ArAS News

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The ArAS Newsletter in the INTERNET: *http://www.aras.am/ArasNews/arasnews.html*

VIKTOR AMBARTSUMIAN INTERNATIONAL PRIZE 2010 WINNERS

Viktor Ambartsumian International Prize 2010 *goes to famous Swiss astrophysicist* ***Prof. Michel Mayor*** *and two of his team members*

Viktor Ambartsumian International Prize has been established by the President of Armenia in 2009 and at present is one of the important awards in astronomy/astrophysics and related sciences. It is being awarded to outstanding scientists from any country and nationality having significant contribution in science. The Prize totals USD 500,000 and will be awarded once every two years, starting with 2010.

The International Steering Committee received nominations from national academies of sciences, universities, observatories, and Nobel Prize winners for 14 outstanding scientists and teams from different countries. After a thorough study of the nominated works, as well as independent referees' reports, the Committee had several discussions and finally *Prof.* Michel Mayor and his team nominated by the Swiss Academy of Sciences were selected as winners.

Michel Mayor, professor at the Geneva University, Switzerland, is the co-discoverer of the first extrasolar planet orbiting a solar-type star. In 1995, together with his colleague Didier Queloz, Michel Mayor discovered 51 Peg b opening up the whole field of exoplanets. Today, almost 500 exoplanets are known, with many of them, in particular the smallest ones, discovered by Mayor's team. Their discovery used precise measurements of the radial velocity of a star, which varies regularly due to the changing direction of the gravitational pull from an (unseen) exoplanet as it orbits the star. The breakthrough discovery was made from the Observatoire de Haute-Provence (OHP, France), but then Mayor and his team used telescopes of ESO for most of their discoveries. First they used the 1.2-metre Swiss telescope at the ESO La Silla Observatory in Chile. Soon, however, it became clear that much higher precision in radial velocities was needed, and this called for an extremely stable new instrument to be developed. In 1999, Mayor led a consortium to build the High Accuracy Radial Velocity Planet Searcher (HARPS), which soon became the most successful low-mass exoplanet hunter in the world. HARPS was installed in 2003 on the refurbished ESO 3.6-metre telescope at La Silla and soon proved to be a unique instrument, reaching precisions of a few tens of centimetres per second. Mayor is the principal investigator of an important survey carried out in the southern hemisphere to search and characterize exoplanets. Still going on at La Silla this survey has allowed the discovery of several planets with mass as small as a few Earth masses. Using HARPS, Mayor's team discovered Gliese 581d, the first exoplanet in a star's habitable zone, as well as the lightest exoplanet ever detected around a normal star, Gliese 581e. More recently, they have also found a potentially lava-covered world, whose density is similar to that of the Earth.

Prof. **Michel Mayor** and his international team members, ***Prof.*** **Garik Israelian** (Astrophysical Institute of Canary Islands, IAC, Spain) and ***Prof.*** **Nuno Santos** (Centro de Astrofísica da Universidade do Porto, CAUP, Portugal) have done outstanding contributions in the domain of planetary systems and their host stars. Despite the large number of discovered extrasolar planets, the formation of planetary systems is still far to be understood. The amazing diversity of these systems is challenging. On the last ten years, Mayor and his international team have characterized the physical and chemical properties of stars with extrasolar planets. Small anomalies of spectra of stars hosting planets contribute to our understanding of the complexity of planetary formation mechanisms. The results obtained by that team had a strong impact on planet formation models.

References: Mayor et al. 2009, Astronomy & Astrophysics 507, 487; Israelian et al. 2009, Nature 462,189; Santos et al. 2004, Astronomy & Astrophysics 415, 1153.

The winners of Viktor Ambartsumian International Prize 2010 were announced at the press-conference held at the Armenian National Academy of Sciences on Friday, July 16. The official award ceremony will take place on September 18 in the Yerevan Opera House.

Viktor Ambartsumian International Prize web site http://vaprize.sci.am/

Areg Mickaelian,
Scientific Secretary,
Steering Committee, Viktor Ambartsumian International Prize

ISYA-2010 FINAL ANNOUNCEMENT

The **International School for Young Astronomers (ISYA-2010)** will be held in Byurakan (Armenia) this year on Sep 12 – Oct 2. The Final Announcement was released recently including the final program and list of participants, as well as practical matters. It is being organized jointly by the International Astronomical Union (IAU), the Byurakan Astrophysical Observatory (BAO), and the Armenian Astronomical Society (ArAS). It is the IAU 32nd International School for Young Astronomers (ISYA-2010) and the 3rd Byurakan International Summer School (3BISS).

A number of well-known scientists are invited to lecture during the school on various interesting topics. Altogether, there will be 18 lecturers from 7 countries (Armenia, Belgium, France, Germany, Russia, Spain, and USA), including the IAU President *Prof.* Robert Williams and other famous scientists. Upper-level University students and post-graduate students will participate in the school. The selection process is now over and 44 students from 19 European, Asian, and African countries are in the list of participants. English will be the official language of the school.

The **school topics and events** include planetary atmospheres, extrasolar planets, stars and nebulae, AGN, galaxy formation, extragalactic surveys, IR and radio astronomy, astronomical surveys, databases, archives, and VOs, astronomical instrumentation and observing techniques, observations with 2.6m telescope, remote observations with Hawaii 2m telescopes, data reduction and analysis (optical, IR, radio), as well as acquaintance to the BAO and its research, participation in the award ceremony of Viktor Ambartsumian International Prize, excursions to famous Armenian sightseeing, sports games and competitions. The scientific program includes 36 lectures, 12 practical exercises and tutorials, observations, reduction, and students' presentations

Organizers and sponsors: IAU (ISYA program), BAO, ArAS, Armenian National Academy of Sciences (NAS RA), Armenian State Committee for Science (SCS), United Nations Educational, Scientific and Cultural Organization (UNESCO), German Academic Exchange Service (Deutscher Akademischer Austausch Dienst, DAAD).

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ISYA-2010 web page: http://www.aras.am/SS2010/ss_index.htm

IYA-2009 CERTIFICATES of APPRECIATION

Nine certificates of appreciation were awarded for the IYA-2009 Armenian activities

As it is well known, the year 2009 was announced by UNESCO as the International Year of Astronomy (IYA-2009). It had a great success, so that even after its completion, many organizations and astronomers continue a number of projects in frame of the initiative called Beyond IYA-2009.

