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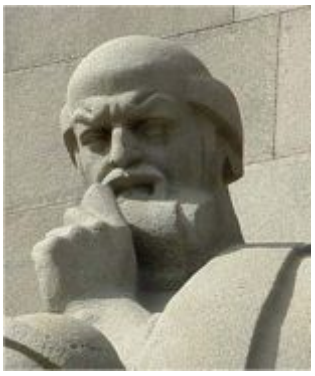


As it is already known, UNESCO has included **Anania Shirakatsi's 1400th anniversary** in the list of its important anniversaries of 2012 (**Mesrop Mashtots 1650th and Satay-Nova's 300th anniversaries** also are in this list). The proposal was submitted on behalf of the Byurakan Astrophysical Observatory. Anania Shirakatsi (612-685) was the greatest Armenian scientist of the middle Ages. He was a philosopher, mathematician, cosmologist, chronologist, the founder of exact and natural sciences in Armenia. Having advanced astronomical views for his epoch and having left rich astronomical heritage, Shirakatsi is by right considered to be the founder of astronomy in Armenia. His scientific heritage has significantly influenced on further development of the Armenian natural science.

To celebrate his 1400th birthday anniversary, we have proposed to organize a number of events this year. An official proposal was sent on behalf of the Armenian National Academy of Sciences (NAS RA) to the Armenian Government. The Ministry of Culture and the Ministry of Education and Science were also engaged. This proposal now has been approved and a Jubilee Committee has been formed headed by the Prime-Minister and involving officials from the State organizations (Ministers of Culture, Education and Science, Foreign Affairs, NAS RA President, et al.) and scientists. A number of events will be planned and accomplished in 2012-2013. The most important event we plan to organize is an **International Archaeoastronomical Meeting in Byurakan on Sep 24-28** ***"Astronomical heritage in the national culture"***, which will be devoted both to Shirakatsi's astronomical heritage and to studies of material and intangible monuments of Armenia having astronomical value. An international summer school for young astronomers will be organized also in Byurakan on Sep 15-23 (**4th Byurakan International Summer School, 4BISS**). A **study and systemization of the Armenian historical-astronomical heritage** will be accomplished during this year, a number of books will be published (note, Yerevan is appointed by UNESCO as the World Book Capital 2012 in connection with the 500th anniversary of the Armenian book-publishing), the 2012 3rd issue of the **NAS RA journal** ***"In the World of Science"*** will be devoted to Anania Shirakatsi, **Anania Shirakatsi digital database and webpage** will be created, several other events, meetings at schools and universities, TV and radio programs, printed and Internet mass media publications will be organized to present Shirakatsi's heritage to the society, etc. BAO, Institute of History, Institute of Archaeology and Ethnography, Matenadaran (the Museum of Ancient Manuscripts), YSU, Armenian State Pedagogical University, Anania Shirakatsi College and other organizations are actively involved in these events.

One of our purposes to celebrate Anania Shirakatsi's 1400th anniversary and give a large importance to this event, is to develop and promote archaeoastronomical matters in Armenia. Our goal is to start collaboration with historians and archaeologists and a preliminary collaboration agreement has already been signed between 4 institutions: BAO, Institute of History, Institute of Archaeology and Ethnography, and Matenadaran. The ICOMOS Armenian Office will also participate. Among the events of astronomical interest, we plan a global survey for historical-astronomical matters in Armenia (study and listing, creation of webpages): rock art, Armenian calendar and chronology, ancient observatories (Karahunge, Metzamor, etc.), astronomical terminology, historical records of astronomical events, Anania Shirakatsi's heritage, Armenian astronomy of the Middle Ages, etc. We plan to collaborate with the UNESCO Astronomy and World Heritage project and the corresponding IAU Working Group.

***Areg Mickaelian**, IAU WG "Astronomy and World Heritage" member*

ANANIA SHIRAKATSI, THE GREAT MEDIEVAL SCIENTIST

Anania Shirakatsi is one of the greatest scientists who made an important contribution to the field of exact sciences in Armenia, a brilliant scientist and philosopher of the 7th century; actually the founder of exact sciences in Armenian reality.

Unfortunately, out of Shirakatsi's rich heritage only some fragments of his works in the fields of Mathematics, Cosmography, Calendarology, Metrology, which are of great value for the history of exact sciences, got to us.

There is a valuable source about Anania Shirakatsi's life and work; the author has left his autobiography.

From Shirakatsi's autobiography we learn that he was born in the village Aneank (Shirakavan) at the beginning of the 7th century. He got his elementary education in the local monastery school, later being eager to improve his knowledge, he went to West Armenia. Shirakatsi dreamt about specializing especially in Mathematics, which he considered "mother of all sciences". "And love strongly the art of figures", he writes, "I thought that it's not possible to compose something without figures honoring them as the mother of all wisdom". He had to travel a lot about West Armenia seeking an advanced specialist in Mathematics. He was leaving for Constantinople but on his way to Signup he learns that in Trapeze a great Greek scientist, Tyukhik lives: "a wise man, popular with the kings, an expert on Armenian Language and Literature". Shirakatsi changed his way and went to Trapeze.

