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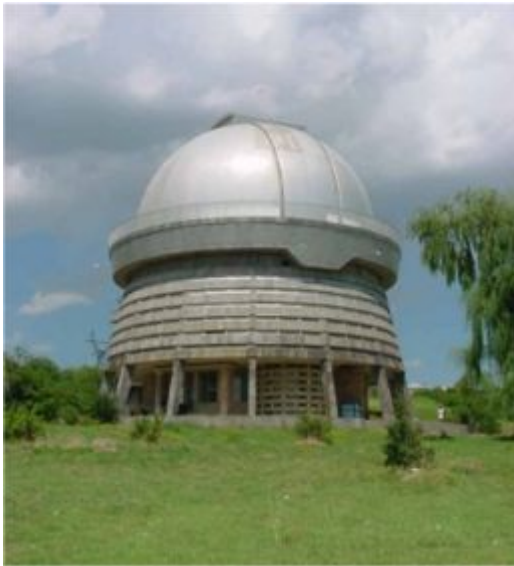
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BYURAKAN ASTROPHYSICAL OBSERVATORY in 2012: ANNUAL REPORT

Introduction

In 2012, the Byurakan astronomers continued and development the scientific projects related to **instability phenomena in the Universe** resulted in a number of important discoveries, active **international collaboration**, a number of **research grants** by Byurakan astronomers, organization of a number of meetings, etc. In 2012 BAO got a status of **National Value**, which allowed getting additional funding for the infrastructure and salaries. BAO scientists won 3 ANSEF grants in 2012, as well as a French-Armenian (CNRS-SCS) joint project for 2012-2013. There have been **30 publications in refereed journals**, including most important international ones (*ApJ, AJ, A&A, MNRAS*). There were **35 missions** for research and participation in meetings and schools. Haik Harutyunian was re-elected as BAO director for 2012-2013.

A few meetings were organized in 2012: the **4th Byurakan International Summer School** was organized in September followed by an **Archaeoastronomy meeting** dedicated to Anania Shirakatsi's 1400th anniversary and the **ArAS XI Annual Meeting**, a number of anniversary meetings and seminars, such as Grigor Gurzadyan – 90 were held.

On BAO's initiative, UNESCO included **Anania Shirakatsi's 1400th anniversary** among its important dates of the year 2012, and BAO took the leadership in organization of archaeoastronomy matters in Armenia and will organize a number of events in 2012.

Structure of BAO and research staff

BAO is one of the institutions of the Armenian **National Academy of Sciences (NAS)** and is affiliated to its **Division of Physics and Astrophysics**. BAO is being funded from the state budget through the **State Committee for Science (SCS) of the Ministry of Education and Science**, through Basic Program called *"Evolution of Cosmic Objects through their Activity"*. All researchers and the technical and administrative services, altogether 84 persons, are maintained due to this program. The administration consists of 3 persons: the **Director (*Dr.* Haik Harutyunian)**, the **Deputy Director (*Dr.* Tigran Magakian)**, and the **Scientific Secretary (*Dr.* Elena Nikogossian)**.

There are several research groups headed by Haik Harutyunian, Edward Khachikian, Tigran Magakian, Norair Melikian, Areg Mickaelian, Arthur Nikoghossian, Elma Parsamian, and Artashes Petrosian. Altogether 43 scientists work in these groups. Three laboratories of scientific-technical character, namely, the laboratories of the **2.6m telescope** (headed by Tigran Movsessian), **1m Schmidt telescope** (Smbat Balayan), and **Smaller telescopes** (Artur Amirkhanian) service are also parts of Basic Program. Unfortunately, none of the BAO research groups won state thematic grants in 2011-2012 to increase funding through such additional source also coming through the SCS (altogether there were 130 such grants in Armenia).

Telescopes and infrastructure

During 2012, BAO telescopes continued working however with very low efficiency. At present the **2.6m telescope** is the only one providing scientific results but the mirror aluminization is the main problem. The Governmental funding is not enough to solve this problem and several attempts have been made to find alternative sources; projects have been submitted but with no results. Moreover, it needs a basic renewal of all electronic part, particularly the control system. This is one of the most important works of BAO to be done in the nearest future.

The **small telescopes** may serve for smaller research projects and educational purposes, however they do not have modern receivers and other equipment. One of them is being used for visitors for promotional purposes.

BAO has a rich **Photographic plate archive** of some 35,000 plates obtained mostly with 0.5m and 1m Schmidt telescopes and the 2.6m one, and among them the First Byurakan Survey (FBS or Markarian survey) 2000 spectroscopic plates are the most valuable ones. It is now available in digital form (**Digitized First Byurakan Survey, DFBS**) and may be used for further efficient studies at high galactic latitudes. The **Armenian Virtual Observatory (ArVO)** operates based on this survey and other astronomical data obtained and being obtained with our telescopes, as well as data from all world databases and archives.

Research at BAO

The main fields of investigation at BAO relate to non-stable phenomena in the Universe. This includes studies of non-stable stars and related objects in the Galactic Astronomy and activity in galaxies in the Extragalactic Astronomy, as well as search for new objects and large surveys. In addition, a group of theoreticians is always active in Byurakan working on topics initiated by V.A. Ambartsumian (radiative transfer theory, principle of invariance). Several recent directions have been introduced during 1990s and 2000s, such as the Large-Scale Structure of the Universe and (alternative) Cosmology, Infrared Astronomy, X-ray Astronomy, Solar physics, Exoplanets, Virtual Observatories (VOs). To describe the main results obtained during 2012, the abstracts of published papers are given.

Stars and Nebulae

Frequency distribution of x-ray flares for young stellar objects in the region of ρ Oph
Akopian, A. A. (Ap 55, 81, 2012)
Methods for determining the frequency distribution function of optical flares have been developed and successfully applied in statistical studies of flare stars. X-ray observations of flare stars provide a basis for extending the use of these methods to statistical studies of X-ray flares of young stellar objects. This article gives a brief description of methods which can be used for determining the frequency distribution of the X-ray flares of young stellar objects. The corresponding function is determined for a sample of 195 low-mass young stellar objects in the cloud L1688, which forms part of the complex of dark clouds ρ Oph. It is found to have an exponential form.

Frequency distribution of x-ray flares for low-mass young stellar objects in the Orion nebula
Akopian, A. A. (Ap 55, 505, 2012)
The frequency distribution of x-ray flares is determined for the young, lowest-mass stellar objects in the Orion nebula. The methods used to do this have been developed previously for determining the analogous function for optical flares of flare stars. For this sample it is found that the x-ray flaring frequency distribution can be described by an exponential function.

A Spectroscopically Normal Type Ic Supernova from a Very Massive Progenitor
Valenti, S.; Taubenberger, S.; Pastorello, A.; **Aramyan, Levon**; et al. (ApJL 749, id. L28, 2012)

We present observations of the Type Ic supernova (SN Ic) 2011bm spanning a period of about one year. The data establish that SN 2011bm is a spectroscopically normal SN Ic with moderately low ejecta velocities and with a very slow spectroscopic and photometric evolution (more than twice as slow as SN 1998bw). The Pan-STARRS1 retrospective detection shows that the rise time from explosion to peak was ~40 days in the R band. Through an analysis of the light curve and the spectral sequence, we estimate a kinetic energy of ~7-17 foe and a total ejected mass of ~7-17 M_{sun}, 5-10 M_{sun} of which is oxygen and 0.6-0.7 M_{sun} is ^{56}Ni. The physical parameters obtained for SN 2011bm suggest that its progenitor was a massive star of initial mass 30-50 M_{sun}. The profile of the forbidden oxygen lines in the nebular spectra shows no evidence of a bi-polar geometry in the ejected material.

Revised and updated catalogue of the First Byurakan Survey late-type stars
Gigoyan, K. S.; Mickaelian, A. M. (MNRAS 419, 3346; VizieR On-line Data Catalog: III/266, 2012)

There have been 15 lists of late-type stars published between 1990 and 2010. These late-type stars have been found in the low-dispersion spectroscopic plates of the First Byurakan Survey (FBS). The systematic search and selection was carried out on a surface ˜16 000 deg^2 on almost the whole area of the FBS. As a result, a comprehensive catalogue of the late-type stars of the FBS was generated. Its preliminary version has been available at the Centre de Donnes Astronomiques de Strasbourg since 2007. We have revised and updated the FBS catalogue of late-type stars with new data from recently published optical and multiwavelength catalogues to give access to all available data and to make further comparative studies of the properties of these objects possible. We have made cross-correlations with the Digitized First Byurakan Survey (DFBS), the United States Naval Observatory-B1.0 catalogue, the Guide Star Catalogue 2.3.2, Tycho-2, Sloan Digital Sky Survey Data Release 8, the Two-Micron All-Sky Survey (2MASS), the Wide-field Infrared Survey Explorer catalogue, the Infrared Astronomical Satellite Point Source Catalogue/Faint Source Catalogue, the AKARI catalogue, the ROSAT Bright Source Catalogue/Faint Source Catalogue, the General Catalogue of Variable Stars and the Northern Sky Variability Survey. Also, we have added updated SIMBAD data for the objects. We present accurate Digitized Sky Survey 2 positions, approximate spectral subtypes refined from the DFBS low-dispersion spectra, luminosity classes estimated from 2MASS colours and available proper motions for 1045 FBS late-type stars. The FBS revised and updated catalogue lists a large number of completely new objects, which promise to extend very significantly the census of M giants, faint carbon stars at high Galactic latitudes and M dwarfs in the vicinity of the Sun. We study the complete samples, as well as investigating individual interesting objects up to 16.0-16.5 mag in visual magnitudes.

New carbon stars found in the Digitized First Byurakan Survey
Gigoyan, K. S.; Russeil, D.; **Mickaelian, A. M.**; Sarkissian, A.; **Avtandilyan, M. G.** (A&A 544, id.A95)

Faint high-latitude carbon stars (FHLCs) are distant, luminous giants. For this reason, they are often used to study the dynamical and chemical properties of the Galactic Halo. However, a more accurate investigation of photometric and spectroscopic surveys has revealed an increasing number of such objects with luminosities of main sequence stars. We report the first results of a systematic search of FHLCs using the Digitized First Byurakan Survey (DFBS) low-resolution spectral database. The DFBS low-resolution spectral plates are analysed to find new faint early and late-type carbon star candidates. Twenty new faint high-latitude carbon star candidates have been detected in an area of ~4030 sq. deg. Moderate-resolution slit spectroscopy was carried out for all candidates, confirming the carbon star nature for thirteen of them (nine are new discoveries), while the remaining objects are M-type stars. The carbon star sample consists of five N-type carbon stars, for which the estimated mass-loss rates agree well with the typical ones found for such carbon stars; five comparatively bright CH-type carbon stars; and three are probably dwarf carbon (dC) stars. The distance determination indicates that the dC stars belong to the thin disk, while the other stars belong the Galactic halo. These results demonstrate that one can efficiently find new faint high-latitude carbon stars in the DFBS database.

New bright carbon stars found in the DFBS
Gigoyan, K. S.; Rossi, C.; Sclavi, S.; Gaudenzi, S. (Ap 55, 424, 2012)
Abstract is not available

Revised classification of the SBS carbon star candidates including the discovery of a new emission-line dwarf carbon star
Rossi, C.; **Gigoyan, K. S.**; **Avtandilyan, M. G.**; Sclavi, S. (Proc. Conf. Young Scientist of CIS Countries, 94, 2012)

In the General Catalogue of the Second Byurakan Survey (SBS), only ten objects are indicated as carbon star candidates. This work aims at clarifying the nature of these stars. We analyzed new optical spectra and

photometry and used astronomical databases available on the web. We verified that two stars are N-type giants already confirmed by other surveys. We found that four candidates are M-type stars and confirmed the carbon nature of the remaining four stars; the characteristics of three of them are consistent with an early CH giant type. The fourth candidate, SBS 1310+561 identified with a high proper motion star, is a rare type of dwarf carbon star showing emission lines in its optical spectrum. We estimated absolute magnitudes and distances to the dwarf carbon star and the three CH stars.

Two trapezium-type systems in CMa
Gyulbudaghian, A. L. (Ap 55, 92, 2012)
This is an examination of two groups of stars, one of which contains a trapezium-type system consisting of four stars, while the second is made up of three stars, which are also part of a trapezium-type system. The two groups are located in the CMa OB1 association and contain cometary nebulae. Data on $^{12}CO(1-0)$ observations of the molecular cloud connected with the first group of stars are presented. The central portion of the molecular cloud is moving toward us. This may be a consequence of the presence of a strong flow inside the cloud produced by the star-formation region.

Three HH objects associated with jets
Gyulbudaghian, A. L. (Ap 55, 186, 2012)
Three HH objects are associated with molecular clouds. Observations of these clouds show that a molecular outflow exists in both clouds, with the bluer outflow near HH 188 coinciding in direction with an optical (visible) jet, while the the red outflow near HH 83 is opposite to this jet. One of the molecular clouds is rotating. All three objects are associated with IRAS point sources and with IR stars, one of which has the IR colors of a YSO (young stellar object). There is an IR star with two nebulae in the form of half-rings near one of the objects (HH 83).