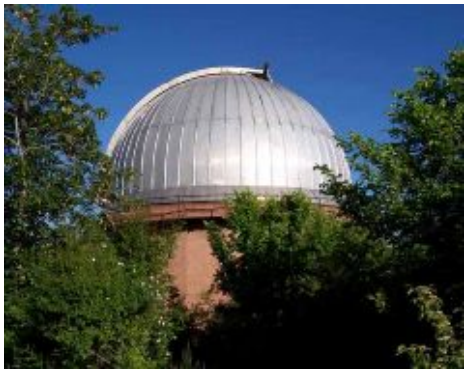
Armenia, though having a tiny budget for any activities, could organize IYA-2009 at enough high level and its report is included in the global IYA-2009 report. A number of people and organizations supported these activities, and recently, the International Astronomical Union (IAU) on behalf of UNESCO and IAU jointly has granted 9 Certificates of Appreciation to the following contributors:

Areg Mickaelian, Coordinator of the IAY-2009 in Armenia, Co-President of ArAS
Haik Harutyunian, Director of the Byurakan Astrophysical Observatory (BAO)
Kristina Mehrabekyan, First Secretary, Armenian National Commission for UNESCO
National Academy of Sciences of Armenia (President: Radik Martirosyan)
State Committee for Science of Armenia (Chairman: Samvel Harutyunyan)
Ministry of Education and Science of Armenia (Minister: Armen Ashotyan)
Ministry of Culture of Armenia (Minister: Hasmik Poghosyan)
"Antares" Holding (President: Armen Martirosyan)
"Armenpress" News Agency (Executive Director: Hrayr Zoryan)

The Certificates are signed by the IAU President *Prof.* Robert Williams, and *Prof.* Catherine Cesarsky, the Chair of the IAU/IYA2009 Executive Committee Working Group.

WIDE-FIELD ASTRONOMICAL TELESCOPES

50 years of the Byurakan 1m Schmidt telescope



The Byurakan Astrophysical Observatory 1m Schmidt telescope (shortly, BAO-1m) is one of the largest Schmidt-type telescopes in the world. It was undoubtedly the most productive among all Byurakan telescopes and was one of the most efficient astronomical telescopes in the world in general. It also has an interesting history, somehow related to several important political figures, such as Hitler, Mussolini, Stalin, and Khrushchev.

History of BAO 1m Schmidt telescope

At the end of 1930s, the German fascist leader Adolf Hitler ordered to build a 1m astronomical telescope to gift it to his friend, the Italian political leader and Prime Minister Benito Mussolini. However, the World War II started in 1939 and the construction works were not so active; the

telescope was in fact not finished. After Germany lost in the war, the Soviet Union (and other winning countries) took from Germany a lot of equipment and other goods as war booty. Among other goods, a few astronomical telescopes built in famous Carl Zeiss factory in Jena were also included. After the war, in summer 1946, Viktor Ambartsumian participated in the celebrations devoted to the 300th anniversary of Isaac Newton in the UK (London and Cambridge). It was in fact Ambartsumian's first ever foreign trip and it became crucial for the future of the Byurakan Astrophysical Observatory (BAO). He organized his trip back from London through Berlin and having a short stop-over there he visited the Carl Zeiss factory in Jena (at that time, German Democratic Republic, GDR). The mirror of the future 1m Schmidt telescope was still there and he already then selected this one for Byurakan. It might happen that having a strong feeling and belief about the importance of astronomical surveys and searches for new objects, Ambartsumian already then decided to make this telescope as the one that could lead BAO to new discoveries and fame. Several telescopes and mirrors were later transported to famous Leningrad (St. Petersburg) Optics & Mechanics Amalgamation (LOMO) for further construction and distribution to Soviet astronomical observatories. Finally, after discussions with the Soviet scientific and political leaders, Ambartsumian succeeded to move 1m Schmidt to Byurakan, where it was installed in 1960. When installed, BAO Schmidt was in fact one of the three largest Schmidt telescopes in the world (together with German Tautenburg and American Palomar Schmidt ones). Our next famous scientist, Beniamin Markarian together with colleagues from LOMO was engaged in its mounting. The large experience acquired by Markarian during mounting of all previous telescopes in Byurakan here became necessary. At the beginning, a 4^{o} objective prism was prepared for BAO-1m. BAO-1m was officially opened by the Soviet leader Nikita Khrushchev in 1961 during his only official visit to Armenia. Science observations also started in 1961.

Since the beginning, several observational programs were started by the Byurakan astronomers. However, at the beginning of 1960s, Ambartsumian was strongly interested in the activity of galactic nuclei (a hypothesis put forward by him in mid-1950s) and mostly in discovery of more active galaxies to test and prove the idea as very few such objects were known at that time. He suggested to Markarian to start such a search work with the newly installed BAO-1m. However, the observational task was not trivial. Markarian himself started working in the field of extragalactic astronomy just a few years before and was searching for criteria to distinguish such active galaxies. His most important and breakthrough discovery was the paper about 73 known galaxies having non-correspondence of their colors (which were bluer) and spectral types. The conclusion was that an additional UV radiation was coming from the central parts of these galaxies thus proving the activity of their nuclei. An idea came on search for more galaxies with UV excess continuum. For this purpose the low-dispersion spectra fitted best of all, obtained with the objective prism in combination with the wide-field telescope. However, Markarian understood that the 4^{o} prism could not solve his task. He clearly understood that spectral features in galaxies were at least by an order of magnitude and more powerful than in the stars. Therefore the dispersion should be decreased to increase the limiting magnitude on the plates. Thin objective prisms were necessary and he ordered additional 1.5 ^{o} and 3^{o} prisms in LOMO. By the way, for a long time these 3 prisms were the largest objective prisms in the world. Markarian used 1.5^{o} prism low-dispersion (1800 A/mm near H_{γ}) and obtained spectra without widening, on which the galactic nuclei were easily detected on their host galaxies. It was the first successful experiment in astronomical practice of using a thin objective prism for this purpose. Some emission lines were easily detected with such dispersion, but the main criteria for selection of new objects was the UV-excess. Thus, the first largest and the most important survey with BAO-1m was started in 1965. BAO-1m operated till 1991 and gave some 9500 astronomical plates with extremely useful information on dozens of millions objects, both galactic and extragalactic ones.