Tyukhik received the young Armenian with pleasure and began to teach him. Shirakatsi remembers his teacher with respect and warmth: "He loved me as his own son, he writes, and he passed all his knowledge with such eagerness that my class-mates were envy".

Shirakatsi had been at Tyukhik's school for 8 years; he became proficient in exact science and came back to his native land with rich knowledge base. Here he opened a school and devoted himself to teaching and research. He wrote research works in Astronomy, Mathematics, Geography and in other fields of science. Among medieval sources there is evidence that in 667 – 669 Shirakatsi first, on the instructions of Catholicos Anastas, formed a new Armenian Calendar with the aim to make a fixed one.

Unfortunately not all the works of Anania Shiraktsi have got to us. From the letter, which was written by Armenian scientist of the 11th century Grigor Magistros to Catholicon Petros it is obvious that there was absolutely unfriendly attitude towards Shirakatsi's scientific work, his works were included among the forbidden books, and Magistros requires from Catholicon to eliminate that injustice.

Out of Shirakatsi's works got to us the most valuable and unique one is the textbook in Arithmetic which, unfortunately, has got in fragments. It contains addition, subtraction, multiplication tables, "6-hazareak", 24 tasks and 8 engaging tasks. As it is mentioned in the book "History of Domestic Mathematics", "On the whole, Shirakatsi's arithmetic work is the oldest one among the textbooks of Arithmetic known by us and it contains the oldest tables for arithmetic which have got to us. He evidences higher arithmetical literacy in Armenia. Shirakatsi also left a rich heritage on Calendars. His works on Calendarology are of great scientific-historical value. Shirakatsi's works became the base for Armenian calendar. It is not by chance that almost all great Armenian medieval writers

concentrated on Calendarology and remarked the importance of calendars: Hovhannes Draskhanakertsi, Stepanos Taronetsi, Kirakos Gandzaketsi, Vardan Areveltsi, Hakob Ghrimetsi and others.

Among Shirakatsi's works the most important one is considered "Knnikon", which contains "Easter Speech", "Christmas Speech" and "Chronicle" including synchronized spatial tables of changeable and fixed calendars for 532 years. In them in separate graphs month counts of new years, spring equinox, 7-days, important Christian holidays of all years of a certain cycle of both changeable and fixed calendars are written. On the basis of these synchronized tables any Christian holiday date can be clearly defined.

Among Shirakatsi's calendaric works an important one is "Patchen Tomari", which is of great value not only on the history of Armenian Calendars but also on the calendars of neighbor nations: such as Egyptians, Jews, Syrians, Persians, Romans, Georgians, Macedonians and others. In this work a calendar is included, which has a close relation with other calendar systems.

Shirakatsi formed a large number of tables and calendar cycles. Among the tables more attractive ones are "Tables of Lunar Cycle" where the exact date of new moon and full moon of the nineteenth-year cycle is given, i.e. the year, the day and the time (in hours and minutes) of new moon and full moon occurring is discovered. And as the nineteenth-year phases of the moon are always repeated then all these tables can be used all the time. Out of Shirakatsi's calendar cycles the most valuable is so called "Special cycle", where the monthly movement of the moon through the phases is given, "Orbital Cycle", where the movement of the moon in the Sun orbit is shown and another astronomical cycle under the name "Shade indicator", where the duration of the light and the dark at nights of the lunar month are defined.

Shirakatsi's works on Cosmography are of great value. The basic questions on Exact Sciences are included in it. These works give us an opportunity to learn about his views on Exact Sciences.

Following antique scientists Shirakatsi thinks that the perceptible world and all its substances consist of the four really existing elements: land, water, air and fire. In his opinion the world is "a certain composition of mixed elements".

Shirakatsi imagines the nature in the process of movement and change. The existing old education decomposes with the time and instead a new one occurs. On the basis of many examples from real life considered as a proof of it he comes to the following philosophic scientific conclusion. "Existence is the beginning of extinction and the extinction is in its turn is the start of existence and as a result of this non-harmful contradiction the world continues to exist.

Shiraktsi's point of view on Cosmography is also significant. The question related to the earth shape interested the humankind for a long time. Various approaches were expressed in different time periods. In his cosmographic works Shirakatsi gives a peculiar explanation: "I think the earth is of an egg-shaped form, he writes, the ball-shaped yolk is in the middle, white is around it and the shell surrounds everything; the same way the earth is in the centre like the yolk, air is around it like the white and the sky surrounds everything like the shell.

Shirakatsi's astronomical system is not heliocentric but geocentric.

Accepting the egg-shape of the Earth it was important to explain the issue of earth balance. This question was of great interest since the ancient times and different opinions were made; some people thought that the earth lay on a gigantic elephant, others considered that it lay on a huge whale, on seas, etc. Shirakatsi gives a very original explanation to this question. He finds that it is balanced by two opposite forces and he writes: “The Earth tends to go down with all its weight and the wind tries to raise it up with all of its power. That’s why the earth doesn’t fall down and the wind doesn’t raise it up”.

In his cosmographic work Shirakatsi tells about the Galaxy (the Milky Way) and tries to explain its main point. Criticizing all the legends of his time he gives a scientific explanation concerning that issue. According to him the Galaxy is the same as “the mass of densely possessed and weakly shining stars”.