Radial system of dark globules in Ser OB2
Gyulbudaghian, A. L. (Ap 55, 363, 2012)
A radial system illuminated by bright, central OB stars is discussed. $^{12}CO(1-0)$ observations are made of three globules from this system. Three molecular clouds are detected which are dark globules of a radial system in Ser OB2. A group of IR stars near the boundary of a globule with a rim is studied. One of the IR stars with bright filaments is a YSO (young stellar object). The radial system contains two bright, Mshaped fronts located at the tip of a jet, which may have emerged from the Wolf-Rayet star WR113. Similar M-shaped fronts are also located near the object SNO 85.

Light curves, variations in the MgII h and k and MgI (2852 Å) emission lines, and polarization of light from the mirids
Melikian, N. D. (Ap 55, 351, 2012)
The shape of the light curves, behavior of the MgII h and k and MgI (2852 Å) emission lines, and polarization of the light in different phases of the brightness variation of the mirids are examined. Studies of these characteristics of the mirids confirm earlier results. An analysis of the light curves shows that almost all Mira Cet stars have a hump in the middle of the rising branch of the light curve. This structure is presumably a consequence of the binary nature of the star. Noteworthy new results include a periodic variation of these emission lines during the inverse phases and a dependence of the width of the MgII h and k lines on stellar magnitude. An analysis of more than 400 polarimetric measurements shows that the maximum polarization of individual stars is observed during phases from $\varphi = 0.6$ to 0.8, and for a synthetic mirid at phase $\varphi = 0.7$.

Spectral Detection of a Very Strong Flare on WX UMa
Melikian, N. D.; Natsvlishvili, R. Sh.; Tamazian, V. S.; **Karapetian, A. A.** (IBVS, 6031, 1., 2012)
Abstract is not available

Emission objects in Cyg OB7. Flare activity variation of UV Ceti.
Melikian, N. D.; Tamazian, V. S.; **Karapetian, A. A.**; **Samsonyan, A. L.** (AIPC, 1452, 73, 2012)
Abstract is not available

A wide-field near-infrared H₂ 2.122 μm line survey of the Braid Nebula star formation region in Cygnus OB7
Khanzadyan, T.; …; **Magakian, T. Yu.; Movsessian, T.**; …; **Nikogossian, E. H.**; et al. (A&A 542, id.A111, 2012)
Outflows and jets are the first signposts of ongoing star formation processes in any molecular cloud, yet their study in optical bands provides limited results due to the large extinction present. Near-infrared unbiased wide-field observations in the H₂ 1-0 S(1) line at 2.122 μm alleviates the problem, enabling us to detect more

outflows and trace them closer to their driving sources. As part of a large-scale multi-waveband study of ongoing star formation in the Braid Nebula star formation region, we focus on a one square degree region that includes Lynds Dark Nebula 1003 and 1004. Our goal is to find all of the near-infrared outflows, uncover their driving sources and estimate their evolutionary phase. We use near-infrared wide-field observations obtained with WFCAM on UKIRT, in conjunction with previously-published optical and archival MM data, to search for outflows and identify their driving sources; we subsequently use colour - colour analysis to determine the evolutionary phase of each source. Within a one square degree field we have identified 37 complex MHOs, most of which are new. After combining our findings with other wide-field, multi-waveband observations of the same region we were able to discern 28 outflows and at least 18 protostars. Our analysis suggests that these protostars are younger and/or more energetic than those of the Taurus-Auriga region. The outflow data enable us to suggest connection between outflow ejection and repetitive FU Ori outburst events. We also find that star formation progresses from W to E across the investigated region. Appendices are available in electronic form at http://www.aanda.org

HH 588: A giant bipolar outflow in the dark cloud BRC 37
Movsessian, T. A.; **Magakian, T. Yu.; Sargsyan, D. M.**; Ogura, K. (Ap 55, 471, 2012)
Results of 2D spectroscopy of the complex of Herbig-Haro objects HH 588 in the dark globule BRC 37 are presented. The multipupil spectrograph VAGR has been used to obtain spectra of four parts of this complex, including the objects NE2, NE1, center, and SW2. The kinematic characteristics of these components of the complex confirm the existence of a giant bipolar outflow from the central infrared source IRAS 21388+5622. Spectral studies also show that the central object has the very low excitation and strong [OI] and [SII] emission characteristic of jets emerging from young stellar objects. In terms of their physical parameters, the other objects are typical Herbig-Haro objects. On the other hand, it is found that the entire HH 588 complex is an irradiated Herbig-Haro flow. This is indicated by the comparatively high excitation of the object NE2, and by the fact that the entire HH 588 flow is an arc with its convex side facing the center of the HII region IC 1396.

Kinematics and the origin of the internal structures in HL Tauri jet (HH 151)
Movsessian, T. A.; Magakian, T. Yu.; Moiseev, A. V. (A&A 541, id.A16)
Knotty structures of Herbig-Haro jets are common phenomena, and knowing the origin of these structures is essential for understanding the processes of jet formation. Basically, there are two theoretical approaches: different types of instabilities in stationary flow, and velocity variations in the flow. We investigate the structures with different radial velocities in the knots of the HL Tau jet as well as its unusual behaviour starting from 20" from the source. Collation of radial velocity data with proper motion measurements of emission structures in the jet of HL Tau makes it possible to understand the origin of these structures and decide on the mechanism for the formation of the knotty structures in Herbig-Haro flows. We present observations obtained with a 6 m telescope (Russia) using the SCORPIO camera with scanning Fabry-Perót interferometer. Two epochs of the observations of the HL/XZ Tau region in Hα emission (2001 and 2007) allowed us to measure proper motions for high and low radial velocity structures. The structures with low and high radial velocities in the HL Tau jet show the same proper motion. The point where the HL Tau jet bents to the north (it coincides with the trailing edge of so-called knot A) is stationary, i.e. does not have any perceptible proper motion and is visible in Hα emission only. We conclude that the high- and low-velocity structures in the HL Tau jet represent bow-shocks and Mach disks in the internal working surfaces of episodic outflows. The bend of the jet and the brightness increase starting some distance from the source coincides with the observed stationary deflecting shock. The increase of relative surface brightness of bow-shocks could be the result of the abrupt change of the physical conditions of the ambient medium as well as the interaction of a highly collimated flow and the side wind from XZ Tau. Based on observations collected with the 6 m telescope of the Special Astrophysical Observatory (SAO) of the Russian Academy of Sciences (RAS), operated under the financial support of the Science Department of Russia (registration number 01-43).

Searches for HH-objects and emission stars in star-formation regions. VIII. Stars with Hα emission in the vicinity of the nebula GM 2-41
Nikoghosyan, E. H.; Magakian, T. Yu.; Movsessian, T. A. (Ap 55, 70, 2012)
43 stellar objects with Hα emission are discovered by slitless spectroscopy in a 14' × 14' area near the nebula GM 2-41 located in the HII region DR 15 at the southern edge of the Cyg OB2 association. Emission is detected for the first time for 30 of these objects. Based on VI and JHK photometric data, the overwhelming majority of these objects are classified as young stellar objects in spectral classes F7-M3 with ages of ~1 Myr. The stars are distributed nonuniformly and form two groups which have the same coordinates as the UCHII regions G0.79 + 0.3 and G79.2 + 0.4.

Extragalactic Astronomy

Supernovae and their host galaxies. I. The SDSS DR8 database and statistics

Hakobyan, A. A.; Adibekyan, V. Zh.; **Aramyan, L. S.**; **Petrosian, A. R.**; Gomes, J. M.; Mamon, G. A.; Kunth, D.; Turatto, M. (A&A 544, id.A81, 2012; VizieR On-line Data Catalog: J/A+A/544/A81, 2012)

In this first paper of a series, we report the creation of large and well-defined database that combines extensive new measurements and a literature search of 3876 supernovae (SNe) and their 3679 host galaxies located in the sky area covered by the Sloan Digital Sky Survey (SDSS) Data Release 8 (DR8). This database should be much larger than previous ones, and should contain a homogenous set of global parameters of SN hosts, including morphological classifications and measures of nuclear activity. The measurements of apparent magnitudes, diameters (D_{25}), axial ratios (b/a), and position angles (PA) of SN host galaxies were made using the images extracted from the SDSS g-band. For each host galaxy, we analyzed RGB images of the SDSS to accurately measure the position of its nucleus to provide the SDSS name. With these images, we also provide the host galaxy's morphological type, and note if it has a bar, a disturbed disk, and whether it is part of an interacting or merging system. In addition, the SDSS nuclear spectra were analyzed to diagnose the central power source of the galaxies. Special attention was paid to collect accurate data on the spectroscopic classes, coordinates, offsets of SNe, and heliocentric redshifts of the host galaxies. Identification of the host galaxy sample is 91% complete (with 3536 SNe in 3340 hosts), of which the SDSS names of ~1100 anonymous hosts are listed for the first time. The morphological classification is available for 2104 host galaxies, including 73 (56) hosts in interacting (merging) systems. The total sample of host galaxies collects heliocentric redshifts for 3317 (~90%) galaxies. The g-band magnitudes, D_{25}, b/a, and PA are available for 2030 hosts of the morphologically classified sample of galaxies. Nuclear activity measures are provided for 1189 host galaxies. We analyze and discuss many selection effects and biases that can significantly affect any future analysis of our sample. The creation of this large database will help to better understand how the different types of SNe are correlated with the properties of the nuclei and global physical parameters of the host galaxies, and minimize possible selection effects and errors that often arise when data are selected from different sources and catalogs. Full Table 7 is only available at the CDS via anonymous ftp to cdsarc.u-strasbg.fr (130.79.128.5) or via http://cdsarc.u-strasbg.fr/cgi-bin/qcat?J/A+A/544/A81

Panoramic spectroscopy of galaxies with star-formation regions. a study of SBS 1202+583

Hakopian, S. A.; **Balayan, S. K.**; Dodonov, S. N.; Moiseev, A. V.; Smirnova, A. A. (Ap 55, 1, 2012)

The methods of panoramic (3D) spectroscopy are used by us in a detailed study of galaxies with ongoing star formation chosen from among objects in seven selected fields of the Second Byurakan Survey (SBS). This article deals with the irregular galaxy SBS 1202 + 583, which our classification scheme identifies as being in a continuous phase of star formation. Observations were made with the panoramic spectrographs MPFS at the 6-m telescope of the Special Astrophysical Observatory (SAO) of the Russian Academy of Sciences and VAGR at the 2.6-m telescope of the Byurakan Astrophysical Observatory (BAO) in Armenia. The data are used to construct maps of the radiative fluxes in the continuum and various emission lines. Special attention is devoted to analyzing the emission in the H α hydrogen recombination line and in the forbidden low-ionization doublets of nitrogen [NII] λλ6548, 6583 and sulfur [SII] λλ6716, 6731, and the ratios of the intensities of the forbidden lines to H α. The observable characteristics (size, H α fluxes, etc.) of nine HII regions are studied. The estimated current rates of star formation in the individual HII regions based on the H α fluxes lie within the range of $0.3-1.2_{\odot}$ M /year. The dependence of the ratio of the intensities of the emission in these above mentioned forbidden doublets on the rate of star formation in the HII regions is found.

Investigation of Dual Active Nuclei, Outflows, Shock-heated Gas, and Young Star Clusters in Markarian 266

Mazzarella, J. M.; Iwasawa, K.; Vavilkin, T.; …; **Khachikian, E. Ye.**; et al. (AJ 144, id.125, 2012)

Results of observations with the Spitzer, Hubble, GALEX, Chandra, and XMM-Newton space telescopes are presented for the luminous infrared galaxy (LIRG) merger Markarian 266. The SW (Seyfert 2) and NE (LINER) nuclei reside in galaxies with Hubble types SBb (pec) and S0/a (pec), respectively. Both companions are more luminous than L* galaxies and they are inferred to each contain a $\approx 2.5 \times 10^8$ M_{sun} black hole. Although the nuclei have an observed hard X-ray flux ratio of f_X (NE)/f_X (SW) = 6.4, Mrk 266 SW is likely the primary source of a bright Fe Kα line detected from the system, consistent with the reflection-dominated X-ray spectrum of a heavily obscured active galactic nucleus (AGN). Optical knots embedded in an arc with aligned radio continuum radiation, combined with luminous H_2 line emission, provide evidence for a radiative bow shock in an AGN-driven outflow surrounding the NE nucleus. A soft X-ray emission feature modeled as shock-heated plasma with T ~10^7 K is cospatial with radio continuum emission between the galaxies. Mid-infrared diagnostics provide mixed results, but overall suggest a composite system with roughly equal contributions of AGN and starburst radiation powering the bolometric luminosity.

Approximately 120 star clusters have been detected, with most having estimated ages less than 50 Myr. Detection of 24 µm emission aligned with soft X-rays, radio continuum, and ionized gas emission extending ~34" (20 kpc) north of the galaxies is interpreted as ~2×10^7 M_{sun} of dust entrained in an outflowing superwind. At optical wavelengths this Northern Loop region is resolved into a fragmented morphology indicative of Rayleigh-Taylor instabilities in an expanding shell of ionized gas. Mrk 266 demonstrates that the dust "blow-out" phase can begin in a LIRG well before the galaxies fully coalesce during a subsequent ultraluminous infrared galaxy (ULIRG) phase, and rapid gas consumption in luminous dual AGNs with kiloparsec-scale separations early in the merger process may explain the paucity of detected binary QSOs (with parsec-scale orbital separations) in spectroscopic surveys. An evolutionary sequence is proposed representing a progression from dual to binary AGNs, accompanied by an increase in observed L_x/L_{ir} ratios by over two orders of magnitude.