Technical description of BAO-1m

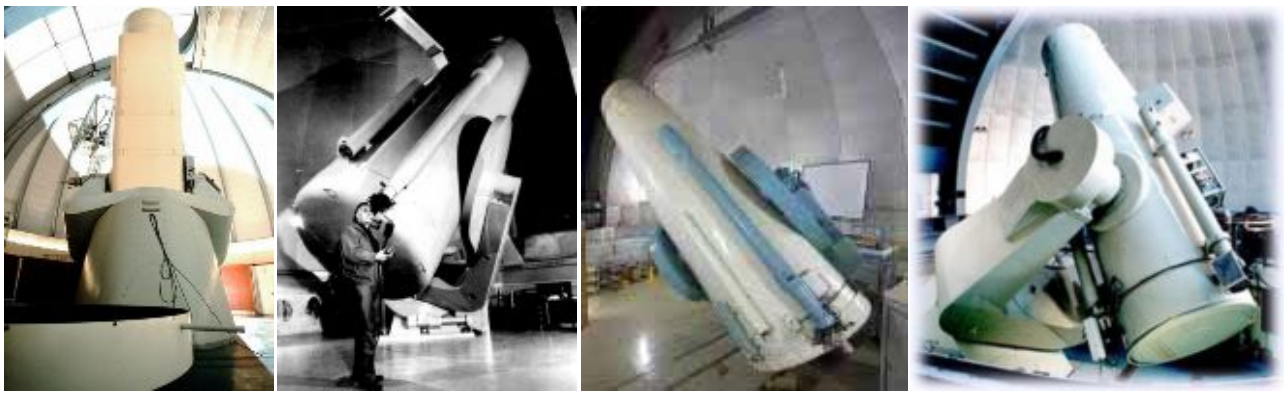
The telescope was installed in 1960 at an altitude of 1397m in the main territory of BAO. First light was in 1961. It was constructed by the Leningrad (St. Petersburg) Optics & Mechanics Amalgamation (LOMO), however the mirror was made in Germany. The mounting type is fork. The telescope's correcting lens has 102 cm (40″) diameter, and the Pyrex mirror's diameter is 132 cm (52″). The focal length is 213 cm (84″), and the aperture ratio (D/F) is 1:2.1. The telescope has 4.1°×4.1° non-vignette field. 16.1×16.1 cm size photographic plates have been used. The scale is 96.8 ″/mm. Due to a Piazzi-Smith lens the telescope has a flat field. The optics is made of uviol glass and the optical system is corrected for the blue spectral range.

One of the 1m Schmidt telescope's advantages was the presence of its three objective prisms (1.5°, 3°, and 4°) made of uviol glass, which made possible wide-field spectroscopic observations with various dispersions: 1800 Å/mm, 900 Å/mm, 285 Å/mm dispersion near Hγ for 1.5°, 3°, and 4° prisms, respectively. The objective prisms can rotate in the position angle that allows obtaining spectra of any orientation.

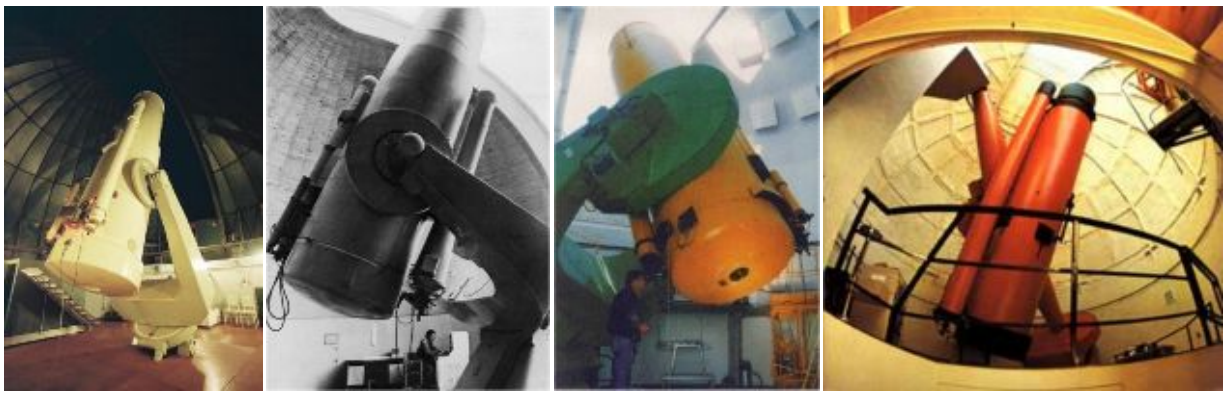
World largest Schmidt telescopes

As BAO-1m is one of the largest wide-field telescopes in the world, we give here the list of these telescopes and their comparative characteristics. Telescopes having correction lenses larger than 80cm are given, including the 8 largest 1m class telescopes and four 80cm class ones.

Telescope name	Corr.	Mirror	Foc.	Focal ratio	Field	Plate	Scale	Location	Country	Alt.	Year
	cm	Cm	cm		deg	Cm	"/mm			m	
Alfred-Jensch	134	203	410	1:3.0	3.4x3.4	24x24	50.3	Tautenburg	Germany	331	1960
Samuel Oschin	122	183	307	1:2.5	6.6x6.6	36x36	67.2	Mt. Palomar	USA	1706	1948
UK Schmidt	122	183	307	1:2.5	6.6x6.6	36x36	67.2	Siding-Spring	Australia	1131	1973
Kiso Schmidt	105	150	330	1:3.1	6.0x6.0	36x36	62.5	Kiso	Japan	1130	1974
ESO Schmidt	102	162	306	1:3.0	5.5x5.5		67.4	Cerro La Silla	Chile	2400	1969
Jurgen Stock	102	152	301	1:3.0	5.5x5.5	29x29	68.5	Llano del Hato	Venezuela	3600	1976
Kvistaberg Schm.	102	135	300	1:3.0	4.6x4.6	24x24	68.8	Kvistaberg	Sweden	33	1964
BAO 1m Schmidt	102	132	213	1:2.1	4.1x4.1	16x16	96.8	Byurakan	Armenia	1397	1960
Uccle Schmidt	84	117	210	1:2.5			98.2	Uccle	Belgium	105	1958
Hamburg Schmidt	81	122	240	1:3.0	5.5x5.5	25x25	86.2	Calar Alto	Spain	2160	1955
Baker-Schmidt	81	91	300	1:3.7			68.8	Bloemfontein	S. Africa	1387	1950
Baldone Schmidt	80	120	240	1:3.0	4.8x4.8	24x24	85.9	Baldone	Latvia	75	1967