Shirakatsi absolutely rejects conservative scientists’ points of view. Among them there are church priests who think that the moon has its own light. He finds that the moon doesn’t have its own light and obtains light from the Sun which reflects the light of the ether like a mirror. According to him it is related to the reflection of sunlight and the change of lunar phases. The sun is in the fifth zone of the sky, and the moon is in the 4^{th} one. Therefore, the moon obtains the light from above, and as the sun and the moon are in perpetual motion round the earth at different speed they either approach or move away. During the period when the sun approaches the moon, its light cycle begins to diminish and in case of moving away it begins to enlarge.

Shirakatsi explains high and low tide of the oceans and seas by changes of lunar phases: during the full moon water level in the oceans and seas begins to rise and when diminishing to fall.

In his cosmographic work Shirakatsi discusses also the solar and the lunar eclipses. According to him the solar eclipse occurs when the sun is in the northern hemisphere, and the Moon in the southern, the earth is between them and hiders the light penetration to the Moon then the lunar eclipse occurs.

In the cosmographic work Shirakatsi criticizes Chaldean astrologists who assures that the fate of the people happy and unhappy, kind and unkind, rich and poor depends on the star under which they were born. Shirakatsi considers such scientists' statements nonsense and names them witches.

In his works Shirakatsi also touches upon other issues concerning the natural phenomena: light and sound speed, causes of the rain, snow, thunder, lightning, springs, etc.

One of his valuable works is “Ashkharhatsuyts” (“Geography”), which includes the description of all the countries in the world discovered at that time. That is a great work in the World Geographical and Cartographical literature of that time. “Ashkharhatsuyts” consists of Introduction and two parts. In the introduction Shirakatsi determines the zones and temperature of the Earth defining the points of view existing in the science. In the first part he gives a general description of the Earth and in the second part there is a description of different countries known at that time. In the main part of “Ashkharhatsuyts” is the description of all the countries in the three continents known then: they are Europe, Africa and Asia. Here the author defines the boundaries of each described country, distinguishes the rivers, mountains and towns, etc.

Metrological works of Anania Shirakatsi are also of great interest: “about the length measures” and “about the weight measures”. His metrological works contain the basic measurements and concepts existing in Armenia then. It is notable that in the 7th century Armenia was an important center of Foreign International trade. Probably Armenian merchants needed some information book containing information about different nations, particularly Persian and Byzantine nations. And Shirakatsi as it is known took the responsibility to form measurements and conceptions of his time and conscientiously realized it.

An important source on economic life of historical Armenia is Shirakatsi's “Mghonachap”, where the ways of camel cades, which crossed Armenia in the 6-7th centuries are depicted.

Shirakatsi has also a little text referring to precious stones. He enumerates 33 various precious stones noting the colors and distinguishing characteristics of each.

Some historical evidence having a great value on socio-economic history of Armenia and neighboring countries is given in “Chronology”. It begins with the part including ancient times taken from Movses Khorenatsi's sources. One of the original and important parts of “Chronology” is the chronics of the kings of Sasanyan Persia, which begins with the period when the king Artashes Sasanid ruled and it is over with the king Khosrov, the son of Vormizd. The last part of “Chronology” is chronics of Roman and Buzantine emperors beginning with Julius Ceasar and ending in days of Justinian II (in 681).

Lilit Nazaryan, *Lecturer, Department of Geology, YSU*

IAU SYMPOSIUM #304 in ARMENIA

Recently the Executive Committee of the International Astronomical Union (IAU), during its meeting in Paris, among many applications discussed and selected the list of the IAU official symposia to be held in 2013; altogether 9 symposia. The meeting “**Multiwavelength AGN Surveys and Studies**” dedicated to the 100th anniversary of the famous Armenian astronomer Beniamin Markarian is among these ones, which will be held on October 7-11, 2013 in Armenia and has already got an official IAU number 304. Other IAU symposia will be held in the USA, Canada, France (2), Netherlands, Poland, China and India. This year already 2 IAU symposia have been organized and the other 8 will be held in Beijing, China in frame of the IAU GA XXVIII on Aug 20-31.

We will celebrate Markarian’s 100th anniversary in 2013, and the IAU meeting will be the most important event. Markarian survey is one of the most important observational works in the history of astronomy. To remind, last year UNESCO has included this survey and its digitized version in its *“Memory of the World”* International Resiter. Markarian survey and Markarian galaxies have played an important role in the field of surveys, active galaxies (both AGN and starbursts), discovery of many other new objects and optical identifications of infrared sources.