Influence of environment on the luminosity function of galaxies
Mahtessian, A. P. (Ap 55, 34, 2012)
The luminosity function (LF) of galaxies in different environments is studied. A method proposed by the author is used to determine the LF of galaxies. It is found that the luminosity functions of galaxies of different morphological types in single galaxies and small groups do not differ greatly. The luminosity functions of galactic clusters differ greatly from the analogous functions for other systems. A relatively large number of faint galaxies is observed in clusters. Groups with low dispersions in their radial velocities and with small average pairwise distances between the members contain relatively many faint galaxies and relatively few bright galaxies compared to groups with large dispersions in their radial velocities and large average pairwise distances between members. This applies to elliptical and lenticular galaxies, as well as to spiral and irregular galaxies.

Relationship between the infrared and radio emission of wolf-rayet galaxies
Malumyan, V. H.; Martirosian, J. R. (Ap 55, 317, 2012)
A close correlation is found between the 1.4 GHz radio luminosity and the integrated far infrared (FIR) luminosity of Wolf-Rayet galaxies. This correlation is essentially the same as that for spiral galaxies. Objects with intense star formation predominate among the Wolf-Rayet galaxies with excess IR emission. It is also found that the number of ULIRGs among the WR galaxies is more than a factor of four greater than that for galaxies with a UV excess.

Close neighbors of Markarian galaxies. I. Optical database
Nazaryan, T. A.; Petrosian, A. R.; Mclean, B. J. (Ap 55, 448, 2012)
The catalogue of close neighbors of Markarian galaxies located inside circles with radii 60 kpc from the centers of Markarian objects is presented, which combines extensive new measurements of their optical parameters with a literature and database search. The measurements were made using images extracted from the Digitized Sky Survey (DSS) J_{pg} (blue), F_{pg} (red) and I_{pg} (near-infrared) band photographic plates. We provide names, accurate coordinates, redshifts, morphological types, blue, red and near-infrared apparent magnitudes, apparent blue major diameters, axial ratios, as well as position angles for the neighbor galaxies. We also include their 2MASS infrared magnitudes. The total number of Markarian galaxies in the database is 274 and the number of their neighbors is 359. The physical parameters of the systems of Markarian galaxies and their neighbors are determined and presented.

Infrared Classification and Luminosities for Dusty Active Galactic Nuclei and the Most Luminous Quasars
Weedman, Daniel; **Sargsyan, Lusine**; Lebouteiller, Vianney; Houck, James; Barry, Donald (ApJ 761, id. 184, 2012)
Mid-infrared spectroscopic measurements from the Infrared Spectrometer (IRS) on Spitzer are given for 125 hard X-ray active galactic nuclei (AGNs; 14-195 keV) from the Swift Burst Alert Telescope (BAT) sample and for 32 AGNs with black hole masses (BHMs) from reverberation mapping. The 9.7 µm silicate feature in emission or absorption defines an infrared AGN classification describing whether AGNs are observed through dust clouds, indicating that 55% of the BAT AGNs are observed through dust. The mid-infrared dust continuum luminosity is shown to be an excellent indicator of intrinsic AGN luminosity, scaling closely with the hard X-ray luminosity, log vL_v(7.8 µm)/L(X) = -0.31 ± 0.35, and independent of classification determined from silicate emission or absorption. Dust luminosity scales closely with BHM, log vL_v (7.8 µm) = (37.2 ± 0.5) + 0.87 log BHM for luminosity in erg s^{-1} and BHM in M_{sun}. The 100 most luminous type 1 quasars as measured in vL_v (7.8 µm) are found by comparing Sloan Digital Sky Survey (SDSS) optically discovered quasars with photometry at 22 µm from the Wide-Field Infrared Survey Explorer (WISE), scaled to rest frame 7.8 µm using an empirical template determined from IRS spectra. The most luminous SDSS/WISE quasars have the same maximum infrared luminosities for all 1.5 < z < 5, reaching total infrared luminosity $L_{ir} = 10^{14.4}$ L_{sun}. Comparing with dust-obscured galaxies from Spitzer and WISE surveys, we find no evidence of

hyperluminous obscured quasars whose maximum infrared luminosities exceed the maximum infrared luminosities of optically discovered quasars. Bolometric luminosities L_{bol} estimated from rest-frame optical or ultraviolet luminosities are compared to L_{ir}. For the local AGN, the median log L_{ir}/L_{bol} = -0.35, consistent with a covering factor of 45% for the absorbing dust clouds. For the SDSS/WISE quasars, the median log L_{IR}/L_{bol} = 0.1, with extremes indicating that ultraviolet-derived L_{bol} can be seriously underestimated even for type 1 quasars.

Dust obscuration of the narrow line region of active galactic nuclei
Sargsyan, L.; **Gevorgyan, M.**; **Abrahamyan, H. V.**;**Kostandyan, G.**; **Paronyan, G.**; **Samsonyan, A.**; **Sargsyan, D.**; **Sinamyan, P.** (Ap 55, 460, 2012)
To estimate the dust absorption of the Narrow Line Region (NLR) of AGN, we have compared the infrared [NeIII] 15.55 µm line and optical [OIII] 5007 Å line fluxes of 59 galaxies having SDSS and IRS low and high resolution spectra. Dividing our objects into objects with infrared spectra showing silicate feature at 9.7 µm in absorption, in emission, and without this feature in their spectra, we determined that ~87 % of the emission from the NLR for objects with silicate absorption is absorbed by the dusty torus surrounding the AGN.

Infrared spectral properties of Wolf-Rayet galaxies
Martirosian, J. R.; **Sargsyan, L. A.** (Ap 55, 306, 2012)
We present infrared properties of 22 WR galaxies having optical classifications as Starburst Galaxies and having Spitzer IRS mid-infrared spectra available from CASSIS. To understand infrared properties of these galaxies we have compared our sample with two independent ultraviolet-selected starburst galaxy samples. We have compared the hardness of radiation of these three samples, using the ratio of total fluxes of [NeIII] 15.55 µm and PAH 11.3 µm, which shows a presence of younger stars in WR galaxies, compared to other UV samples. We also have calibrated the IR and UV SFRs. Our results show that the ~35% of the UV luminosity of WR SB galaxies is observed, compared to ~9% and ~25% of other UV samples. We determine that the classification of objects to pure SB based on criteria EW(6.2µm)> 0.4µm is not applicable for SB galaxies with the youngest star populations.

[C II] 158 µm Luminosities and Star Formation Rate in Dusty Starbursts and Active Galactic Nuclei
Sargsyan, L.; Lebouteiller, V.; Weedman, D.; …; **Samsonyan, A.** (ApJ 755, id. 171, 2012)
Results are presented for [C II] 158 µm line fluxes observed with the Herschel PACS instrument in 112 sources with both starburst and active galactic nucleus (AGN) classifications, of which 102 sources have confident detections. Results are compared with mid-infrared spectra from the Spitzer Infrared Spectrometer and with L_{ir} from IRAS fluxes; AGN/starburst classifications are determined from equivalent width of the 6.2 µm polycyclic aromatic hydrocarbon (PAH) feature. It is found that the [C II] line flux correlates closely with the flux of the 11.3 µm PAH feature independent of AGN/starburst classification, log [f([C II] 158 µm)/f(11.3 µm PAH)] = -0.22±0.25. It is concluded that the [C II] line flux measures the photodissociation region associated with starbursts in the same fashion as the PAH feature. A calibration of star formation rate (SFR) for the starburst component in any source having [C II] is derived comparing [C II] luminosity L([C II]) to L_{ir} with the result that log SFR = log L([C II]) - 7.08 ± 0.3, for SFR in M_{sun} yr^{-1} and L([C II]) in L_{sun}. The decreasing ratio of L([C II]) to L_{ir} in more luminous sources (the "[C II] deficit") is shown to be a consequence of the dominant contribution to L_{ir} arising from a luminous AGN component because the sources with the largest L_{ir} and smallest L([C II])/L_{ir} are AGNs. Based on observations with the Herschel Space Observatory, which is an ESA space observatory with science instruments provided by European-led Principal Investigator consortia and with important participation from NASA.

Multiwavelength data for bright active galaxies
Mickaelian A.M.; Abrahamyan H.V.; Paronyan G.M.; Harutyunyan G.S. (Proc. IAU Symp.284, 237, 2012)
The spectral energy distribution (SED) gives a complete picture of the radiation of space objects and may result in correct classifications compared to those based only on optical (or other local) spectra. This is especially crucial for active galaxies, both AGN and Starbursts (SB). For this, multiwavelength (MW) data are needed taken from available surveys and catalogs. We have cross-correlated the Catalogue of quasars and active galaxies with all-sky or large-area MW catalogues, such as X-ray ROSAT (BSC and FSC), UV GALEX (MIS and AIS), optical APM, MAPS, USNO-B1.0, GSC 2.3.2, and SDSS DR8, NIR 2MASS, MIR/FIR WISE, IRAS (PSC and FSC) and AKARI (IRC and FIS), radio GB6, NVSS, FIRST, and WENSS. We have established accurate positions and photometry for a few thousands of objects that appeared in the catalog with poor data, as well as achieved the best astrometric and photometric data for all objects. This allowed correct cross-correlations and establishing correct MW data for these objects. As a result, we obtained 34 photometric points from X-rays to radio and using VO tools built SEDs for some 10,000 bright objects. Some data from other surveys were also used, such as Chandra, XMM, Spitzer, etc. All objects were grouped into several forms of SED and were compared to the known optical classes given in the catalog (QSO, BLL, Sy1, Sy1.2-1.9, Sy2, LINER, SB, and HII). This allowed reveal obscured AGN, as well as find previously

misclassified objects. A homogeneous classification for these objects was established. The first part of this project is presented; establishment of accurate positions and photometry and cross-correlations with MW catalogs.

Study and classification of SDSS spectra for Byurakan-IRAS Galaxies
Harutyunyan, G. S.; Mickaelian, A. M. (Proc. Conf. Young Scientists of CIS Countries, 157, 2012)
The sample of Byurakan-IRAS galaxies (BIG) has been created based on optical identifications of the IRAS Point Source Catalog (PSC) at high galactic latitudes. As a result, 1178 galaxies have been identified. 171 of them have been observed spectroscopically with Byurakan 2.6 m, SAO (Special Astrophysical Observatory) 6 m, and OHP (Observatoire de Haute Provence) 1.93 m telescopes. In addition, 81 galaxies have been found to have spectra in the Sloan Digital Sky Survey (SDSS). We have extracted these spectra, classified them, measured spectral features, made cross-correlations with multiwavelength catalogs. Diagnostic diagrams have been built and different physical properties of these objects have been studied. Among these 81 objects, 47 HIIs, 17 Seyfert galaxies, 1 LINER, 10 composite-spectrum objects, and 6 other emission-line galaxies have been revealed. 4 of these objects have been classified as ULIRGs.

Multiwavelength investigation of X-ray Active Galactic Nuclei
Paronyan, G. M.; Mickaelian, A. M. (Proc. Conf. Young Scientists of CIS Countries, 202, 2012)
In this study, we attempt to create a master catalog of active galactic nuclei (AGN) with X-rays. To do this, the catalogs HRC (Hamburg RASS Catalog) and BHRC (Byurakan Hamburg RASS Catalog) served as a basis; they were used to perform optical identification of X-ray sources from ROSAT catalogs based on low-dispersion spectra of the Hamburg Quasar Survey (HQS). The first catalog used the ROSAT Bright Source Catalogue, and in the second, ROSAT Faint Source Catalogue. As a result, we compiled a new sample of X-ray selected AGN, which collected 4401 X-ray sources with count rates of photons CR ≥ 0.04 ct/s in the area with galactic latitudes |b|≥ 30° and declinations δ ≥ 0°. All these sources are classified as AGN (3362 of them are in the 13th version of the catalog of AGN by Veron-Cetti and Veron) or are AGN candidates. For these sources, we have performed a multiwavelength investigation in several ranges of electromagnetic waves (X-ray, optical, radio). An attempt was made to find a connection between radiation fluxes in different bands for different types of sources, to reveal their characteristics, and thus to confirm the candidate AGN.

Surveys and Databases

Large Astronomical Surveys, Catalogs and Databases
Mickaelian, A. M. (BaltA 21, 331, 2012)
We review the status of all-sky and large astronomical surveys and their catalogued data over the whole range of electromagnetic spectrum, from gamma-ray to radio, such as ROSAT in X-ray, GALEX in UV, SDSS and several POSS1/2 based catalogs (APM, MAPS, USNO, GSC) in optical, 2MASS and WISE in NIR, IRAS and AKARI in MIR/FIR, NVSS and FIRST in radio range and others. Present astronomical archives contain billions of objects, Galactic as well as extragalactic, and the vast amount of data in them permit new studies and discoveries. Cross-correlations result in revealing new objects and new samples. Very often, dozens of thousands of sources hide a few very interesting ones that are needed to be discovered by comparison of various physical characteristics. Most of the modern databases currently provide VO access to the stored information. This permits not only open access but also fast analysis and managing of these data.