Four of the world largest Schmidt telescopes: Tautenburg, Palomar, Siding-Spring, and Kiso.
In the photo of the Palomar Schmidt, Edwin Hubble is looking through the guide.



Four other big Schmidt telescopes: Kvistaberg, Byurakan, Hamburg, and Obs. de Haute-Provence (OHP).

BAO-1m main observational projects and obtained results

As mentioned above, several large observing programs were started since the beginning. Among the most important ones, the following can be listed:

- Detailed colorimetry of bright galaxies
- First Byurakan Survey (FBS, Markarian survey)
- Search for flare stars in Pleiades
- Search for flare stars in Orion
- Search for flare stars in NGC 7000 (Cygnus)
- Search for flare stars in Praesepe
- Search for flare stars in Taurus Dark Clouds
- Second Byurakan Survey (SBS)
- Extension of the FBS in the Galactic Plane

*The **First Byurakan Survey*** **(FBS)** is the most famous work done with this telescope. More than 2000 photographic plates were obtained in frame of this survey by Markarian, Lipovetski and Stepanian. 1500 objects were selected, which are known at present as Markarian galaxies. In addition, some 1100 and 1050 blue and red stellar objects, respectively, were selected and studied from the FBS plates, as well as 1500 IRAS sources were optically identified. The continuation of the FBS is ***Second Byurakan Survey*** **(SBS)** carried out with 1m Schmidt telescope (Markarian, Stepanian, Erastova, et al.). Total number of the discovered peculiar objects is about 3600, about 1800 of which are stellar and 1800 are non-stellar objects. The SBS is one of the most effective surveys in respect of discovery of bright QSOs. Extensive work on ***discovery and investigation of flare stars*** in open stellar clusters and associations has been also carried out with the help of 1m Schmidt telescope by L.V. Mirzoyan and colleagues. Since 1969 more than 500 flare stars have been discovered.

At present all FBS plates and part of the SBS plates have been digitized and the **Digitized First Byurakan Survey (DFBS)** and the Digitized Second Byurakan Survey (DSBS) have been created. Digitization works are being continued for other observational projects as well. By its projects and results BAO-1m undoubtedly is one of the most productive telescopes in the world.

Present state and reconstruction projects of BAO-1m

In 1991, the 1m Schmidt telescope was stopped and since then no observations have been carried out. Recently, a project for reconstruction of this telescope was put forward in collaboration with the Russian Special Astrophysical Observatory (SAO), including equipping it with a contemporary detector and advanced controlling system. Photometry in wide-band filters and slitless spectroscopy with objective prisms would be the main observing modes. The re-equipment of 1m telescopes must include the installation of a CCD camera in the focus with pixel size of about 1 arcsec and field of view of ~2 deg^2; constitution of a set of middle and broad band filters covering the whole visible range (3400–10000Å); creation of fully-automated control and monitoring system of the telescope including guiding system, control of CCD, feeding of filters to the telescope focus, controlling of the dome, etc. The principal purpose of the re-equipment of the telescopes is the creation of possibility to obtain samples of objects up to $R\sim23^m$ with signal-to-noise ratio of ~5 and images better than 2″. Such data ensure the successful classification of objects and measurement of redshifts by analysis of energy distribution in the objects spectra.

However, this project is still under discussion and was in fact not started. On the other hand, an agreement with the Armenian “Vivacell MTS” mobile phone company (Director: Ralph Yirikian) was obtained in 2005 to refurbish BAO-1m and prepare its dome and main parts for further reconstruction projects. Some parts of the program have been completed. A test automation of the telescope control was made in 2009 by two Yerevan State University (YSU) students, Vazgen and Aram. Vazgen Gabrielyan participated in the Third Byurakan Summer School for the YSU students in July 2009 and got acquainted to BAO-1m during their stay in Byurakan. An idea came to try to build and automated control system that could move the telescope using a PC, even a Laptop. And this was accomplished a few months later. Anyway, a significant amount of funds are still needed for re-operation of BAO-1m.

Importance of large-area surveys

It is pretty obvious that almost all important objects for further astronomical studies have come from wide-field surveys, both colorimetric and spectroscopic. Among the colorimetric surveys, Palomar Observatory Sky Surveys are well known (POSS-I and POSS-II) taken with the famous Palomar Schmidt telescope, which gave very large coverage in two (B and R, POSS-I) and three (B, R and I, POSS-II) bands. Together with similar Southern surveys taken with ESO and Australian Schmidt telescopes they give total sky coverage with more than 1 billion objects brighter 21^{st} magnitude. However, very little information on the nature of these objects may be retrieved from these plates.

Spectroscopic surveys give more information about the nature of objects and are much more important, though requiring rather harder work and are thus very rare. Unlike the colorimetric ones, there is no any all-sky spectroscopic survey and only several large area surveys exist. To show the importance of the FBS and SBS obtained with BAO-1m, we give a comparative table of large area objective field photographic surveys and the Sloan Digital Sky Survey (SDSS). Until now, FBS remains the largest area spectroscopic survey during the whole history of astronomy. In addition, it may give complementary (in sense of larger wavelength coverage) information to better resolution surveys such as HQS and Case.

