroids and comets (based on the data from the 61-cm telescope at the Skalnaté Pleso Observatory); the filamentary structure of selected meteor showers and study of the meteor sporadic background (the forward scatter radio system operating over the triangle Lecce-Bologna-Modra); composition and physical properties of the cosmic dust particles (provided by NASA); cooperation in the European Fireball Network; transfer orbits among different populations of small bodies in the Solar System regarding near-Earth objects; the investigation of cometary nuclei and their activity at large heliocentric distances; the structure and dynamics of meteoroid streams and evolution of their parent bodies; cosmogony of reservoirs of small Solar-System bodies.

The research in the Stellar Department is focused mainly on the investigation of interactive binaries and multiple systems and determination of their basic parameters; study of physical processes during phases of activity of symbiotic stars and novae, their origin, structure and evolution including the physical conditions in the circumstellar environment (own photometric observations, ground-based spectroscopic observations within international projects, satellites data from the IUE, HST, ISO, FUSE). Spectroscopic data are used to derive stratification and surface distribution of elements in chemically peculiar stars.

AISAS is one of the leading institutes in the Slovak Academy of Sciences for public outreach activities. The annual number of lectures, articles in journals and newspapers, radio, TV performances and press conferences has reached 300. AISAS cooperates with the Slovak Astronomical Society<sup>6</sup> (SAS), Slovak Union of Amateur Astronomers<sup>7</sup> (SUAA) and Slovak Central Observatory<sup>8</sup> Hurbanovo to organise conferences, e.g. the 26<sup>th</sup> *European Symposium on Occultation Projects*<sup>9</sup> was held at Stará Lesná in August 2007.

The necessary funds for public outreach activities are provided by two projects, granted by the Science and Technology Assistance Agency (STAA), which started in 2007 and will last three years, so they will cover many activities related to the IYA2009:

1) *Meeting with the Universe*<sup>10</sup>, LPP-0146 (2007–9), principal investigator: V. Rušin. The following activities were supported in the year 2007:

- a) Teachers' workshop (4–6 October 2007) for 60 selected teachers from elementary and high schools in Slovakia. All expenses for teachers and lecturers (professional astronomers) were covered by the grant. Nine lectures will be published in the proceedings of the workshop and will be freely available for 200 schools in Slovakia together with the PowerPoint

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<sup>6</sup> <http://www.ta3.sk/sas/sas.html>

<sup>7</sup> <http://www.szaa.sk/>

<sup>8</sup> <http://www.suh.sk/>

<sup>9</sup> <http://esop2007.szaa.sk/>

<sup>10</sup> <http://www.ta3.sk/~zkanuch/apvv>

presentations on CD.

- b) Six articles in the journal KOZMOS 2007 No. 5 written by astronomers of the Department of Solar Physics of the AISAS about their research and results.
- c) Twelve open door activities with guided excursions at the observatory Skalnaté Pleso and Lomnický štít coronal station.
- d) 70 lectures and school excursions at headquarters in Stará Lesná.
- e) 20 public lectures outside AISAS including six lectures in Bratislava.
- f) Issuing posters and postcards.
- g) Creation of the www glossary with basic astronomical terms for teachers and scholars of elementary and high schools.
- h) Publishing the booklet *Astronomy in Slovakia*.
- i) Organising press meetings and cooperation with radio, TV and journals.

2) *Astronomy — the Science for Teachers and Students*<sup>11</sup>, LPP-068 (2007-9), principal investigator: A. Kučera. The project is devoted to the astronomy education of teachers and students in the Poprad region (where AISAS is located): the high school in Poprad and four elementary schools in Poprad, Tatranská Lomnica and Spišský Štiavnik. The lectures and practical lessons in astronomy at schools and excursions of the students at the Observatory Skalnaté Pleso took place in 2007. The SPoC of Slovakia has just applied for a STAA grant to cover the expenses of Slovakia in IYA2009 Global Cornerstone Projects.

## The Slovak Astronomical Society as organiser of the Astronomy Olympiad

SAS is a voluntary and selective association of scientific and pedagogical workers and friends of astronomy. The activity is performed through regional branches, specialised sections (solar, stellar (variable stars), interplanetary matter (meteor showers, asteroids and comets), eclipses and occultations) and commissions (terminological, pedagogical). SAS contributes to the development of astronomy in Slovakia, executes publication activity, organises meetings and cooperates with the AISAS, universities, schools and public observatories. The STAA provided SAS with the grant *Olympiad in Astronomy*<sup>12</sup>, LPP-172 (2006–10) principal investigator: L. Hric. The project is devoted to organising the competition between students from elementary and high schools in Slovakia. The first round was organised in schools at the beginning of 2007, the second round at the public observatories Partizánske and Prešov in May 2007 and final round at AISAS in June 2007. Three winners from elementary schools received astronomical telescopes as prizes. Two winners from high schools will participate in the 1<sup>st</sup> International Olympiad in Astronomy and Astrophysics, which will be held in Thailand in December 2007.

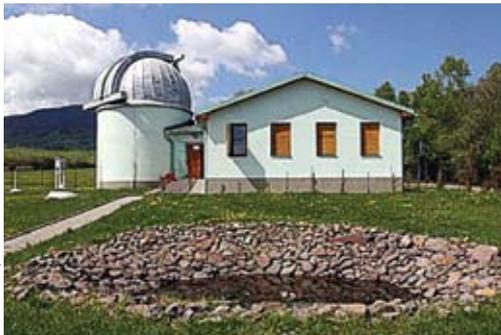
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<sup>11</sup> <http://www.ta3.sk/sas/sas.html>

<sup>12</sup> <http://www.szaa.sk/>

## Public observatories in Slovakia and their public outreach

The main aim of public observatories in Slovakia is to spread knowledge of modern astronomy and science among the public, to offer students at elementary and high schools, excursions and lectures and to organise public observations of interesting astronomical phenomena. They collaborate with SAS and SUAA to organise meetings, workshops and conferences for active amateurs. The STAA provided the Public Observatory in Rimavská Sobota<sup>13</sup> through by the grant *Astronomy is the Door for Science*, LPP-130 (2006–7), principal investigator: P. Rapavý. Lectures, observations, two exhibitions of astronomical images were organised and a booklet about light pollution: *Save the night* was issued. The STAA provided the Public Observatory in Humenné<sup>14</sup> with the grant *The Universe in Direct Transmission*, LPP-049 (2007-9), principal investigator: I. Kudzej. As part of this grant the ASTRO practicum for high schools in Snina, Humenné and Prešov was organised at the Kolonické sedlo Observatory<sup>15</sup> on 16–18 February 2007 (Variable stars), 20–22 April 2007 (Lyrids meteor shower), 25–27 May, 2007 (Eclipses by Moon and planets) and 21–23 September 2007 (Variable stars — visual observations). A 1-m reflector (donated by the Odessa Observatory, Ukraine) — the biggest telescope in Slovakia, was put into operation in 2002. The first observations with the double-channel photoelectric photometer mounted in the Cassegrain focus were obtained in February 2007.



Credit: I. Kudzej

Figure 5 – Kolonické sedlo Observatory.



Credit: I. Kudzej

Figure 6 – 1-m reflector at the Kolonické sedlo Observatory

<sup>13</sup> <http://www.astrors.szm.sk/>

<sup>14</sup> <http://www.astrokolonica.sk/hvezdaren.html>

<sup>15</sup> <http://www.astrokolonica.sk/>