The topics of the meeting include:

- Historical surveys: spectral and colorimetric surveys for AGN, surveys for UV-excess galaxies
- AGN from IR/submm surveys: 2MASS, IRAS, ISO, AKARI, SCUBA, SST, WISE, Herschel
- AGN from radio/mm surveys: NVSS, FIRST, ALMA, Planck, and others
- AGN from X-ray/gamma-ray surveys: ROSAT, ASCA, BeppoSAX, Chandra, XMM, INTEGRAL, Fermi, HESS, MAGIC, VERITAS
- Multiwavelength AGN surveys, AGN statistics and cross-correlation of multiwavelength surveys
- Unification models of AGN, other AGN models, accretion modes
- Understanding of the structure of nearby AGN from IFUs on VLT and other telescopes
- AGN feedback in galaxies and clusters
- AGN host galaxies and the AGN environments
- Study of unique AGN and AGN variability
- Future large projects
- The Phenomena of Activity

Modern astrophysics is characterized by its multiwavelength (MW) approach to studies of various kinds of objects. Putting together data coming from gamma, X-ray, UV, optical range, IR, sub-mm, and radio gives the possibility of a complete unbiased study of an object, both galactic and extragalactic one. For this, ground-based and space telescopes are being used providing full coverage of the sky in various wavelength bands, as well as spectroscopic coverage of optical and IR domains. MW studies are particularly important for active galaxies, both AGN and Starbursts (SB), as these objects have significant contribution in almost all wavelength ranges, from gamma to radio. It has been proved that active galaxies are among the most powerful sources in almost all wavelength ranges. Many all-sky or large area surveys have been and are being carried out to reveal new active galaxies and their new properties.

AGN surveys are the source for the most interesting objects in the extragalactic Universe: QSOs, Seyfert galaxies, blazars, radio galaxies, LINERs, etc. B.E. Markarian was the first to conduct a systematic survey for active galaxies in 1965, the First Byurakan Survey (FBS), where 1500 UV-excess galaxies were revealed leading to discovery of many new AGN and SB, and in fact the definition of SB. Several dozen well-known surveys, principally at UV, optical, and radio wavelengths, have been conducted over the years and revealed dozens of thousands of AGN, while recently, new surveys in the FIR/sub-mm and at gamma/X-Ray wavelengths (INTEGRAL, Fermi, HESS, MAGIC, VERITAS, ROSAT, ASCA, BeppoSAX, Chandra, XMM, SST, AKARI, SCUBA, Herschel, and Planck) have discovered a substantial new population of obscured AGN that appear to reside both in otherwise normal galaxies as well as in faint, heavily reddened hosts. New important data provide and will still provide also GALEX in the UV, SDSS in the optical wavelengths, 2MASS and WISE in NIR/MIR, and ALMA in mm. The matching of these surveys leads to the discovery of large amount of new AGNs.

One of the most important problems still to be solved is the study of evolutionary and physical connections between different types of objects, which will be possible by accumulating data by MW observations and their overall analysis. We appear to be entering into a golden age for AGN research. MW datasets are raising challenging new questions about the origin and evolution of AGN and their relationship to galaxy and star formation. Some of the most important current problems in AGN research are: (1) understanding the possible evolutionary and/or physical connection between the different classes of AGN: i.e. their consistency with the unification model, (2) the relation of AGN to their host galaxies, (3) understanding the true fraction of heavily

obscured AGN in order to determine the true AGN luminosity function and its variation with redshift. Other questions could be: What do we learn about dusty tori from these MW samples? How does the evolution of source counts relate to galaxy evolution and galaxy interaction rate? What is the relationship of the inferred population of supermassive black holes (SMBH) from AGN to the observed local population of BH's surveyed by stellar and gas disk kinematics? How accurately does the high-redshift end of the quasar distribution reflect the actual formation of AGN, and how does that formation history compare to that of galaxies? How obscured are AGN in the early Universe? A major advance in these analyses should come from a cross-correlation of data from the different MW surveys plus the timely planning of future follow-up studies. Our proposed Symposium will be important for addressing all of these questions and objectives.

On the other hand, modern astronomy enters the era of Virtual Observatories (VO), an environment, where available databases and current observing material are being used as a collection of interoperating data archives and software tools to form a research environment in which complex research programs can be conducted. To make progress in the field of AGN, building “complete” samples at various wavelengths is certainly necessary. Digitization of the existing important photographic surveys, integration of these data into the format of the current digital surveys such as the SDSS, as well as present and future digital surveys are and will be important contributions to this undertaking. Among all these data, a large spectroscopic database for all objects would be especially useful; the Digitized First Byurakan Survey (DFBS) now provides 20,000,000 low-dispersion spectra of all objects over 17,000 square degrees surface of the Northern extragalactic sky. The Symposium would provide a good opportunity to elaborate a strategy, based on the acquired experience, to plan future surveys best fitted to fulfill the needs, and to coordinate follow-up observations with the new large ground-based and space telescopes. Although large telescopes will be needed for the most distant sources, the brighter objects could still be studied by targeted surveys with relatively smaller telescopes.

The timing of the IAU Symp. #304 in Oct 2013 will be perfect to take advantage of the interest that will be strong among the AGN community in gathering together existing survey data on AGN as well as in planning for new surveys during the lifetime of the present and near-future space missions. Of particular interest are the number of recent important observations made in gamma/X-rays, and in the FIR and sub-mm. We have succeeded in resolving the hard X-ray background into discrete sources and revealing many new AGN at a wide range of redshifts. A substantial fraction of these sources appear to be highly obscured and certainly deserved to be observed at many wavelengths to understand their properties. At FIR/sub-mm/mm wavelengths we have succeeded in resolving a substantial fraction of the FIR/sub-mm/mm background into discrete sources, and although many of these may be SB galaxies, a majority of the most luminous sources appeared to be powered by AGN. There will clearly be great interest in obtaining as much MW data as possible (radio-through-UV) in order to understand the properties of the X-ray and FIR sources and their relation to optical and radio selected objects.