Variability Analysis based on POSS1/POSS2 Photometry
Mickaelian, Areg M.; Sarkissian, Alain; **Sinamyan, Parandzem K.** (Proc. IAU Symp. 285, 366, 2012)
We introduce accurate magnitudes as combined calculations from catalogues based on accurate measurements of POSS1- and POSS2-epoch plates. The photometric accuracy of various catalogues was established, and statistical weights for each of them have been calculated. To achieve the best possible magnitudes, we used weighted averaging of data from APM, MAPS, USNO-A2.0, USNO-B1.0 (for POSS1-epoch), and USNO-B1.0 and GSC 2.3.2 (for POSS2-epoch) catalogues. The r.m.s. accuracy of magnitudes achieved for POSS1 is 0.184 in B and 0.173 mag in R, or 0.138 in B and 0.128 in R for POSS2. By adopting those new magnitudes we examined the First Byurakan Survey (FBS) of blue stellar objects for variability, and uncovered 336 probable and possible variables among 1103 objects with POSS2-POSS1 >= 3σ of the errors, including 161 highly probable variables. We have developed methods to control and exclude accidental errors for any survey. We compared and combined our results with those given in Northern Sky Variability Survey (NSVS) database, and obtained firm candidates for variability. By such an approach it will be possible to conduct investigations of variability for large numbers of objects.

Large-area astronomical Surveys and Catalogs
Mickaelian, A. M. (Proc. Conf. Young Scientists of CIS Countries, 19, 2012)
We review the status of all-sky and large astronomical surveys and their catalogued data over the whole range of electromagnetic spectrum, from gamma-ray to radio, such as ROSAT in X-ray, GALEX in UV, SDSS and several POSS1/2 based catalogs (APM, MAPS, USNO, GSC) in optical, 2MASS and WISE in NIR, IRAS and AKARI in MIR/FIR, NVSS and FIRST in radio and many others, as well as most important surveys giving optical images (DSS, SDSS), variability (GCVS, NSVS, ASAS) and spectroscopic (FBS, SBS, HQS, HES, SDSS) data. An overall understanding of coverage along the whole wavelength range and comparisons between various surveys are given: galaxy redshift surveys, QSO, radio, Galactic structure, and Dark Energy surveys.

Astronomical Archives, Databases and Virtual Observatories
Mickaelian, A. M. (Proc. Conf. Young Scientists of CIS Countries, 29, 2012)
Present astronomical archives contain billions of objects, both Galactic and extragalactic, and the vast amount of data on them allow new studies and discoveries. Astrophysical Virtual Observatories (VO) use available databases and current observing material as a collection of interoperating data archives and software tools to form a research environment in which complex research programs can be conducted. Most of the modern databases give at present VO access to the stored information. This makes possible not only the open access but also a fast analysis and managing of these data. Cross-correlations result in revealing new objects and new samples. Very often dozens of thousands of sources hide a few very interesting ones that are needed to be discovered by comparison of various physical characteristics.

Joint catalogue of IRAS PSC/FSC
Abrahamyan, H. V.; Mickaelian, A. M.; Knyazyan, A. V.; **Harutyunyan, G. S.** (Proc. Conf. Young Scientists of CIS Countries, 223, 2012)
We have created a tool for cross-matching astronomical catalogues and applied it to epy IRAS Point Source and IRAS Faint Source catalogues (PSC and FSC). Using this tool, we have carried out identifications with a search radius corresponding to 3σ errors for each source from these catalogues. As a result, we obtained 73,799 associations. Positional distances for 71,411 out of 73,799 associations do not exceed 60° and the farthest association is at 990". The combined RMS uncertainty calculated from IRAS PSC and FSC is 161.95", which was used to check our cross-correlations with the VizieR tool. As a result, we obtained 73,801 identified objects where coordinate errors of 71,634 associations do not exceed 3σ. We tested the optimal operation of our program with the VizieR.

Theoretical Astrophysics

Radiation transfer in an inhomogeneous medium. optical depth depending on absorption coefficient
Alecian, G.; **Harutynian, H. A.** (Ap 55, 251, 2012)
The invariance principle is applied to obtain the equations for finding the radiation field intensity in an inhomogeneous atmosphere. Though the behavior of the inhomogeneity is not specified, the absorption coefficient is assumed to depend on the optical depth. Such kind of depth dependence is needed because this case exists when the elemental diffusion is considered in the atmospheres of Ap stars. The corresponding equations are obtained for solution by numerical methods.

Solution of linear radiative transfer problems in plane-parallel atmospheres. II
Nikoghossian, A. G. (Ap 55, 261, 2012)
This paper describes a new possibility for reducing linear radiative transfer problems in plane-parallel inhomogeneous atmospheres to the solution of initial value problems. It is shown that, in general, in order to find both the external and the internal radiation field it is sufficient to solve two problems of this sort for the differential equations. The method of invariant imbedding is used for this purpose. Both one-dimensional and three-dimensional problems of diffuse reflection and transmission for a family of media with different optical thicknesses are examined. The proposed approach is also used to obtain solutions of radiative transfer problems in three-dimensional inhomogeneous atmospheres containing energy sources. The results of numerical calculations are presented.

Extended Lorentz code of a superluminal particle
Ter-Kazarian, G. (eprint arXiv:1202.0469, 2012)
While the OPERA experimental scrutiny is ongoing in the community, in the present article we construct a toy model of {\it extended Lorentz code} (ELC) of the uniform motion, which will be a well established consistent and unique theoretical framework to explain the apparent violations of the standard Lorentz code (SLC), the possible manifestations of which arise in a similar way in all particle sectors. We argue that in the

ELC-framework the propagation of the superluminal particle, which implies the modified dispersion relation, could be consistent with causality. Furthermore, in this framework, we give a justification of forbiddance of Vavilov-Cherenkov (VC)-radiation/or analog processes in vacuum. To be consistent with the SN1987A and OPERA data, we identify the neutrinos from SN1987A and the light as so-called {\it 1-th type} particles carrying the {\it individual Lorentz motion code} with the velocity of light $c_{1}\equiv c$ in vacuum as maximum attainable velocity for all the 1-th type particles. Thereby, we treat superluminal muon neutrinos as so-called {\it 2-nd type} particles carrying the individual Lorentz motion code with the velocity c_{2} as maximum attainable velocity for all the 2-nd type particles. For the muon neutrinos mean energy $E_{\nu 2}=17.5$ GeV, claimed velocity $(v_{\nu 2}-c)/c= 2.48\times 10^{-5}$, and expected finite rest mass $m_{0}\approx 1eV/c^{2}$, we obtain then $ c_{2}/c\approx 17.5\times 10^{9}$.

Exoplanets

Exploring the α-enhancement of metal-poor planet-hosting stars. The Kepler and HARPS samples
Adibekyan, V. Zh.; Delgado Mena, E.; Sousa, S. G.; …; **Hakobyan, A. A.** (A&A 574, id.A36, 2012)
Recent studies have shown that at low metallicities Doppler-detected planet-hosting stars tend to have high α-content and to belong to the thick disk. We used the reconnaissance spectra of 87 Kepler planet candidates and data available from the HARPS planet search survey to explore this phenomenon. Using the traditional spectroscopic abundance analysis methods, we derived Ti, Ca, and Cr abundances for the Kepler stars. In the metallicity region -0.65 < [Fe/H] < -0.3 dex, the fraction of Ti-enhanced thick-disk HARPS planet harboring stars is 12.3 ± 4.1%, and for their thin-disk counterparts this fraction is 2.2 ± 1.3%. Binomial statistics give a probability of 0.008 that this could have occurred by chance. Combining the two samples (HARPS and Kepler) reinforces the significance of this result (P ~ 99.97%). Since most of these stars harbor small sized or low-mass planets we can assume that, although terrestrial planets can be found in a low-iron regime, they are mostly enhanced by α-elements. This implies that early formation of rocky planets could start in the Galactic thick disk, where the chemical conditions for their formation are more favorable. Table with chemical abundances is only available at the CDS via anonymous ftp to cdsarc.u-strasbg.fr (130.79.128.5) or via <A href="http://cdsarc.u-strasbg.fr/viz-bin/qcat?J/A+A/547/A36"> http://cdsarc.u-strasbg.fr/viz-bin/qcat?J/A+A/547/A36</A>

A Possible Detection of Occultation by a Proto-planetary Clump in GM Cephei
Chen, W. P.; …; **Nikogossian, E. H.**; et al. (ApJ 751, id.118, 2012)
GM Cephei (GM Cep), in the young (~4 Myr) open cluster Trumpler 37, has been known to be an abrupt variable and to have a circumstellar disk with a very active accretion. Our monitoring observations in 2009-2011 revealed that the star showed sporadic flare events, each with a brightening of <~ 0.5 mag lasting for days. These brightening events, associated with a color change toward blue, should originate from increased accretion activity. Moreover, the star also underwent a brightness drop of ~1 mag lasting for about a month, during which time the star became bluer when fainter. Such brightness drops seem to have a recurrence timescale of a year, as evidenced in our data and the photometric behavior of GM Cep over a century. Between consecutive drops, the star brightened gradually by about 1 mag and became blue at peak luminosity. We propose that the drop is caused by the obscuration of the central star by an orbiting dust concentration. The UX Orionis type of activity in GM Cep therefore exemplifies the disk inhomogeneity process in transition between the grain coagulation and the planetesimal formation in a young circumstellar disk.

The Virtual Observatory in planetology, two scientific use cases: asteroids and exoplanets
Sarkissian, A.; Arzoumanian, E.; **Mickaelian, A. M.**; et al. (Proc. Conf. Young Scientists of CIS Countries, 56, 2012)
Searching with a "naked eye" in a planetary data archive takes a considerable time. This work must be done in an automatic way. However, the planetary data archive is subject to a constant change (new elements, new version of analysis, new parameters). Furthermore, there are several archives for a same object, thus, obtaining reliable information requires a sequential search of several different archives. Workflows developed in the frame of the virtual observatories (VO), can use all collections of integrated astronomical data archives and software tools that utilize computer networks to create an environment in which research can be conducted. Several countries have initiated national virtual observatory programs that combine existing databases from ground-based and orbiting observatories and make them easily accessible to researchers. As a result, data from all the world's major observatories will be available to all users and to the public. This is significant not only because of the immense volume of astronomical data but also because the data on stars and galaxies has been compiled from observations in a variety of wavelengths - optical, radio, infrared, gamma ray, X-ray and more. In a virtual observatory environment, all of this data is integrated so that it can be synthesized and used in a given study. In this paper, we show how to develop a workflow using a selection of the virtual observatory tools in the case of two hot topics: asteroids and exoplanets (51 Peg b).

Other

Analysis of CoRoT N2-light curves corrected with a new quasi-automatic procedure
Ghazaryan, S. A.; Alecian, G.; **Harutyunyan, H. A.** (Proc. Conf. Young Scientists of CIS Countries, 77, 2012)
This work is devoted to the analysis of CoRoT light curves to which we apply a new quasi-automatic procedure we have developed. This IDL procedure corrects the abnormal jumps and the instrumental drifts which survived in N2-exoplanet data. The method we present can be used for the CoRoT targets observed through exoplanets channel. We study 3 stars already considered by Alecian et al. (2009) who used less sophisticated methods for corrections and an older release of the N2 data. With our method, we succeed to remove random jumps and systematic trends encountered in typical CoRoT data. We describe the algorithm and compare our new results to the old ones, published in 2009.

Designing a New Control System for the Schmidt Telescope
Gabrielyan, V. V. (Proc. Conf. Young Scientists of CIS Countries, 242, 2012)
After the collapse of the Soviet Union, science and research suffered substantial cuts in funding which affected the Byurakan Astrophysical Observatory as well. Virtually all projects and even maintenance work came to a stop at the 1-meter Schmidt telescope, a device unique in its category and well known outside the country. I was entrusted with the responsibility to design a new and fully automatic control system for the telescope. After three years of hard work, the telescope is now fully functioning and ready for both local and remote observations. The design of the following devices is included in the project: Alpha Unit, Delta Unit, Dome Unit, and a Weather Station. The full description of the devices and their functions is presented in the article.

Meetings held in Byurakan

Armenian Astronomical School Olympiad, 11 May 2012
The final stage of the annual astronomical contest for school pupils and selection of candidates for the International Astronomical Olympiad.

4th Byurakan International Summer School (4BISS), 15-23 Sep 2012
The 4th traditional Byurakan International Summer School for young astronomers and students with invitation of a number of international renowned lecturers, students from the Middle East region, former Soviet Union and Europe.

Archaeoastronomy meeting dedicated to Anania Shirakatsi's 1400th anniversary, 25-26 Sep 2012, Byurakan, Armenia
Meeting on Archaeoastronomy dedicated to Anania Shirakatsi's 1400th anniversary; talks by astronomers, historians, archaeologists, geologists, linguists, et al.

ArAS XI Annual Meeting, 26 Sep 2012
ArAS XI annual meeting was only an administrative one, without a scientific session. ArAS annual report and discussions were held.

Grigor Gurzadyan – 90 seminar, 15 Oct 2012
BAO seminar dedicated to Grigor Gurzadyan's 90th anniversary; introduction by H.A. Haruyunian and watching a film on Gurzadyan's life and scientific activity and memories about G.A. Gurzadyan.