Survey	Years	Telescopes and Equipment	Emulsions	Disp. at Hγ	Spectral range, Å	Area covered, deg^2	V_{lim}	Objects of interest
FBS	1965-1980	Byurakan 102/132/213cm Schmidt 1.5° prism	IIa-F	1800	3400-6900	|b|>15° δ>-15° 17,000	17.5	UVX galaxies (Markarian galaxies) FBS BSO/RS
SBS	1978-1991	Byurakan 102/132/213cm Schmidt 1.5°/3°/4°prisms	IIIa-J IIIa-J+GG495 IIIa-F+RG2 IV-N	1800 900 280	3400-5300 4950-5400 6300-6950	|b|>30° 49°<δ<61° 965	19	UVX gals, QSO/Sy, BCDG, hot stars
Case	1983-1995	Kitt Peak 61/91/cm Burrell Schmidt 1.8° prism	IIIa-J	1350	3400-5300	|b|>30° δ>30°	18	Blue stellar objects, UVX galaxies CSO/CBS/CG
HQS	1985-1997	Calar-Alto 81/122/240cm Schmidt 1.7° prism	IIIa-J	1390	3400-5300	|b|>20° δ>0° 12,000	19	QSOs, Hamb./RASS HS objects
HES	1990-1996	ESO 102/162/306cm Schmidt 4° prism	IIIa-J	280	3400-5300	|b|>30° δ<+2.5° 9,000	18	QSOs hot stars HES objects
SDSS	2000-2007	Apache Point 2.5 m Ritchey-Chretien Double MOS	CCD	res.: 2.5 Å	3800-9200	|b|>30° δ>0° 10,000	21	100 million objects; 1 million gals, 100,000 QSOs

Modern astronomical research is impossible without various multiwavelength data present in numerous catalogues, archives, and databases. Summarizing, the largest all-sky or large-area catalogues and databases available today in various wavelengths are:

- optical images: DSS1 (all-sky images in blue and red from POSS-I), DSS2 (all-sky images in blue, red, and IR from POSS-II), SDSS (images for 10,000 deg^2 in five bands; u, g, r, i, z)
- optical photometry: USNO-B1.0 (accurate positions, B1, R1, B2, R2, and I photometry; proper motions for all 1,045,913,669 objects in POSS-I and POSS-II), MAPS (accurate positions, O and E photometry for 89,234,404 POSS-I objects), SDSS (accurate positions, u, g, r, i, z photometry for 357 million objects mainly in the Northern extragalactic sky)
- optical spectroscopy: FBS, SBS, Case, HQS, HES (low-dispersion spectra for most of the extragalactic sky, 17,000 deg^2 in North, 9,000 deg^2 in South), SDSS (medium dispersion spectra for 1,640,960 objects, incl. 929,555 galaxies, 121,373 quasars, and 464,261 stars)
- X-ray data: ROSAT BSC and FSC (X-ray positions and 0.1-2.4 keV photon counts and two hardness ratios for 124,730 sources)
- UV data: GALEX (provides fluxes at 1528A FUV and 2310A NUV bands)
- NIR photometry: 2MASS (accurate positions and JHK photometry for 470,992,970 objects)
- MIR and FIR photometry: IRAS PSC and FSC (IR positions and fluxes in 12μm, 25μm, 60μm, and 100μm bands for some 270,000 sources), AKARI-IRC Point Source Catalogue in Mid-IR (9μm and 18μm fluxes for 870,973 sources) and AKARI-FIS Bright Source Catalogue in Far-IR (65μm, 90μm, 140μm, 160μm bands for 427,071 sources), WISE
- radio data: NVSS (radio positions and 21cm fluxes for 1,773,484 sources over all the sky available from NRAO), FIRST (accurate radio positions and 21cm fluxes for 811,117 sources from 10,000 deg^2 area of the Northern extragalactic sky).

Future of the Schmidt-type and other wide-field telescopes

Though many historically important Schmidt telescopes are being closed, anyway such type of optics is extremely useful for new astronomical discoveries. The prove is that the biggest Schmidt-type telescope, 4m LAMOST (given in the figure), is being built in China and will serve for wide-area surveys. Moreover, some of the space telescopes have used and now use Schmidt cameras, such as HIPPARCOS and Kepler telescopes. ESA's HIPPARCOS Space Astrometry Mission was launched in 1989 and operated till 1993 to measure accurate positions and magnitudes and resulted in Hipparcos Catalogue of 118,218 stars and Tycho Catalogue of 2,539,913 stars with the highest accuracy positions and proper motions. A small 29cm Schmidt camera did all this work. NASA's Kepler mission was launched in March 2009 and is aimed at search for habitable planets. Kepler's telescope is a 95cm Schmidt camera with a very wide angle, 105 deg^2. Due to this, it will be bale to observe 100,000 stars during its 3.5 life years.

Classical Schmidt telescopes gave the vast majority of new astronomical objects making all important discoveries possible. New Schmidt telescopes are now orbiting Earth and Sun and proved huge amounts of data for further astrophysical research. Among all these telescopes, BAO-1m will always have its important role in discovery of thousands of new objects, especially the famous Markarian galaxies.

Areg Mickaelian

EURO-ASIAN ASTRONOMICAL SOCIETY

20 years of the Euro-Asian Astronomical Society (EAAS)

The Soviet Astronomical Society (called **AstrO**, Astronomical Society in Russian, at the beginning and later renamed to **Euro-Asian Astronomical Society, EAAS**) was founded in April 1990 to unify all astronomers working in 15 republics of the former Soviet Union (two of them in fact didn't have astronomy at all). Very soon, in 1991, the Soviet Union disintegrated, however the Society survived and further served for needs of astronomy. ***Prof.*** **Nikolai Bochkarev** had a significant contribution in the creation and development of AstrO. He, together with V.G. Gorbatski (St. Petersburg) and A.A. Sapar (Estonia) became the first Co-Presidents. At present N.N. Samus, M.I. Ryabov and L.V. Rykhlova are the EAAS Co-Presidents. Since the beginning EAAS is based on the Sternberg Astronomical Institute (SAI) in Moscow.

EAAS holds its **General meetings** every two years (altogether 9 meetings) and publishes electronic newsletter called **"Astrocourier"** (typically once per 2 months), which is being distributed to its members. EAAS is one of the affiliated societies of the European Astronomical Society (EAS). Since 1991, EAAS also published for 16 years a professional journal

"Astronomical and Astrophysical Transactions" and at present works on recovery of its regular publication are being carried out. The largest event organized by EAAS was JENAM-2000 (the European annual meeting) in Moscow and JENAM-2011 will be organized in St. Petersburg as well.