The Symposium will bring together survey specialists who can exchange acquired experience, compare different surveys, discuss methodological problems, and elaborate a strategy for further investigations. It would be helpful for planning the most efficient way to make significant advances in the field: plan future surveys best fitted to improve our knowledge about AGNs, coordinate observations with large ground-based and space telescopes, construct as homogeneous as possible sample of AGNs over the whole sky, obtain an overall patterns of the distant Universe and understand AGN phenomena and the related evolution of galaxies. The Symposium will be important for addressing all of above mentioned questions and objectives.

The official supporters of the IAU Symp. #304 are: IAU Division VIII: *Galaxies and the Universe* (Coordinating IAU Division), IAU Commission 28: *Galaxies* (Proposing IAU Commission), and IAU Commissions 40: *Radio astronomy* and 47: *Cosmology* (Supporting IAU Commissions). An international Scientific Organizing Committee (SOC) has been formed:

Felix Aharonian (DIAS, MPK, Ireland/Germany, Co-chair)
Roger Blandford (Stanford Univ., USA)
George Djorgovski (Caltech, USA)
Malcolm Longair (Cambridge Univ., UK)
Laura Maraschi (Milan, Italy)
Enrico Massaro (Univ. Roma "La Sapienza", Italy)
Areg Mickaelian (Byurakan Obs., Armenia, Co-chair)
Felix Mirabel (CEA/CONICET, France/Argentina)
Ray Norris (CSIRO, Australia)
Paolo Padovani (ESO, Germany)
Bradley Peterson (Ohio, USA)
Elaine Sadler (Sydney, Australia)
David Sanders (Hawaii, USA, Co-chair)
Helene Sol (OBSPM, France)
Tadayuki Takahashi (ISAS/JAXA, Japan)
Yervant Terzian (Cornell Univ., USA)
Megan Urry (Yale, USA)
Lutz Wisotzki (AIP, Potsdam, Germany)

Many outstanding scientists will be present to give invited reviews and other talks, as well as many young astronomers will participate, altogether some 200 people expected.

The Byurakan Astrophysical Observatory (BAO) has a long tradition in organizing international meetings, including four IAU Symposia: #29 in 1966 (*Non-Stable Phenomena in Galaxies*), #121 in 1986 (*Observational Evidence of Activity in Galaxies*), #137 in 1989 (*Flare Stars in Star Clusters, Associations and Solar Vicinity*), and #194 in 1998 (*Activity in Galaxies and Related Phenomena*), the IAU Colloquium #184 in 2001 (*AGN Surveys*), as well as the all-European JENAM meeting in 2007. Moreover, BAO recently started organizing the Byurakan International Summer Schools (BISS), and three successful schools were held in 2006, 2008, and 2010, the last one combined with the 32th IAU International School for Young Astronomers (ISYA). The 4BISS will be organized this year in September.

To compare, altogether 16 IAU symposia have been organized in the territory of the Former Soviet Union (FSU), icluding 8 in Russia, 4 in Armenia, 3 in Ukraine and 1 in Estonia. Since 1953 (also counting 2012), altogether 295 IAU symposia have been organized in 164 cities and other places of 43 countries. Among the countries, most often have been: USA – 41, France – 21, Australia – 20, UK and Italy – 18, China – 17, Germany – 14, Brazil, Japan and Netherlands – 13, Switzerland – 9, Canada, Russia and Spain – 8, etc. Among the places, most often have been: Paris – 11, Beijing – 10, Sydney – 9, Rio de Janeiro – 8, Kyoto and Prague – 7, Hague – 6, Geneve, Leningrad/St.Petersburg and Manchester – 5, Byurakan, Cambridge (MA, USA), Canberra, Heidelberg and Tokyo – 4. Note, all but Byurakan are very large and/or important cities.

***Areg Mickaelian**, Co-chair of SOC and Chair of LOC, IAU Symp. #304*

EUROPEAN ASTRONOMICAL SOCIETY 2012 PRIZES

The European Astronomical Society (EAS) awards its **2012 Tycho Brahe Prize** to ***Prof.*** **Reinhard Genzel** in recognition of his outstanding contributions to European near-infrared astronomy, through the development of sophisticated instrumentation, and for groundbreaking work in galactic and extra-galactic astronomy leading to the best evidence to date for the existence of black holes. The **2011 Lodewijk Woltjer Lecture** is awarded to ***Prof.*** **Wolfgang Hillebrandt** for his fundamental contributions to the study of supernova explosions.