Research grants

International research grants support the research at BAO and are a significant contribution compared to the low level of national funding. In 2012, following projects were active:

ANSEF (2012): *"Software for control 1m telescope BAO"*, PI: **S.K. Balayan**; *"Supernovae distribution and host galaxy properties"*, PI: **Artur Hakobyan**; *"Investigation of the internal structures in the jets from young stars" (William Mesrobian Astronomy Award)*, PI: **Tigran Movsessian**

CNRS-SCS (2012-2013): *"Supernovae Host Galaxies in the SDSS DR8"*, PIs: ***Artashes Petrosian*** and ***Daniel Kunth***

Academic Visits

Altogether, 21 Byurakan scientists had 35 academic visits to astronomical centres of 14 countries (USA, France, Germany, Italy, Spain, Switzerland, Vatican, Hungary, China, Korea, Russia, Ukraine, Georgia, and Artsakh) (compared to 34 visits to 11 countries by 18 scientists in 2012, 33 visits to 13 countries by 17 scientists in 2010 and 17 visits to 6 countries by 11 scientists in 2009). As before, most active collaboration was with French institutions (altogether 8 visits by 7 scientists). Five times Armenian scientists visited Russia, three times USA and Ukraine (each), twice – Germany, Italy, Switzerland, China and Korea (each). Out of the 35 visits, 15 have been accomplished for research work in frame of collaborations (mostly France, USA and Germany), 14 for participation in meetings (including the IAU General Assembly and the European annual meeting JENAM/EWASS-2012), 3 for participation in summer schools, 1 for seminar and 2 in the international astronomical Olympiad (as the team supervisors).

Areg Mickaelian	Rolle, Switzerland	1 week	30.01-02.02	meeting
Kamo Gigoyan	Marseille, France	3 weeks	02.02-23.02	work
Edward Khachikian	Caltech, USA	2 months	02.02-02.04	work
Satenik Ghazaryan	Paris, France	2 months	16.02-11.04	work
Haik Harutyunian	Rome, Pescara, Italy	1 week	17.02-22.02	meeting
Gohar Harutyunian	Switzerland	1 week	25.03-01.04	school
Lusine Sargsyan	Cornell Univ., USA	7 weeks	10.04-31.05	work
Gurgen Paronyan	Pushchino, Russia	1 week	16.04-20.04	meeting
Satenik Ghazaryan	Kiev, Ukraine	1 week	22.04-30.04	meeting
Knarik Khachatryan	Kiev, Ukraine	1 week	22.04-30.04	meeting
Ani Vardanyan	Kiev, Ukraine	1 week	22.04-30.04	meeting
Artur Hakobyan	Paris, France	10 days	03.05-12.05	work
Tigran Movsisyan	SAO, Russia	2 weeks	10.05-24.05	work
Areg Mickaelian	Moscow, Russia	1 week	28.05-01.06	meeting
Ararat Yeghikyan	Germany	2 months	04.06-03.08	work
Hayk Abrahamyan	Vatican	1month	31.05-01.07	school
Areg Mickaelian	Paris, France	1 week	25.06-01.07	work
Areg Mickaelian	Rome, Italy	1 week	02.07-07.07	meeting
Ruben Andreasyan	Beijing, China	3 weeks	12.08-02.09	work/meet.
Areg Mickaelian	Beijing, China	2 weeks	20.08-01.09	meeting
Artashes Petrosian	STScI, USA	2 weeks	31.08-13.09	work
Levon Aramyan	Budapest, Hungary	1 week	02.09-08.09	meeting
Haik Harutyunian	Stepanakert, Artsakh	2 days	15.09-16.09	meeting
Norair Melikyan	Stepanakert, Artsakh	2 days	15.09-16.09	meeting
Levon Aramyan	Tbilisi, Georgia	3 days	26.09-29.09	seminar
Artur Karapetyan	SAO, Russia	1 week	07.10-13.10	work
Tigran Movsisyan	SAO, Russia	1 week	13.10-20.10	meeting
Marietta Gyulzadyan	Gwanju, Korea	1 week	16.10-24.10	Olympiad
Tigran Nazaryan	Gwanju, Korea	1 week	16.10-24.10	Olympiad
Gohar Harutyunian	Canary Islands, Spain	4 weeks	01.11-26.11	school
Artashes Petrosian	Paris, France	4 weeks	01.11-28.11	work
Artur Hakobyan	Paris, France	2 weeks	01.11-15.11	work
Levon Aramyan	Paris, France	4 weeks	01.11-28.11	work
Tigran Nazaryan	Paris, France	2 weeeks	08.11-21.11	work
Tigran Movsisyan	Germany	17 days	26.11-13.12	work

Visits of foreign scientists and other guests

Altogether 34 scientists and other guests from 14 countries (Armenia (other institutions), Estonia, France, Georgia, Germany, India, Iran, Italy, Poland, Portugal, Russia, Spain, USA, and Ukraine) visited Byurakan during 2012. Most of the guests were for the 4th Byurakan International Summer

School, 11 lecturers and 10 students. Most active were guests from Russia (11), France, Iran and USA (each 3), Armenia, Germany, Poland and Ukraine (each 2).

March

Seminar: **Viktor Charugin** and **Denis Denisenko** (Space Research Institute, Russia)

May

Seminar: **Narek Sahakyan** (Institute of Physical Research, Armenia)

Seminar: **Vladimir Airapetian** (NASA/GSFC, USA)

June

Collaboration: **Rezo Natsvlishvili** (Abastumani Observatory, Georgia)

Collaboration: **A. Malikov** (SAO, Russia)

Collaboration: **B. Zakharov** and **A. Yudin** (Proekt-Tekhinka, Russia)

June – August

Training: **Azad Banikyan** (LATMOS, France)

August

2.6m telescope works: **Alexandr** (CrAO, Ukraine)

Seminar: **Vardan Adibekyan** (CAUP, Porto, Portugal)

September

4th Byurakan International Summer School (4BISS) lecturers:

Georges Alecian (OBSPM, France)

Tigran Arshakyan (University of Cologne, Germany)

Gennady Bisnovatyi-Kogan (Russia)

Ashot Chilingarian (YerPhI, Armenia)

Jaan Einasto (Tartu Observatory, Estonia)

Garik Israelian (IAC, Spain)

Richard Lovelace (Cornell University, USA)

Jayant Narlikar (IUCAA, India)

Igor Novikov (Astro-Space Center, P.N. Lebedev Physics Institute, Russia)

Corinne Rossi (Sapienza University of Rome, Italy)

Alain Sarkissian (LATMOS, UVSQ, France)

4th Byurakan International Summer School (4BISS) students:

Karolina Bakowska (Nicolaus Copernicus Astron. Center, Polish Academy of Sci., Poland)

Nassim Beiranvand (Damghan University, Iran)

Mikhail Ivanov (Moscow State University, Russia)

Kostyantyn Martynyuk-Lototskyy (I. Franko National Univ. of Lviv, Astron. Obs., Ukraine)

Pavel Medvedev (Space Research Institute, Russian Academy of Sciences, Russia)

Gor Oganesyan (Southern Federal University, Russia)

Remigiusz Pospieszynski (Adam Mickiewicz University, Poland)

Joveini Rouhollah (Sharif University of Technology (SUT), Iran)

Teymur Saifollahi (K.N.Toosi University of Technology, Iran)

Anastasia Titarenko (Moscow State University, Russia)

Anania Shirakatsi – 1400 meeting: **Valery Hambaryan** (Germany)

November – December

Collaboration: **Daniel Weedman** (Cornell University, Ithaca, NY, USA)

Participation in Meetings

During 2012, Byurakan astronomers have participated in 19 meetings, including a number of important international ones, such as the IAU XXVIII General Assembly in Beijing, China, JENAM/EWASS-2012 in Rome, Italy, as well as other meetings in Switzerland, Italy, Hungary and Russia, Young Scientists Conference in Kiev, Ukraine, summer schools in Switzerland, Vatican

and Canary Islands, the International Astronomical Olympiad in South Korea, as well as meetings and seminars in Yerevan and Byurakan: ANSEF Forum, Anania Shirakatsi – 1400 meeting, ArAS XI Annual Meeting, 4th Byurakan International Summer School (4BISS), etc.

EAS Affiliated Societies meeting, 30 Jan – 01 Feb 2012, Rolle, Switzerland (A.M. Mickaelian)

Governing Committee Meeting of the International Centre for Relativistic Astrophysics Network (ICRANet), 17-22 Feb 2012, Pescara, Italy (H.A. Harutyunian)

42nd SAAS-FEE Course, 26-31 Mar 2012, Villars-sur-Ollon, Switzerland (G.S. Harutyunian)

XXIX Conference on "Modern Problems of Extragalactic Astronomy", 17-19 Apr 2012, Pushchino, Russia (G.M. Paronyan)

19th Young Scientists' Conference on Astronomy and Space Physics, 23-28 Apr 2012, Kiev, Ukraine (S.A. Ghazaryan, K.G. Khachatryan, A.V. Vardanyan)

Armenian Astronomical School Olympiad, 11 May 2012 (Jury members: A.A. Akopian (Chair), A.E. Grigoryan, M.V. Gyulzadian, E.L. Karapetian, A.M. Mickaelian, T.A. Nazaryan, S.Ye. Nersisyan, A.G. Yeghikian)

EAAS XI general meeting, 28 May – 1 June 2012, Moscow, Russia (A.M. Mickaelian)

13th Vatican Observatory Summer School (VOSS), 3-29 June 2012, Vatican (H.V.Abrahamyan)

Joint European and National Astronomical Meeting / European Week of Astronomy and Space Science (JENAM/EWASS-2012), 2-7 July 2012, Rome, Italy; Symposium 9 *"Astronomy education in Europe"* and Special Session 5 *"Morphology and kinematics of interacting galaxies"* (A.M. Mickaelian)

IAU XXVIII General Assembly, 20-31 Aug 2012, Beijing, China; IAU Symposia #290 *"Feeding compact objects: Accretion on all scales"*, #292 *"Molecular Gas, Dust, and Star Formation in Galaxies"* and #295 *"The intriguing life of massive galaxies",* Special Sessions #4 *"New era for studying interstellar and intergalactic magnetic fields"*, #5 *"The IR view of massive stars: the main sequence and beyond"*, #11 *"IAU Strategic Plan and the Global Office of Astronomy for Development"*, #13 *"High-precision tests of stellar physics from high-precision photometry"* and #15 *"Data intensive astronomy"*, Joint Discussion #6 *"The connection between radio properties and high-energy emission in AGNs"* (R.R. Andreasyan, A.M. Mickaelian)

6th Workshop of Young Reaserchers in Astronomy and Astrophysics: "The Multi-wavelength Universe from Starbirth to Star Death", 3-6 Sep 2012, Budapest, Hungary (L.S. Aramyan)

4th Byurakan International Summer School (4BISS), 15-23 Sep 2012, Byurakan, Armenia (H.A. Harutyunian, A.M. Mickaelian, E.H. Nikogossian; H.V. Abrahamyan, L.S. Aramyan, M.G. Avtandilyan, S.A. Ghazaryan, G.S. Harutyunyan, V.S. Harutyunyan, K.G. Khachatryan, G.M. Paronyan, A.V. Vardanyan)

XV Astronomical Olympiad of CIS countries and the XX autumn school, 17-24 Sep 2012, Yerevan, Armenia (A.A. Akopian, M.V. Gyulzadian, T.A. Nazaryan, et al.)

ANSEF Forum, 24 Sep 2012, Yerevan, Armenia (A.M. Mickaelian)

Archaeoastronomy meeting dedicated to Anania Shirakatsi's 1400th anniversary, 25-26 Sep 2012, Byurakan, Armenia (E.S. Parsamian, H.A. Harutyunian, A.M. Mickaelian, M.V. Gyulzadyan, et al.)

ArAS XI Annual Meeting, 26 Sep 2012, Byurakan, Armenia (ArAS BAO staff members)

Grigor Gurzadyan – 90 seminar, 15 Oct 2012, Byurakan, Armenia (BAO staff)

17th International Astronomical Olympiad (IAO), 16-24 Oct 2012, Gwangju, South Korea (M.V. Gyulzadian, T.A. Nazaryan)

XXIV Canary Islands Winter School of Astrophysics, 4-16 Nov 2012, Puerto de la Cruz, Tenerife, Spain (G.S. Harutyunian)

Talks, posters and lectures presented at meetings and schools

During 2012, Byurakan astronomers presented invited, oral and poster contributions at 11 meetings (in Russia, Ukraine, Italy, Switzerland, Hungary, China, Yerevan and Byurakan) and gave lectures at the 4th Byurakan International Summer School (4BISS). Altogether, there were 2 invited talks, 19 contributed talks, 11 posters, 3 lectures, and 1 report.