At present some 800 astronomers are **EAAS members**, including those from foreign countries. Armenian astronomers actively participated and participate in EAAS. 19 of them have been EAAS members at different times. It is worth mentioning that our great scientist Viktor Ambartsumian also became an EAAS member in April 1996, just four months before his death. In addition, the Armenian Astronomical Society is the official representative of EAAS in Armenia. We congratulate all EAAS members for this great anniversary and wish its further development for the benefit of our beloved science astronomy.

EAAS official web site: http://www.sai.msu.su/EAAS/eng/index_eng.html

ASTRO2010 DECADAL SURVEY

The **Astro2010 Survey Committee report**, *"New Worlds, New Horizons in Astronomy and Astrophysics"*, was released by the National Academies in Washington, DC. The report recommends priorities for the most important scientific and technical activities of the next 10 years in astronomy and astrophysics. These include a balance of small, medium, and large initiatives, with ground- and space-based telescopes across the electromagnetic spectrum. The report also addresses important demographic and career issues.

The 23-member Astro2010 Survey Committee, chaired by ***Prof.*** **Roger Blandford** (Stanford University), surveyed the whole astronomical enterprise, from science to infrastructure, and assessed ground- and space-based activities in astronomy and astrophysics, including both new and previously identified concepts. Their recommendations for the coming decade are addressed to the agencies supporting the field, the Congressional committees with jurisdiction over those agencies, the scientific community, and the public. It is difficult to overemphasize the importance to our discipline of the decadal survey recommendations. Congress, the White House, and the funding agencies applaud us for undertaking this effort, and they will use our community priorities to allocate federal resources to astronomy and astrophysics projects.

Astro2010 Decadal Survey Website: http://sites.nationalacademies.org/bpa/BPA_049810

New Worlds, New Horizons in Astronomy and Astrophysics (prepublication version):
http://www.nap.edu/catalog.php?record_id=12951

Presentation slides from Aug 13 briefing by Roger Blandford:
http://sites.nationalacademies.org/xpedio/groups/bpasite/documents/webpage/bpa_058306.pdf

R136a1, MOST MASSIVE STAR KNOWN

Massive stars are of special interest for astrophysics. The most extreme of these stars was found in the cluster RMC 136a (more often nicknamed R136). Named R136a1, it is found to have a current mass of 265 times that of the Sun. Being a little over a million years old, R136a1 is already "middle-aged" and has undergone an intense weight-loss programme, shedding a fifth of its initial mass over that time, or more than fifty solar masses. It also has the highest luminosity, close to ten million times greater than the Sun.

R136 is a cluster of young, massive and hot stars located inside the Tarantula Nebula, in one of the Milky Way's neighbouring galaxies, the Large Magellanic Cloud, 165 000 light-years away. Summarizing, the R136 star cluster hosts several stars whose individual masses greatly exceed the accepted 150 $M_{\odot}$ stellar mass limit.

Related article: http://www.eso.org/public/archives/releases/sciencepapers/eso1030/eso1030.pdf

THE EVOLUTION of the UNIVERSE ACCORDING to V.A. AMBARTSUMIAN

Robert Sargsyan's new booklet

Robert Sargsyan was a former BAO researcher and one of Viktor Ambartsumian's students. Recently his booklet *"The evolution of the Universe according to V.A. Ambartsumian"* in three languages (Armenian, Russian, and English) was published (among several other popular booklets) by the publishing company *"Lusakn"* (48p., Yerevan 2010). Sargsyan describes Ambartsumian's most important contributions in science giving an overall understanding on his views on the evolution of the Universe. He tried to represent the integrity of Ambartsumian`s concepts of the origin and the evolution of the Universe, as well as some of many problems suggested by him. Ambartsumian's affirmance of the evolution of the Universe, which will promote the new evolution of astrophysics and physics will be more fixed by the solution of those problems.

One of the motives of this work is also the fact that since 2000 more than twenty Armenian teenagers captured prize-winning places in the international Astronomical Olympiads among school pupils, which confirmed the immortality of Ambartsumian's concepts. With the purpose of systematizing the scientific activity of the Armenian winners of the Olympiads the fund "V.A. Ambartsumian's adherents" will be soon formed with Sargsyan's efforts, which will promote the future development of astronomy in Armenia.

ZADIG MOURADIAN – 80

Prof. **Zadig MOURADIAN**, one of the most outstanding astronomers of Armenian origin, recently celebrated his 80th anniversary. He is one of the most famous French astronomers and is widely known in the field of theoretical astrophysics and Solar physics.

Zadig Mouradian was born on July 10, 1930, in Bucharest (Romania). In 1954 he graduated from the Faculty of Mathematics and Physics of the Bucharest University with Licentiate's degree and in 1957-1958 was a researcher at the Bucharest Astronomical Institute. In October 1958 Mouradian moved to France and since 1959 works as a researcher at the Solar Physics Dept of the Meudon branch of Observatoire de Paris. In 1965, he defended his Ph.D. thesis at Paris Sorbonne University and obtained a degree of Doctor in Physical Sciences.

Mouradian's research is related to Solar physics, particularly to the outflow of matter from the chromosphere to the corona (Solar wind), disappearance of prominences due to heating, the regions having rotation of solid matter causing magnetic flows (discovery of relation of solar activity to the rigid rotation). The *"Mouradian effect"* discovered by him allows revealing phenomena taking place in the Solar upper layers by means of radial velocities.

Out of the most important scientific results by Mouradian one should mention the first observation of the magnetic field evolution of Solar active region before, during, and after a Solar flare, the discovery of the main reason of the material transport by spicules from the Solar chromosphere toward Solar corona (i.e. the Solar wind), the measurement of the darkening of the extreme part of Sun (Solar limb profile, quoted in "Astrophysical Quantities"), *"Mouradian effect"* of optically thick spectral lines (the Solar atmosphere velocity field causes Doppler shift, which decreases the optical thickness in line centres), discovery of thermal disappearance of Solar prominences due to heating, design and leading of the construction of 8m Solar spectrograph for Pic du Midi Observatory (Pyrenean mountains, France) working till now, development and leading of the principle of computer software for digital recording, analysis, designing and publication of *"Solar activity synoptic maps"* (the only synoptic maps existing in the world with computer control), suggestion of a new method for the measure of Solar activity rotation velocity, which reveals new parameters of Solar activity.