Tycho Brahe Prize to Professor Reinhard Genzel

The Tycho Brahe Prize is awarded in recognition of the development or exploitation of European instruments, or major discoveries based largely on such instruments The European Astronomical Society awards its 2012 Tycho Brahe Prize to Prof. Reinhard Genzel, Max-Planck-Institute for Extraterrestrial Physics, in recognition of his outstanding contributions to European near-infrared astronomy, through the development of sophisticated instrumentation, and for ground-breaking work in galactic and extra-galactic astronomy. Reinhard Genzel and the group led by him were responsible for building the SINFONI near-infrared integral-field spectrograph for the ESO Very Large Telescope, a key instrument for the study of the structure and dynamics of distant galaxies, as well as the detailed dynamics of the Milky Way Galaxy. He and his group have used this to great effect, pushing the boundaries of our knowledge, be this in our own backyard, studying the compact object that is at the centre of the Galaxy, or detecting forming galaxies at redshifts of z~2. Thanks largely to Genzel and his group, who measured in the near infrared the proper motion of stars near the centre of the Milky Way, the compact object at the galactic centre now arguably provides the best evidence for the existence of black holes. It offers an ideal laboratory for testing the black hole paradigm and general relativity in the strong field limit, and for investigating the interaction of a massive black hole with its environment. This links directly to the formation and evolution of black holes at large redshift and how they co-evolve with the stellar bulge of galaxies to form the relation between black hole mass and stellar velocity dispersion in the bulge, a key aspect of the understanding of the evolution of galaxies in the Universe. Furthermore, Genzel and his group produced the first-ever survey of the kinematics of massive star forming galaxies at redshift 2, approximately 3 billion years after the Big Bang. This ground-breaking survey has been highly successful and has given key insights into the evolution of star-forming galaxies at that epoch. A related project focuses on star formation and galaxy evolution, using the IRAM Plateau de Bure interferometer to trace the molecular gas component of galaxies at redshifts between 1 and 3. Reinhard Genzel was born in 1952 in Frankfurt am Main. He followed a classical high school curriculum which gave him a lasting interest in history and archeology. He enjoyed his first training in physics in early years from his father, a well known solid state physicist. Sports were also part of his early years; he trained in handball and javelin/discus. He studied physics and astronomy in Germany, obtaining a PhD in radioastronomy in Bonn. He then spent a number of years in the US, in Harvard and Berkeley, before joining the Max Planck Institute for Extraterrestrial Physics in Garching. He spends now part of his time in Germany and part in the US.

Lodewijk Woltjer Lecture to Professor Wolfgang Hillebrandt

The Lodewijk Woltjer Lecture honours astronomers of outstanding scientific distinction. Supernovae, the spectacular brightening of a star that can appear almost as bright as its parent galaxy, have fascinated physicists and astronomers for many decades or even centuries. It was suggested in the 1930s that supernovae could be the transition between a normal star and a neutron star, implying that the source of energy is gravitational. In the intervening time, it was also suggested that explosive nuclear reactions could be at the origin of the supernova phenomenon. It is now clear that both explosion mechanisms are at work, albeit in different types of supernovae. Those of type Ia are due to thermonuclear disruption of white dwarfs and those of type II, to the collapse of the core of massive stars. These basic facts established, also with contributions of Hillebrandt and his team, it remains necessary to understand the physics at work. Core collapse leads to the implosion of the star, while it is an explosion that is observed. For many years, models of supernovae have failed to describe these explosions. Hillebrandt and his team have little by little incorporated many physical processes, like for example the interactions of neutrinos with stellar matter, in models of pre-supernova stars and are thus now becoming capable of following the star from the collapse of its core to the explosion of the outer layers. Similarly the work of Hillebrandt and his group is leading to a detailed understanding of the thermonuclear disruption of white dwarfs. While understanding the physics of supernovae is a major achievement per se, it is also a major building block for the understanding of the evolution of galaxies and the Universe. Not only are supernovae of type Ia standard candles that allow us to “measure” the Universe, but all supernovae synthetise new elements and disperse the product of nucleosynthesis in their surroundings. They are thus an essential element in the long chain of events that leads to life. Hillebrandt and his team have contributed key elements to this subject. Wolfgang Hillebrandt was born in 1944. He studied physics and mathematics at the University of Cologne where he obtained his PhD in 1973. After some time at Caltech in California and some at the Technical University of Darmstadt, he joined the Max Planck Institute for Physics and Astrophysics in Munich in 1978 and then Garching, where he became director. He is Honorary Professor at the Technische Universtat Munchen.

***Thierry Courvoisier**, EAS President*
***Elias Brinks**, EAS Secretary*

HARPS-N, NEW PLANET HUNTER at TNG

The new HARPS-N spectrograph was inaugurated on April 23, 2012 at the Italian 3.6 meter Telescopio Nazionale Galileo (TNG) on La Palma, Canary Islands, Spain.

HARPS-N (High Accuracy Radial Velocity Planet Searcher North) is a high resolution spectrograph designed to detect and study extra solar planets (exoplanets). It is an almost exact twin of HARPS instrument already installed at the European Southern Observatory's (ESO) 3.6m telescope in La Silla, Chile. The primary science goal of HARPSN will be the confirmation and further study of the extrasolar planet candidates found by NASA's Kepler satellite.