EAS Affiliated Societies meeting, 30 Jan – 01 Feb 2012, Rolle, Switzerland (1 oral talk)
A.M. Mickaelian: *"The Armenian Astronomical Society in 2008-2011"* (oral talk)

XXIX Conference on "Modern Problems of Extragalactic Astronomy", 17-19 Apr 2012, Pushchino, Russia (1 oral talk)
G.M. Paronyan: *"Neutral hydrogen in near 3C radiogalaxies"* (oral talk)

19th Young Scientists' Conference on Astronomy and Space Physics, 23-28 Apr 2012, Kiev, Ukraine (1 oral talk, 2 posters)
S.A. Ghazaryan: *"On the question of detecting granulation signal in A and B star's CoRoT light curves"* (oral talk)
K.G. Khachatryan: *"The spectral investigation of the WR galaxy PGC97542"* (poster)
A.V. Vardanyan: *"The chemical abundance gradient and star formation rate in the galaxy M101"* (poster)

EAAS XI general meeting, 28 May – 1 June 2012, Moscow, Russia (1 oral talk)
A.M. Mickaelian: *"Multiwavelength Studies of Markarian Galaxies"* (oral talk)

JENAM/EWASS-2012, 2-7 July 2012, Rome, Italy (2 oral talks)
Symposium 9: *Astronomy education in Europe:*
     A.M. Mickaelian: *"Astronomical education in Armenia"* (oral talk)
Special Session 5: *Morphology and kinematics of interacting galaxies:*
     A.M. Mickaelian: *"Interacting/merging pairs and multiples among Byurakan-IRAS Galaxies"* (oral talk)

IAU XXVIII General Assembly, 20-31 Aug 2012, Beijing, China (1 oral talk, 9 posters)
IAU Symposium 290: *Feeding compact objects: Accretion on all scales:*
     A.M. Mickaelian: "The sample of FBS cataclysmic variables" (poster)
IAU Symposium 292: *Molecular Gas, Dust, and Star Formation in Galaxies:*
     A.M. Mickaelian: "Study of the sample of Byurakan-IRAS galaxies" (poster)
IAU Symposium 295: *The intriguing life of massive galaxies:*
     A.M. Mickaelian: "Byurakan-IRAS galaxies as massive galaxies with nuclear and starburst activity" (poster)
Special Session 4: *New era for studying interstellar and intergalactic magnetic fields:*
     Ruben Andreasyan: "Magnetic field structure near the Galactic plane" (poster)
Special Session 5: *The IR view of massive stars: the main sequence and beyond:*
     A.M. Mickaelian: "New IR data on the Byurakan-IRAS Stars (BIS)" (poster)
Special Session 11: *IAU Strategic Plan and the Global Office of Astronomy for Development:*
     A.M. Mickaelian: "Armenia as a Regional Center for "Astronomy for Development" activities" (oral talk)
Special Session 13: *High-precision tests of stellar physics from high-precision photometry:*
     A.M. Mickaelian: "Photometric analysis of large catalogues and databases based on POSS1 and POSS2 surveys" (poster)
Special Session 15: *Data intensive astronomy:*

A.M. Mickaelian: "ArVO products and services on ArmCluster" (poster)
A.M. Mickaelian: "MW studies of Markarian galaxies in frame of the Armenian Virtual Observatory" (poster)
Joint Discussion 6: *The connection between radio properties and high-energy emission in AGNs:*
A.M. Mickaelian: "Study of the radio-X-ray properties of AGN based on their complete sample" (poster)

6th Workshop of Young Reaserchers in Astronomy and Astrophysics: "The Multi-wavelength Universe from Starbirth to Star Death", 3-6 Sep 2012, Budapest, Hungary (1 oral talk)
L.S. Aramyan: *""* (oral talk)

4th Byurakan International Summer School (4BISS), 15-23 Sep 2012, Byurakan, Armenia (3 lectures and 6 talks)
H.A. Harutyunian: *"Viktor Ambartsumian and Byurakan Astrophysical Observatory"* (lecture)
A.M. Mickaelian: *"Astronomical Surveys, Catalogs, Archives, Databases and VOs"* (lecture)
E.H. Nikogossian: "*The Observational Evidences of Young Stellar Objects*" (lecture)
L.S. Aramyan: *"The SNe and their host galaxies in SDSS: Characterization of the unconfirmed SNe"* (talk)
S.A. Ghazaryan: *"On the question of detecting granulation signal in A and B star's CoRoT light curves"* (talk)
G.S. Harutyunyan: *"Study of interacting and merging BIG galaxies"* (talk)
V.S. Harutyunyan: *"On a possible relation between the velocity dispersion and the luminosity for cD clusters of galaxies"* (talk)
K.G. Khachatryan: *"Kinematics of planet hosting stars"* (talk)
A.V. Vardanyan: *"Chemical and kinematic properties of Solar-neighbourhood stars from the HARPS GTO planet search program"* (talk)

ANSEF Forum, 24 Sep 2012, Yerevan, Armenia (1 invited talk)
A.M. Mickaelian: *"Study of Multiwavelength Properties of Markarian Galaxies using Virtual Observatory"* (invited talk)

Anania Shirakatsi – 1400th anniversary meeting, 25-26 Sep 2012, Byurakan, Armenia (1 invited talk, 5 oral talks)
E.S. Parsamian: *"Armenian ancient astronomy"* (invited talk)
H.A. Harutyunian: *"Vahagn epic and ancient Armenian understanding on the world structure"* (oral talk)
A.M. Mickaelian: *"Armenian astronomical heritage"* (oral talk)
A.M. Mickaelian: *"Anania Shirakatsi webpage"* (oral talk)
A.M. Mickaelian: *"Popular astronomy in the world and in Armenia"* (oral talk)
M.V. Gyulzadyan: *"Armenian pupils in international Olympiads"* (oral talk)

ArAS XI Annual Meeting, 26 Sep 2012, Byurakan, Armenia (1 report)
A.M. Mickaelian: *"ArAS annual report 2011-2012"* (annual report)

Seminars

26.03, Byurakan	**Viktor Charugin** (Space Research Institute, Russia): *Synchrocompton boilers in quasars and active galactic nuclei*
26.03, Byurakan	**Denis Denisenko** (Space Research Institute, Russia): *Discovery and study of new variable stars*
10.05, Byurakan	**Narek Sahakyan** (Institute of Physical Research, Armenia): *Investigation of high energy neutrinos of the gamma-radiation of Cen A radiogalaxy and Galactic sources*
31.05, Byurakan	**Vladimir Airapetian** (NASA/GSFC, USA): *The activity in NASA/Goddard Space Flight Center and in nearby Universe*
18.06, Byurakan	**Mkrtich Gevorgyan** (BAO): *Dust absorption in the AGN narrow-line region*
09.07, Byurakan	**Areg Mickaelian** (BAO): *Summary of investigations based on astronomical surveys and multiwavelength data*
27.08, Byurakan	**Vardan Adibekyan** (CAUP, Porto, Portugal): *Chemical composition and kinematics of exoplanets host stars*
03.09, Byurakan	**Areg Mickaelian** (BAO): *Results of the IAU XXVIII General Assembly in Beijing held in August 2012*

10.09, Byurakan	**Elena Nikogossian** (BAO): *Young stellar objects in Cep B star-forming region*
08.10, Byurakan	**Tigran Magakian** (BAO): *V2494 Cyg (HH 381 IRS): a new fuor in Cyg OB7 complex*
05.11, Byurakan	**Gurgen Paronyan** (BAO): *Multiwavelength studies of X-ray AGN*

Foreign invited seminar

06.07, Rome, Italy	**Areg Mickaelian**: *MW studies of Markarian galaxies with VO tools*
27.09, Tbilisi, Georgia	**Levon Aramyan**:
13.11, IAP, France	**Levon Aramyan**: *The association of different types of SNe with spiral structure of the host and star forming regions*
15.11, IAP, France	**Levon Aramyan**: *On the nature of unconfirmed SNe*

Publications

During 2012, Byurakan astronomers published 30 papers in refereed journals (including 17 in *Astrophysics*, 4 in *ApJ*, 1 in *AJ*, 5 in *A&A*, 1 in *MNRAS*, 1 in *Baltic Astronomy* and 1 in *IBVS*), 12 in proceedings of 4 meetings, 2 electronic catalogs in Vizier, 6 review papers in a book, and 1 preprint, as well as 2 books have been edited and a DVD has been produced. Numerous information materials and popular articles were published as well. Compared to 2011, there is a slight decrease in refereed papers but significant increase in other publications.

Refereed journal papers

Gigoyan, K. S.; Mickaelian, A. M. – Revised and updated catalogue of the First Byurakan Survey of late-type stars *// Monthly Notices of the Royal Astronomical Society, Volume 419, Issue 4, pp. 3346-3353, Feb 2012.*

Hakopian, S. A.; Balayan, S. K.; Dodonov, S. N.; Moiseev, A. V.; Smirnova, A. A. – Panoramic spectroscopy of galaxies with star-formation regions. a study of SBS 1202 + 583 *// Astrophysics, Volume 55, Issue 1, pp. 1-13, Mar 2012.*

Mahtessian, A. P. – Influence of environment on the luminosity function of galaxies *// Astrophysics, Volume 55, Issue 1, pp. 34-44, Mar 2012*

Nikoghosyan, E. H.; Magakian, T. Yu.; Movsessian, T. A. – Searches for HH-objects and emission stars in star-formation regions. VIII. Stars with Hα emission in the vicinity of the nebula GM 2-41 *// Astrophysics, Volume 55, Issue 1, pp. 70-80, Mar 2012.*

Akopian, A. A. – Frequency distribution of x-ray flares for young stellar objects in the region of ρ Oph *// Astrophysics, Volume 55, Issue 1, pp. 81-91, Mar 2012.*

Gyulbudaghian, A. L. – Two trapezium-type systems in CMa *// Astrophysics, Volume 55, Issue 1, pp. 92-97, Mar 2012.*

Valenti, S.; Taubenberger, S.; Pastorello, A.; **Aramyan, L.**; Botticella, M.T.; Fraser, M.; Benetti, S.; Smartt, S.J.; Cappellaro, E.; Elias-Rosa, N.; Ergon, M.; Magill, L.; Magnier, E.; Kotak, R.; Price, P.A.; Sollerman, J.; Tomasella, L.; Turatto, M.; Wright, D.E. – A Spectroscopically Normal Type Ic Supernova from a Very Massive Progenitor *// The Astrophysical Journal Letters, Volume 749, Issue 2, article id. L28, Apr 2012.*

Movsessian, T.A.; Magakian, T.Yu.; Moiseev, A.V. – Kinematics and the origin of the internal structures in HL Tauri jet (HH 151) *// Astronomy & Astrophysics, Volume 541, id.A16, May 2012.*

Gyulbudaghian, A.L. – Three HH objects associated with jets *// Astrophysics, Volume 55, Issue 2, pp. 186-192, June 2012.*

Alecian, G.; **Harutynian, H. A.** – Radiation transfer in an inhomogeneous medium. optical depth depending on absorption coefficient *// Astrophysics, Volume 55, Issue 2, pp. 251-260, June 2012.*

Nikoghossian, A. G. – Solution of linear radiative transfer problems in plane-parallel atmospheres. II // *Astrophysics, Volume 55, Issue 2, pp. 261-274, June 2012.*

Chen, W. P.; Hu, S. C.-L.; Errmann, R.; Adam, Ch.;Baar, S.; Berndt, A.; Bukowiecki, L.; Dimitrov, D. P.; Eisenbeiß, T.; Fiedler, S.; Ginski, Ch.; Gräfe, C.; Guo, J. K.; Hohle, M. M.; Hsiao, H. Y.; Janulis, R.; Kitze, M.; Lin, H. C.; Lin, C. S.; Maciejewski, G.; Marka, C.; Marschall, L.; Moualla, M.; Mugrauer, M.; Neuhäuser, R.; Pribulla, T.; Raetz, St.; Röll, T.; Schmidt, E.; Schmidt, J.; Schmidt, T. O. B.; Seeliger, M.; Trepl, L.; Briceño, C.; Chini, R.; Jensen, E. L. N.; **Nikogossian, E. H.**; Pandey, A. K.; Sperauskas, J.; Takahashi, H.; Walter, F. M.; Wu, Z.-Y.; Zhou, X. – A Possible Detection of Occultation by a Proto-planetary Clump in GM Cephei // *The Astrophysical Journal, Volume 751, Issue 2, article id. 118, June 2012.*

Khanzadyan, T.; Davis, C. J.; Aspin, C.; Froebrich, D.; Smith, M. D.; **Magakian, T. Yu.; Movsessian, T.**; Moriarty-Schieven, G. H.; **Nikogossian, E. H.**; Pyo, T.-S.; Beck, T. L. – A wide-field near-infrared H$_2$ 2.122 µm line survey of the Braid Nebula star formation region in Cygnus OB7 // *Astronomy & Astrophysics, Volume 542, id.A111, June 2012.*

Melikian, N. D.; Natsvlishvili, R. Sh.; Tamazian, V. S.; **Karapetian, A. A.** – Spectral Detection of a Very Strong Flare on WX UMa // *Information Bulletin on Variable Stars, 6031, 1., July 2012.*

Gigoyan, K. S.; Russeil, D.; **Mickaelian, A. M.**; Sarkissian, A.; **Avtandilyan, M. G.** – New carbon stars found in the Digitized First Byurakan Survey // *Astronomy & Astrophysics, Vol. 544, id.A95, Aug 2012.*

Hakobyan, A. A.; Adibekyan, V. Zh.; **Aramyan, L. S.**; Petrosian, A. R.; Gomes, J. M.; Mamon, G. A.; Kunth, D.; Turatto, M. – Supernovae and their host galaxies. I. The SDSS DR8 database and statistics // *Astronomy & Astrophysics, Vol. 544, id.A81, Aug 2012.*

Sargsyan, L.; Lebouteiller, V.; Weedman, D.; Spoon, H.; Bernard-Salas, J.; Engels, D.; Stacey, G.; Houck, J.; Barry, D.; Miles, J.; **Samsonyan, A.** – [C II] 158 µm Luminosities and Star Formation Rate in Dusty Starbursts and Active Galactic Nuclei // *The Astrophysical Journal, Vol. 755, Issue 2, article id. 171, Aug 2012.*