Altogether, Mouradian is an author or co-author of some 160 scientific papers. It is interesting to note that he was present at 7 Solar eclipses, during which he carried out investigations. He established active international collaborations in the field of Solar physics with the scientists of Armenia, Bulgaria, China, Japan, Romania, Russia, and USA. Mouradian has given lectures on the Solar physics at the Department of Physics of the Bucharest University. He has been supervisor of a number of Ph.D. theses. Mouradian has organized the first pre-eclipse meeting (NATO Workshpo) in Sinaia. He has been the editor of "Cartes Synoptiques de l'Activite Solaire", publication of Observatoire de Paris.

Mouradian is a member of the International Astronomical Union (IAU, 1970), European Astronomical Society (EAS), French Society of Astronomy Experts (Societe Francaise des Specialistes en Astronomie), Romanian Academy of Sciences (Academia Oamenilor de Stiinta). In 2008, he was elected a foreign member of the Armenian National Academy of Sciences, and in 2009 he became a member of ArAS.

Is Zadig Mouradian really 80 years old?

Late 60s. I have been working at Bucharest Observatory for quite a while. The Iron Curtain was shutting out a whole world from us. Only my older colleagues had memory of a great expert in solar physics working in Paris, who fled Romania in 1958. A true legend one might say. Much later, the fall of the Wall. Soon after, in 1990, I became the director of the Astronomical Institute in Bucharest. An entirely new world was opening up to us.

I finally had the chance to travel to that Western world, so badly criticized during the communist regime. It so happened that the first relations resumed were those with France, the traditional partner of the Romanian astronomy since the foundation of Paris Observatory. Naturally, I planned to look for the man who has started his research on the Sun in Romania, in the very Observatory where I was working. I was in one of the offices on the top floor of the so-called “bâtiment Perrault” of Paris Observatory when I saw a man visibly absorbed in his thoughts, his trenchcoat blowing in the wind, rushing down the narrow path leading to the building. It was Zadig Mouradian. I was nervous as I kept wondering if he could still speak Romanian. It soon turned out that his Romanian was flawless, and so was his French and his Armenian, because he kept speaking them at home all the while after he had left his native country.

The surprise was up to my expectations. He smiled at me a bit intrigued while he shook my hand. That was the beginning of a collaboration and friendship that have lasted ever since.

We happened to have from the very beginning a common concern: preparing the last total solar eclipse of the 20th century, namely that of 11th August 1999. Its maximum was visible from a place in Romania, very close to Bucharest Observatory.

From his rich recommendations I shall mention only his most important accomplishments:

- First observation of solar magnetic field evolution of an active region before, during and after a solar flare.
- Discovery of material transport by specula from chromospheres toward corona, the main supply of solar wind.
- Measure of solar extreme limb darkening quoted in "Astrophysical Quantities", issues 1973 and 2000.
- "Mouradian's Effect" of optical thick spectral lines. The velocity field of the solar atmosphere produces Doppler shift which reduces the optical thickness in the line core.
- Discovery of thermal disappearance of solar prominences by heating.
- Design and building supervision of the 8 m Solar spectrograph set up at Pic du Midi Observatory (Pyrenean Mountains, France), still working.
- Conception and supervision of a computer program for digital recording, analysing and drawing of “Synoptic Maps of Solar Activity” and their publication. The only existing computer controlled synoptic maps in the world.
- Finding of a new method for the measure of solar activity rotation rate, which reveals new parameters of solar activity.

We have started work straight away. In 1996 we set up and organized together, in the Romanian city of Sinaia, the first workshop on the observation of the total solar eclipse (“Theoretical and Observational Problems Related to Solar Eclipses“ – NATO ASI Series C – vol. 494, 1997, eds. Zadig Mouradian, Magda Stavinschi).

Subsequently we have started to prepare for the event: experiments, trips to the countryside, lectures to the students and young researchers, all intended to bring about optimal results during the famous eclipse observation.

This opportunity was unique, but our co-operation didn't stop there. Z. Mouradian supervised doctoral dissertations of Romanian young researchers, co-ordinated research topics, delivered numerous conferences, among which I should like to mention only the last two: the conference that took place in April 2008 on the occasion of the centenary of Bucharest Observatory, where he began his career, and the one in December 2009 at the French Cultural Institute in Bucharest, ending the International Year of Astronomy in Romania.

Last but not least, his unusual vitality makes many people wonder about his age. Thinking also of his unquenched curiosity, his present research or future projects I cannot help wondering too: could it be true? Is Zadig really 80 years old? Yes, according to his identity card, and we should all wish him many happy returns because we all need him, from us humble mortals to the Sun, an enigma which is far from being solved.

Happy Birthday Zadig !

Magda Stavinschi

ANATOL CHEREPASHCHUK – 70

Prof. **Anatol CHEREPASHCHUK**, famous Russian astronomer, renowned specialist in the field of close binary stars, Director of Moscow State University Sternberg Astronomical Institute (SAI), Academician of Russian Academy of Sci. (RAS), ArAS member, celebrated his 70th anniversary.

Anatol Mikhailovich Cherepashchuk was born on July 7, 1940 in Syzran (Samara province, Russia). He graduated from the astronomical division of the Department of Physics of Moscow State University (MSU) in 1964. Ph.D. thesis in 1967 ("Study of the system V444 Cygni. Interpretation of eclipsing systems as inverse problem of photometry"), Doctoral thesis in 1976 (Method and results of narrow-band photometric studies of close binary systems with extended atmospheres and other non-stable objects). Since 1985 he is a Professor, since 1986 heads the Chair of *Astrophysics and Stellar Astronomy*, since 1986 also heads the astron. division of the Dept of Physics, as well as since 1986 is Director of SAI and Chair of division of Stellar Astrophysics, Corresponding Member of RAS (1997), Academician of RAS (2006). He is the Deputy Chair of the Astronomical Council (1993), Chair of the section *"Stars and Planetary Systems"* of the Scientific Council of RAS.