Kepler mission looks for the exolpanets in a sky area including Cygnus and Lyra constellations in the Northern Hemisphere. This was the reason behind the installation of HARPS-N in La Palma, one of the best places to observe the Northern sky, and this summer will be the first hunting season. To confirm an exoplanet HARPS-N has to detect the movement which the orbiting planet's gravity causes to its star. To accomplish this, the instrument needs an extreme mechanical and thermal stability, which is guaranteed by a very accurate control of the environmental conditions in its enclosure. In particular the temperature variations will be as small as 0.001°C. Astronomers expect that HARPS-N will be the most precise planet hunter in the Northern Hemisphere, able to report stellar movements down to 1 meter per second or less. This will allow the detection of planets only few times more massive than Earth.

The installation of the instrument by the TNG staff, colleagues from Switzerland and UK in March was followed by its first light on April 1 and further commissioning during the month of April.

HARPS-N project is a consortium of Geneva Observatory and University (Switzerland), INAF-TNG (Italy), CfA and Harvard University (USA), ATC Edinburgh, Queens University and University of St. Andrews (UK).

For more information: http://www.tng.iac.es, http://www.tng.iac.es/instruments/harps/

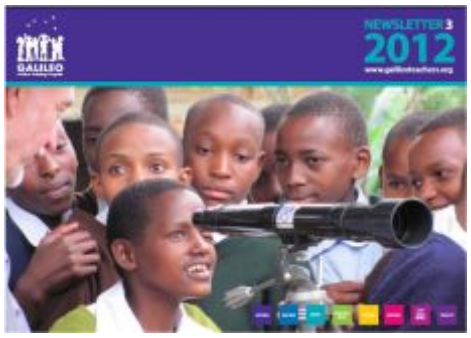
***Avet Harutyunyan**, TNG*

IVOA NEWSLETTER RELEASED

The May 2012 issue of the International Virtual Observatories Alliance (IVOA) Newsletter is now available at http://www.ivoa.net/newsletter/ and via a link on the IVOA home page (http://www.ivoa.net/). This biannual newsletter for astronomers is intended to highlight new capabilities of VO tools and technologies for doing astronomy research. It also lists recent papers and upcoming events. This issue is dedicated to the memory of *Dr.* Dave De Young, one of the pioneers of the Virtual Observatory movement. In this issue, several interesting articles have been placed, including IVOA News, VO Applications Highlights (US VAO Data Discovery Portal, VOSA (VO Sed Analyzer) 3.0, US VAO Cross-Comparison Tool, VOPlot v1.8 Beta, CDS XMatch Service, US VAO Time Series Search Tool), some recent papers about VO-enabled science and VO calendar (21-25 May 2012 – IVOA Interoperability Meeting, Urbana, IL, USA; 9-11 July 2012 – .Astronomy 4, Heidelberg, Germany; 28-31 Aug 2012 – IAU GA XXVIII Special Session 15: Data Intensive Astronomy, Beijing, China; 10-13 Sep 2012 – AstroInformatics 2012, Redmond, WA, USA; 23-28 Sep 2012 – Session on "e-Infrastructures and the VO for Planetary Sciences" at EPSC 2012, Madrid, Spain).

Comments and feedback are encouraged; you may contact the editors at ivoa-news-editors@ivoa.net. IVOA Newsletter Editors are: Mark G. Allen, Sarah Emery Bunn, Chenzou Cui, Mark Taylor, and Jonathan Tedds.

GTTP NEWSLETTER #3 RELEASED



The **Galileo Teachers Training program (GTTP)** started in 2009 during the International Year of Astronomy (IYA-2009). However, being one of the most successful IYA-2009 projects, it was continued next years as well. Now its activities include the publication of GTTP Newsletters. In this first issue of 2012 you will find many inspiring reports, several new training opportunities, very interesting meetings and campaigns. Assembling such a vast repository of amazing activities and stories is never an easy task. But such a task is one we take with a great pride and humility. It is overwhelming the reach of educator's efforts and the seeds they keep planting every day.

By no means this newsletter is representative of all that is going on in the world of Astronomy education, in particular in GTTP corner, but we are all very happy to be able to share with you at least a small part of this world that makes so much sense. We hope that this newsletter is a source of ideas and opportunities to you and that you find yourself a member of this fast growing movement! Once again, thanks to Kathan Kothari (Manthan Educational Programme Society), we have a very nice issue to you. The GTTP Newsletter is available at: http://www.site.galileoteachers.org/newsletters/203-gttp-newsletter-3

***Rosa Doran**, GTTP coordinator*

ASTRONOMICAL BOOKS DATABASE at ArAS WEBPAGE

In connection with the 500th anniversary of the Armenian book-publishing and UNESCO appointment of Yerevan as the World Book Capital 2012, astronomers also intend to create a full database of astronomy-related books and make these books available to the wide society. ArAS has opened a new page in its website: Astronomical Books (http://aras.am/Books/books.html), where the list of all books and brochures written by the Armenian astronomers or devoted to the Armenian astronomy have been included starting from 1934, altogether 164 ones. Out of them 36 have hyperlinks to PDF files of these books, which allow download and easily use them. Among the books there are publications in Armenian, Russian, English, German, French and other languages – textbooks, monographs, V.A. Ambartsumian's volumes, proceedings of meetings held in Byurakan, biographical and info books and scientific-popular brochures devoted to various fields of astrophysics, space flights, extraterrestrial intelligence, calendar and chronology, Byurakan Astrophysical Observatory and Viktor Ambartsumian, which are given both in original and English languages. Among the most often authors are V.A. Ambartsumian, L.V. Mirzoyan, G.A. Gurzadyan, B.E. Tumanian, H.M. Tovmassian et al.