Martirosian J.R., **Sargsyan L.A.** – Infrared spectral properties of wolf-rayet galaxies // *Astrophysics, Vol. 55, Issue 3, pp. 306-316, Sep 2012.*

Malumyan, V. H.; Martirosian, J. R. – Relationship between the infrared and radio emission of wolf-rayet galaxies // *Astrophysics, Vol. 55, Issue 3, pp. 317-324, Sep 2012.*

Melikian, N. D. – Light curves, variations in the MgII h and k and MgI (2852 Å) emission lines, and polarization of light from the mirids // *Astrophysics, Vol. 55, Issue 3, pp. 351-362, Sep 2012.*

Gyulbudaghian, A. L. – Radial system of dark globules in Ser OB2 // *Astrophysics, Vol. 55, Issue 3, pp. 363-370, Sep 2012.*

Gigoyan, K. S.; Rossi, C.; Sclavi, S.; Gaudenzi, S. – New bright carbon stars found in the DFBS // *Astrophysics, Vol. 55, Issue 3, pp.424-428, Sep 2012.*

Adibekyan, V. Zh.; Delgado Mena, E.; Sousa, S. G.; Santos, N. C.; Israelian, G.; González Hernández, J. I.; Mayor, M.; **Hakobyan, A. A.** – Exploring the α-enhancement of metal-poor planet-hosting stars. The Kepler and HARPS samples // *Astronomy & Astrophysics, Vol. 547, id.A36, Nov 2012.*

Mazzarella, J. M.; Iwasawa, K.; Vavilkin, T.; Armus, L.; Kim, D.-C.; Bothun, G.; Evans, A. S.; Spoon, H. W. W.; Haan, S.; Howell, J. H.; Lord, S.; Marshall, J. A.; Ishida, C. M.; Xu, C. K.; Petric, A.; Sanders, D. B.; Surace, J. A.; Appleton, P.; Chan, B. H. P.; Frayer, D. T.; Inami, H.; **Khachikian, E. Ye.**; Madore, B. F.; Privon, G. C.; Sturm, E.; U, Vivian; Veilleux, S. – Investigation of Dual Active Nuclei, Outflows, Shock-heated Gas, and Young Star Clusters in Markarian 266 // *The Astronomical Journal, Vol. 144, Issue 5, article id. 125, Nov 2012.*

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Sargsyan, L.; Gevorgyan, M.; Abrahamyan, H. V.; Kostandyan, G.; Paronyan, G.; Samsonyan, A.; Sargsyan, D.; Sinamyan, P. – Dust obscuration of the narrow line region of active galactic nuclei // *Astrophysics, Vol. 55, Issue 4, pp. 460-470, Dec 2012.*

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Weedman, D.; **Sargsyan, L.**; Lebouteiller, V.; Houck, J.; Barry, D. – Infrared Classification and Luminosities for Dusty Active Galactic Nuclei and the Most Luminous Quasars // *The Astrophysical Journal, Vol. 761, Issue 2, article id. 184, Dec 2012.*

Mickaelian, A. M. – Large Astronomical Surveys, Catalogs and Databases // *Baltic Astronomy, Vol. 21, p. 331-339, 2012.*

Proceedings papers

Mickaelian, A.M.; Sarkissian, A.; **Sinamyan, P.K.** – Variability Analysis based on POSS1/POSS2 Photometry // *Proc. IAU Symp. 285: New Horizons in Time-Domain Astronomy, CUP, Vol. 285, p. 366-368, Apr 2012.*

Melikian, N.D.; Tamazian, V.S.; **Karapetian, A.A.; Samsonyan, A.L.** – Emission objects in Cyg OB7. Flare activity variation of UV Ceti. // *International Workshop: Binaries Inside and outside the Local Interstellar Bubble. AIP Conf. Proc., Vol. 1452, pp. 73-79, May 2012.*

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Sarkissian, A.; Arzoumanian, E.; **Mickaelian, A.M.**; Berthier, J.; Thuillot, W.; Vachier, F. – The Virtual Observatory in planetology, two scientific use cases: asteroids and exoplanets // *"Fifty years of Cosmic Era: Real and Virtual Studies of the Sky", Proc. Conf. Young Scientists of CIS Countries, held 21-25 Nov 2011, in Yerevan, Armenia. Eds: A.M. Mickaelian, O.Yu. Malkov, N.N. Samus. Yerevan: NAS RA, p. 56-64, May 2012.*

Ghazaryan, S.A.; Alecian, G.; **Harutyunyan, H.A.** – Analysis of CoRoT N2-light curves corrected with a new quasi-automatic procedure // *"Fifty years of Cosmic Era: Real and Virtual Studies of the Sky", Proc. Conf. Young Scientists of CIS Countries, held 21-25 Nov 2011, in Yerevan, Armenia. Eds: A.M. Mickaelian, O.Yu. Malkov, N.N. Samus. Yerevan: NAS RA, p. 77-80, May 2012.*

Rossi, C.; **Gigoyan, K.S.; Avtandilyan, M.G.**; Sclavi, S. – Revised classification of the SBS carbon star candidates including the discovery of a new emission-line dwarf carbon star // *"Fifty years of Cosmic Era: Real and Virtual Studies of the Sky", Proc. Conf. Young Scientists of CIS Countries, held 21-25 Nov 2011, in Yerevan, Armenia. Eds: A.M. Mickaelian, O.Yu. Malkov, N.N. Samus. Yerevan: NAS RA, p. 94-97, May 2012.*

Harutyunyan, G.S.; Mickaelian, A.M. – Study and classification of SDSS spectra for Byurakan-IRAS Galaxies // *"Fifty years of Cosmic Era: Real and Virtual Studies of the Sky", Proc. Conf. Young Scientists of CIS Countries, held 21-25 Nov 2011, in Yerevan, Armenia. Eds: A.M. Mickaelian, O.Yu. Malkov, N.N. Samus. Yerevan: NAS RA, p. 157-161, May 2012.*

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Gabrielyan, V.V. – Designing a New Control System for the Schmidt Telescope *// "Fifty years of Cosmic Era: Real and Virtual Studies of the Sky", Proc. Conf. Young Scientists of CIS Countries, held 21-25 Nov 2011, in Yerevan, Armenia. Eds: A.M. Mickaelian, O.Yu. Malkov, N.N. Samus. Yerevan: NAS RA, p. 242-246, May 2012.*

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Other papers

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Kalloghlian A.T. – Stellar Associations // *Book "Ambartsumian's Legacy and Active Universe", ed. H. Harutyunian, D. Sedrakian, A. Kolloghlian, A. Nikoghossian, Springer, p. 77-88, 2012*

Gyulbudaghian A.L. – Star formation and molecular clouds // *Book "Ambartsumian's Legacy and Active Universe", ed. H. Harutyunian, D. Sedrakian, A. Kolloghlian, A. Nikoghossian, Springer, p. 89-107, 2012.*

Harutyunyan H.A. – Ambartsumian's paradigms for the Activity of Galactic Nuclei and Evolution of Galaxies // *Book "Ambartsumian's Legacy and Active Universe", ed. H. Harutyunian, D. Sedrakian, A. Kolloghlian, A. Nikoghossian, Springer, p. 107-122, 2012.*

Akopian A.A., **Parsamian E.S.** – V. A. Ambartsumian and Statistics of Flaring Objects // *Book "Ambartsumian's Legacy and Active Universe", ed. H. Harutyunian, D. Sedrakian, A. Kolloghlian, A. Nikoghossian, Springer, p. 123-136, 2012.*

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Harutyunian H.A., Sedrakian D.M., **Kolloghlian A.T.**, **Nikoghossian A.G.** (Eds.) – Ambartsumian's Legacy and Active Universe // *Springer, 2012.*

Mickaelian A.M. – Astronomy for Schools // *DVD, Nov 2012.*

Most productive authors have been (3 and more refereed papers):

Authors	Ref. papers	Proc. papers	Other publ.-s	All public.-s
Gigoyan K.S.	3	1	1	5
Gyulbudaghian A.L.	3	-	1	4
Magakian T.Yu.	4	-	-	4
Mickaelian A.M.	3	8	1	12
Movsessian T.H.	4	-	-	4
Nikogossian E.H.	3	-	-	3
Sargsyan L.A.	4	-	-	4

Publications by research groups:

Head of the group	Ref. papers	Proc. papers	Other publ.-s	All public.-s
Harutyunian H.A.	1	1	1	3
Khachikian E.Ye.	4	-	1	5
Magakian T.Yu.	5	-	-	5
Melikian N.D.	2	1	-	3
Mickaelian A.M.	8	9	1	18
Nikoghosian A.G.	1	-	1	2
Parsamian E.S.	5	-	2	7
Petrosian A.R.	4	-	1	5

Isaac Newton Institute (INI) Armenian Branch

The President of the Isaac Newton Institute of Chile *Dr.* **Gonzalo Alcaino** established the INI Armenian Branch in 2000. *Dr.* **A.M. Mickaelian** is its Resident Director. Altogether in 2012, 11 papers were published in AJ, ApJ, A&A, and MNRAS, including 6 in frame of INI (listed in *"Publications"*). The research staff (25): H.V. Abrahamian, L.S. Aramyan, T.G. Arshakian, M.G. Avtandilyan, S.K. Balayan, L.K. Erastova, K.S. Gigoyan, A.L. Gyulbudaghian, A.A. Hakobyan, S.A. Hakopian, H.A. Harutyunian, L.R. Hovhannisyan, R.A. Kandalyan, A.A. Karapetian, T.Yu. Magakian, N.D. Melikian, A.M. Mickaelian, G.A. Mikayelyan, H.Kh. Navasardian, A.G. Nikoghossian, E.H. Nikoghossian, A.R. Petrosian, L.A. Sargsyan, P.K. Sinamyan, A.A. Sinanian.

Teaching, supervision of students

Following Byurakan scientists teach astrophysical subjects at the YSU Department of Physics, Chair of General Physics and Astrophysics: A.A. Akopian, A.A. Hakobyan, H.A. Harutyunian, V.H. Malumian, T.H. Movsessian, A.G. Nikoghossian, A.G. Yeghikyan. *Prof.* **Davit Sedrakian** is the head of the Chair of General Physics and Astrophysics.

Byurakan scientists have also been supervisors of B.Sc. and M.Sc. Diploma theses at the YSU. At present BAO has three Ph.D. students. **Satenik Ghazaryan** (supervisor: H.A. Harutyunian) is involved in the joint French-Armenian post-graduate fellowship sponsored by the French Embassy in Armenia. Her second (French) supervisor is Georges Alecian. The other Ph.D. students are **Tigran Nazaryan** and **Levon Aramyan** (supervisor: A.R. Petrosian). In addition, a few other Byurakan fellows are in the stage of preparation of their Ph.D. theses: N.S. Asatrian, A.G. Eghikian, M.V. Gyulzadian, A.A. Karapetian, H.V. Abrahamyan and G.M. Paronyan. No theses have been defended at BAO Special Council during 2012.

The International Astronomical Olympiad was held in 2012 in Gwangju, South Korea, where the Armenian pupils won one First-rank, one Second-rank and two Third-rank Diploma (teachers: Marietta Gyulzadian and Tigran Nazaryan).

Membership

International Astronomical Union (IAU, 17 members): K.S. Gigoyan, A.L. Gyulbudaghian, S.A. Hakopian, H.A. Harutyunian, R.Kh. Hovhannessian, A.T. Kalloghlian, E.Ye. Khachikian, T.Yu. Magakian, A.P. Mahtessian, V.H. Malumian, N.D. Melikian, A.M. Mickaelian, A.G. Nikoghossian, E.H. Nikogossian, E.S. Parsamian, A.R. Petrosian, H.V. Pikichian.

European Astronomical Society (EAS, 18 members): A.S. Amirkhanian, R.R. Andreasyan, K.S. Gigoyan, A.A. Hakobyan, H.A. Harutyunian, M.A. Hovhannissian, S.G. Iskudarian, E.Ye. Khachikian, T.Yu. Magakian, V.H. Malumian, N.D. Melikian, A.M. Mickaelian, T.H. Movsessian, E.H. Nikogossian, E.S. Parsamian, A.R. Petrosian, H.V. Pikichian, A.G. Yeghikian.

Euro-Asian Astronomical Society (EAAS, 7 members): T.Yu. Magakian, N.D. Melikian, A.M. Mickaelian, A.G. Nikoghossian, G.B. Ohanian, E.S. Parsamian, A.R. Petrosian.

American Astronomical Society (AAS, 1 member): A.M. Mickaelian.

Armenian Astronomical Society (ArAS): 40 members from BAO.