Cherepashchuk's main research fields are astrophysics, stellar physics, and study of close binary stars at late evolutionary stages. He developed a new research field, physics of close binary systems at late evolutionary stages. Well-known are his works on Wolf-Rayet stars, neutron stars and candidates for black holes in binary systems. Observations led to new methods developed for the interpretation of observations of close binary stars in frame of non-traditional models. Masses, radii, temperatures, and evolutionary statuses of peculiar stars in binary systems were determined. He carried out a number of pioneering studies, including the creation of high-efficiency theory, methodology, and equipment for study of close binary stellar systems, correct

definitions of radii and temperatures of Wolf-Rayet stars were given, it was shown that they are naked helium nuclei of massive stars at late evolutionary stage, optical evidences of X-ray binary systems were studied, mass estimations of black hole candidates were given. He developed and obtained observational confirmation for the concept of cloudy wind of Wolf-Rayet stars. He discovered optical eclipse in the unique object SS433 with collimated precessing relativistic outflows and revealed the nature of this mysterious object. He suggested and justified by optical observations the presently accepted model of SS433 as a massive X-ray binary system at its late evolutionary stage with precessing supercritical accretion disk around the relativistic object. These investigations are useful for the understanding of the nature of the galactic nuclei with similar relativistic collimated outflows of matter. At present the study of variability of spectral lines and search for delay effects grew to a new direction of investigations of structure of AGN. He has prepared 18 Ph.D. students and 3 Doctors of Science. He has published some 250 research papers.

Cherepashchuk is a member of IAU, EAS, Royal Astronomical Society (1999), ArAS (2009). He has been the EAS Vice-President (2000), Deputy Editor-in-Chief of Russian *Astronomical Journal* (*"Astronomy Reports"*) and of *"Astrophysics and Space Science"*, member of editorial boards of *"Priroda"* and *"Zemlya i Vselennaya"*. He is Laureate of Lenin Comsomol Prize (1974), MSU Lomonosov Prize of I degree for scientific research (1988), MSU Lomonosov Prize for teaching activities (2001), RAS A.A. Belopolski Prize (2002), Russian Federation State Prize in the field of science and technology (2008). He was awarded an Order of People's Friendship (1999) and medal "To the 850th anniversary of Moscow" (1997).

OTHER ANNIVERSARIES

Dr. **Hovhannes PIKICHIAN – 60.** *Dr.* Pikichian is one of the senior research associates at BAO. He was born on August 14, 1950. He graduated from the YSU in 1972 and works at BAO since 1974. Ph.D. in 1984 under the supervision of V.A. Ambartsumian, senior researcher since 1990.

Pikichian's main filed of investigations are radiation transfer theory and inverse problems in astrophysics. He studied the radiation field in a plane-parallel atmosphere containing energy sources, the problem of diffuse reflection with arbitrary law of frequency redistribution of radiation, Green's function of a plane-parallel layer in the case of incoherent anisotropic scattering, light emission from a medium under illumination by parallel rays in the case of arbitrary frequency redistribution of radiation, general relationships of invariance for the study of transfer problems in media with geometrical and physical characteristics of arbitrary complexity, determination of the radiation field in a composite medium on the basis of known solutions of problems of transfer in its arbitrarily selected macroparts, finding a solution to the problem of transport in an isolated part of a volume on the basis of a known solution for the total volume, principle of invariance in problems of adding of layers with arbitrary properties, principle of invariance and transfer problems with physical and geometrical characteristics of arbitrary complexity, reconstruction of the 3D density distribution of flare stars in the Pleiades, high energy radiative transfer processes in the superdense degenerate plasma, nonlinear diffuse reflection and transmission of radiative energy by a layer of finite thickness, etc.

Pikichian has published 20 research papers, as well as edited proceedings of meetings (*"Principle of invariance and its applications"*, 1989, together with M.A. Mnatsakanian). He has been the Scientfiic Secretary of BAO. Pikichian is a member of IAU (1994), EAS, and ArAS (1999).

***Dr.* Meri ZAZYAN – 60.** *Dr.* Zazyan works at the Yerevan Physics Institute (YerPhI) as a senior researcher. She was born on August 7, 1950 and graduated from the Department of Physics of the Yerevan State University (YSU). She works in the field of cosmic rays studies and gamma-ray astrophysics and has taken part in a number of experiments by the Cosmic Ray Department of YerPhI. Zazyan is ArAS member since 2003.

***Dr.* Ara MIRZOYAN – 50**. *Dr.* Mirzoyan is the Director of *"Galaktika"* optical laboratory in Garni. He was born on July 21, 1960. He graduated from the YSU in 1982 and worked at BAO in 1984-1993. In 1995, he defended his Ph.D. thesis under the joint supervision of V.V. Hambaryan and H.A. Harutyunian. Mirzoyan's main fileds of investigations were statistical study of flare stars, prediction of the flare activity of stellar aggregates, flare activity of stars as a cluster membership criterion, relative number of flare stars in systems of different ages, flare stars and the evolution of red dwarf stars, proper motions and distribution of flare stars in the Pleiades, optical observations of flare stars in the Galaxy, sizes of real Trapezia. He has published 30 research papers. Ara Mirzoyan is the son of the famous Armenian astronomer Ludwik Mirzoyan, who was one of the oldest Byurakan scientists and worked as Ambartsumian's deputy for 27 years in 1959-1986.

OBITUARIES. VAGHARSHAK SANAMIAN

***Dr.* Vagharshak SANAMIAN (1917-2010)**. *Dr.* Sanamian, the oldest astronomer at BAO, recently passed away on June 30 at the age of 93. Sanamian was born on November 17, 1917. He started working at BAO in 1950 and participated in the development of the Observatory as one of the leading world centres. Moreover, he defended his Ph.D. thesis in 1957 under the supervision of the famous radioastronomer S.E. Khaikin and then led the radioastronomical investigations at BAO. He was the teacher of almost all our radioastronomers of further generations. Sanamian published 72 research papers and interestingly, the last one in 2007 at the age of 90! He was ArAS member since 2004.