International Committees and Working Groups (WG)

EAAS Executive Council: A.M. Mickaelian

EAAS Scientific-Technical Committee: T.Yu. Magakian

EAAS International Bureau: A.M. Mickaelian

IAU Commission 5 WG on Astronomical Data (WGAD): A.M. Mickaelian

IAU Commission 5 WG on Preservation and Digitization of Photographic Plates (PDPP): A.M. Mickaelian

IAU Commission 41 WG on Astronomy and World Heritage (WGAWH): A.M. Mickaelian

IAU Commission 46 "Astronomy Education & Development": H.A. Harutyunian (Liaison in Armenia)

International Centre for Relativistic Astrophysics (ICRANet) Director's Council: H.A. Harutyunian

International Virtual Observatory Alliance (IVOA) Executive Committee: A.M. Mickaelian

Large Telescopes Thematic Committee (KTBT): E.Ye. Khachikian

Sub-Regional European Astronomical Committee (SREAC): A.M. Mickaelian

Journal *Astrofizika/Astrophysics*

The journal *Astrofizika* (English translation: *Astrophysics*) is being published by the Armenian NAS. Five Byurakan astronomers are involved in the Editorial Board of *Astrofizika* (Editor-in-Chief: *Prof. Davit Sedrakian from the YSU*): **E.Ye. Khachikian** (*Deputy Editor-in-Chief*), **A.T. Kalloghlian** (*Secretary-in-Chief*), **H.A. Harutyunian**, **A.G. Nikoghossian**, and **E.S. Parsamian**. Four issues of Vol. 55 were published in 2012 with 52 papers, including 17 (32.7%) from BAO (compared to 21 out of 56 (37.5%) in 2011 and 20 out of 57 (35%) in 2010). Other papers were from the YSU, other Armenian institutions, Russia, Ukraine, etc.

Armenian Astronomical Society (ArAS)

ArAS was created in 1999-2001 and at present is an active organization supporting astronomy/astrophysics and science in general in Armenia. Co-Presidents: **H.A. Harutyunian**, **A.M. Mickaelian**, **Ye.Terzian** (Cornell Univ, USA), Vice-President: **T.Yu. Magakian**, Secretary: **E.H. Nikoghossian**, Treasurer: **M.V. Gyulzadyan**, Webmaster: **G.A. Mikayelyan**. ArAS has **95 members from 21 countries**, including 56 from Armenia. During 2012, the **ArAS webpage** was updated, eight issues (Nos. 53-60) of the **ArAS Newsletter (ArASNews)** were released, **ArAS XI meeting** was held on September 26, **ArAS Annual prize for Young Astronomers** was awarded for the 9th time (2012 winner: Vardan Adibekyan), **2 new ArAS members** were accepted. During 2012, in frame of the **scientific journalism**, ArAS prepared and circulated more than 100 press-releases to Armenian mass media with information on sky events, international and local astronomical news that resulted in some 1000 publications.

Areg Mickaelian, Gohar Harutyunyan

ARMENIA JOINS UN COPUOS

Recently the UN General Assembly in its general session adopted a resolution according to which Armenia was elected as a member of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). This is rather important for Armenia not only for scientific-technical matters but also for political ones. A justification for the membership of small countries not having own Space projects is that some countries may have high scientific potential and may contribute in international Space agencies projects. Being a COPUOS member, Armenia will join five main international conventions on peaceful uses of outer space: 1. So-called "Outer Space Treaty" (the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies), 2. So-called "Rescue Agreement" (the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space), 3. So-called "Liability Convention" (the Convention on International Liability for Damage Caused by Space Objects), 4. So-called "Registration Convention" (Convention on Registration of Objects Launched into Outer Space) and 5. So-called "Moon Agreement" (the Agreement Geoverning the Activities of States on the Moon and Other Celestial Bodies). In addition, Armenia's representative will participate in annual meetings of the COPUOS and its scientific-technical and juridical sub-committees.

Among the peaceful uses of the outer space, one can mention e.g. the participation of our astronomers in the scientific projects, which are being accomplished by American and European space observatories, including optical (Hubble Space Telescope), IR (IRAS, Spitzer, Herschel), X-ray (ROSAT, Chandra, XMM) ones. Moreover, recently we have received an invitation to join the International Planetary Data Alliance (IPDA). At last, in 2011 am agreement was signed between the Armenian National Academy of Sciences and "Roskosmos" (Russian Space Agency) and in 2012 the program on tracking and study of cosmic garbage (debris remaining from space devices) was started in the Byurakan Astrophysical Observatory (BAO). In frame of this program, fast telescopes will be installed in BAO, as well as BAO telescopes will be renovated.

Areg Mickaelian

ANSEF GRANT WINNERS 2013

A.N.S.E.F.

The Armenian National Science & Education Fund

The ANSEF Review Board announced the recipients of the ANSEF 2013 awards, altogether 26 research groups. Among them, there are 15 projects representing institutes of the Armenian National Academy of Sciences (including 3 from the Institute for Physical Research, 3 from the Byurakan Astrophysical Observatory, and 2 from the Institute of Molecular Biology), 7 representing the Yerevan State University (YSU), 2 from the Armenian State Engineering University, 1 from the

Armenian State Medical University, and 1 from A. Alikhanyan National Physics Laboratory. 12 awards are in the area of exact sciences (mainly physics and astrophysics), 13 are in the area of natural sciences, and 1 is in the area of social sciences. We are happy to list the ANSEF 2013 winners from BAO:

Dr. **Smbat Balayan** – *Software for control 1m telescope BAO*

Dr. **Artur Hakobyan** – *Supernovae distribution and host galaxy properties*

Dr. **Tigran Movsessian** (*William Mesrobian Astronomy Award*) – *Investigation of the internal structures in the jets from young stars*

Since 2001, in the field of astronomy and astrophysics, ANSEF has supported 36 projects (USD 5000 each; projects by 21 Principal Investigators involving more than 70 scientists), including 30 projects from BAO and 6 from YSU.

EAS AFFILIATED SOCIETIES MEETING in SWITZERLAND

The EAS Affiliated Societies meeting took place on Jan 24-25 in Rolle, near Geneva, Switzerland, a superb environment facing Lake Geneva. This was the third such meeting; the first one was in 2008 in Leiden, Netherlands and the second one, also in Rolle, Switzerland. EAS has a policy of activation of its contacts and collaboration with its 25 affiliated societies, as well as to work more intensely to increase the role of the Society in the European astronomy. The EAS Council, presidents or representatives of national astronomical societies, and representatives of other European organizations took part in the meeting. The main goals were to summarize the EAS and national societies' activities during the last year and plan the further affairs. Among the participants, there were: EAS President Thierry Courvoisier (Switzerland, also recently elected the President of the Swiss Academy of Arts and Sciences), Vice-Presidents Roger Davies (UK) and Mary Kontizas (Greece), EAS Secretary Serena Vitti (Italy), other members of EAS Council, EAAS Co-Chairman Vladimir Obridko (Russia), the representative of ASTRONET project Johannes Andersen (Denmark), et al., altogether 26 scientists from 15 countries. ArAS Co-President Areg Mickaelian participated from Armenia; his talk was devoted to ArAS activities in 2012. Talks on the state of astronomy in different countries were presented by presidents of the astronomical societies of Austria, Czech Republic, Greece, France, Italy, Portugal, Russia, Serbia, Spain, Switzerland, UK, Ukraine and the representative of the Northern European countries.

At present, EAS officially includes national astronomical societies of 25 countries; however among the individual members there are scientists from all European and a number of other countries. ArAS became an EAS Affiliated Society in 2001 and there are 18 individual astronomers from Armenia. ArAS together with EAS organized JENAM-2007 in Armenia, which was the largest ever held scientific meeting in Armenia.

Europe, together with the USA, is one of the two largest astronomical centres in the world. Working together, the European countries are able to keep a leading role in many areas. In particular, Europe possesses four 8-metre telescopes operating in Chile, the European Southern Observatory (ESO) having total efficiency of one 16-metre telescope. At present Europe builds E-ELT (a 39-metre telescope) and in this year Gaia Space observatory will be launched which may result in

revolutionary discoveries in astronomy. In addition to EAS and ESO, nice examples of the European collaboration are also the European Space Agency (ESA) unifying 14 countries, the European Virtual Observatory (Euro-VO), ASTRONET and OPTICON projects, as well as the all-European journal *Astronomy & Astrophysics.*

Areg Mickaelian

ANNIVERSARIES

Lidia ERASTOVA – 75. *Dr.* Lidia K. Erastova recently celebrated her 75th anniversary. She was born on February 6, 1938, in Ush-Tode (Alma-Ata, Kazakhstan). She graduated from the Yerevan State University (YSU), Department of Astrophysics in 1974 and since the same year works at BAO. In 1960, she has graduated from the Yerevan State University (YSU), Department of Physics (Chair of Astrophysics), and began working at the Byurakan Astrophysical Observatory (BAO). Since then, she almost all the time (with a short absence to the Russian Special Astrophysical Observatory, SAO at the beginning of 1990s) lives in Byurakan and is one of the most experienced scientists of BAO. In 1982, she defended her Ph.D. thesis under *Prof.* V.A. Ambartsumian's supervision. Erastova has participated in two very important projects carried out in Byurakan: search for flare stars in star clusters and associations (under *Prof.* L.V. Mirzoyan's supervision) and the Second Byurakan Survey (SBS), one of the most important projects of BAO (under *Prof.* B.E. Markarian's supervision). Her main scientific fields are the non-stable stars, surveys, AGN, starburst galaxies. She has published some 100 scientific papers on various topics of astronomy. *Dr.* Erastova is a founding member of ArAS (since July 2001). At present she continues to work on active galaxies, SBS galaxies, as well as the Digitized First Byurakan Survey (DFBS).

Richard BELIAN – 75. *Dr.* Richard (Dick) Belian was born on February 23, 1938, in Santa Fe, New Mexico, USA. He received his Masters Degree in physics from the University of New Mexico in the spring of 1967. Following two summers as a Los Alamos GRA in J.G., he joined the full time staff at the Los Alamos National Laboratory (LANL), Los Alamos, New Mexico, in 1967 where he has been ever since. Initially, Belian worked on a new instrument for the Vela satellites, the XAVIER or cosmic X-ray detector. This instrument was responsible for the discovery of short, intense, high energy astrophysical events. Since then Richard has worked as on a large number of energetic particle detectors for earth orbit. In 1982, he became the PI for the Advanced Particle Outboard or APO detectors, which is the follow-through energetic particle detector for the Advanced RADEC II (AR II) program. In addition, Richard has hardware responsibilities for the Imaging Electron Spectrometer or IES instruments for NASA and ESA/NASA International Solar-Terrestrial Physics (ISTP) program. In all, Richard is or has been PI on 45 instruments now in space, and 5 more awaiting launch and co-I on several others. Recently, Richard has been associated with the highly successful NASA Lunar Prospector project, where he was responsible for one of the three LANL detectors, the APS, on that lunar satellite. Also, Richard is PI on a new programmatic instrument the PEM (Proton Electron Monitor) that will be flown as part of new nuclear detection instrumentation for geosynchronous orbit. He is the Los Alamos Cluster team leader of the Space and Remote Sensing Sciences group. Although Richard's major efforts have been in the areas of conceiving, designing, building, calibrating and testing flight instruments, he has been fortunate enough to have had the opportunity to do basic research, both in the area of energetic particles in the earth's magnetosphere and in X-ray astronomy during the early days of that area of high energy astrophysics – first author on 12, coauthor on more than 100 refereed papers. *Dr.* Belian is an AAS and ArAS (since March 2002) member.

OBITUARIES

Vigen MALUMIAN. *Prof.* Vigen Haik Malumian, one of the most famous radioastronomers at the Byurakan Astrophysical Observatory (BAO), passed away on February 2, 2013. *Prof.* Malumian was born on March 11, 1932 in Yerevan, Armenia. In 1954 he graduated from the Yerevan State University (YSU) Chair of Astrophysics. In 1963 he defended his Ph.D. theses under the supervision of *Prof.* S. Khaykin and in 1991 he was awarded the scientific degree of Doctor of physical-mathematical sciences. More than half a century *Prof.* Malumian worked at BAO. Since 1995, he was a leading scientific researcher of BAO. For long years he was a member of the Scientific Council and Specialized Council (Council for Scientific Degrees) of BAO and lectured at the YSU, since 1995 he was a Professor and has contributed significantly in preparation of Armenian astronomers as well. *Prof.* Malumian's main research interests included investigations of isolated and double galaxies, groups of galaxies, radio galaxies, quasars and other radio sources in both radio and other wavelengths ranges, as well as the study of radio properties of Markarian and spiral galaxies. On these and some other scientific topics he had published more than 85 papers, presented a number of talks at different international scientific meetings. *Prof.* Malumian was a member of IAU (since 1997), EAS, one of the founding members of ArAS (1999).

Robert EPREMYAN. *Dr.* Robert Epremyan, one of the oldest researchers of the Byurakan Astrophysical Observatory (BAO), passed away on February 2, 2013. *Dr.* Epremyan was born on January 11, 1938 in village Khatunarkh, Echmiatzin district, Armenia. In 1962 he graduated from the Yerevan State University (YSU) and since 1963. Since 1979 he was a research associate at BAO. He defended his Ph.D. theses in 1982 under the supervision of *Prof.* G.A. Gurzadyan. His research interests were in the field of stars, stellar associations, interstellar medium and nebulae, particularly studies in UV. He published more than 60 papers.

ArAS MEMBERSHIP FEES

We would like to remind you to pay **ArAS membership fees 2012**. Those members who haven't yet paid for 2011 (or more years), please do this asap. All previous dues should be paid before March 31, 2013. Our treasurer **Marietta Gyulzadyan** (mgyulz@yahoo.com) is in charge of arrangement for the payments (or you can contact the Co-President Areg Mickaelian, aregmick@aras.am, aregmick@yahoo.com). The table gives the membership fees depending on the country of residence and the age of the members:

Countries	Membership fees	
	Full member	*Junior member* (30 years or younger)
Armenia	AMD 5000	AMD 2500
Western Europe, USA & Canada	USD 50	USD 25
Other countries	USD 30	USD 15