Also devoted to the 500th anniversary of the Armenian book-publishing and appointment of Yerevan as the World Book Capital 2012, astronomical book exhibitions will be organized at BAO in Byurakan and the Armenian National Academy of Sciences in Yerevan during 2012.

PROCEEDINGS OF YOUNG SCIENTISTS CONFERENCE 2011

The **Proceedings of the Conference of Young Scientists of CIS countries *"50 Years of Cosmic Era: Real and Virtual Studies of the Sky"*** dedicated to the 50th anniversary of Yuri Gagarin's flight to the Space have been published recently. The Conference was held on November 21-25, 2011 at the Armenian National Academy of Sciences (NAS RA). NAS RA, ArAS, BAO, "Development of the International Cooperation" NGO were the organizers, and the Intergovernmental Foundation for Educational, Scientific and Cultural Cooperation of CIS countries was the sponsoring organization. Lecturers and young astronomers from Russia, Armenia, Ukraine, Lithuania, Latvia, Tajikistan, as well as France were among the participants, altogether 52 astronomers and students. The Conference involved very broad areas: Solar System, extrasolar planets, stars and nebulae, galaxies and cosmology, real and virtual observatories.

Invited lectures and young participants' talks have been included in the Proceedings, divided into sections according to the subjects. Altogether 5 lectures and 38 talks are available either in Russian or English, however abstracts are given in both languages. Also a preface by the editors (Areg Mickaelian, Oleg Malkov, and Nikolay Samus), list of participants, and author index are given in both languages.

All abtsracts will soon be available in ADS, and the full book in PDF format is available at ArAS webpage at http://aras.am/Books/books/2012%20YSC%20Proceedings.pdf. The full reference of the Proceedings is:

"Fifty years of Cosmic Era: Real and Virtual Studies of the Sky", Proceedings of the Conference of Young Scientists of CIS Countries, held 21-25 Nov 2011, in Yerevan, Armenia. Editors: A.M. Mickaelian, O.Yu. Malkov, N.N. Samus. 251 p., Yerevan, May 2012.

***Areg Mickaelian**, Co-Editor of the Proceedings*

CONFERENCE "MODERN PROBLEMS of EXTRAGALACTIC ASTRONOMY"

On April 17-19, the XXIX Conference on "Modern Problems of Extragalactic Astronomy" took place at Pushchino Radio Astronomical Observatory of the P.N. Lebedev Physical Institute Astro Space Center (ASC LPI), Pushchino, Russia. This Conference is being taken place annually since 1984. The XXIX Conference was devoted mainly to the black holes, galaxy formation, AGN, and radio observations. There were 67 participants from different countries: Armenia, Kazakhstan, Russia and Ukraine. Among the participants there were well-known scientists *Prof.* N. Kardashev (ASC LPI), *Prof.* I. Novikov (ASC LPI), *Prof.* S. Pilipenko (ASC LPI), D. Nagirner (St. Petersburg State University), V. Shishov (ASC LPI), B. Komberg (ASC LPI), et al., as well as young scientists and students. Many of these scientists have had collaborations with BAO scientists. From Armenia, **Gurgen Paronian**, junior researcher of the Byurakan Astrophysical Observatory (BAO) participated. He gave a talk devoted to *"Neutral hydrogen in near 3C radiogalaxies"*.

***Gurgen Paronyan**, Junior researcher*

YOUNG SCIENTISTS CONFERENCE on ASTRONOMY and SPACE PHYSICS

The 19th Young Scientists' Conference on Astronomy and Space Physics took place on 23-28 April, 2012 at Faculty of Physics of Taras Shevchenko National University, Kyiv, Ukraine. The conference was intended for participation of students, PhD students and young researches who are involved in research in one of the following fields:

- atmospheric studies and space geophysics
- Solar physics and heliosphere
- Solar System & extrasolar planets
- stellar astrophysics
- interstellar and intergalactic medium
- extragalactic astrophysics and cosmology
- high-energy astrophysics and astroparticle physics
- positional astronomy and astronomical equipment
- computers in astronomy

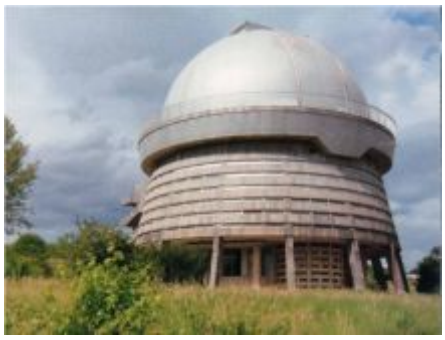
The sessions included important talks given by invited famous lectures *David Pinfield (University of Hertfordshire, Hatfield, UK), Michael Mishchenko (NASA Goddard Institute for Space Studies, New York, USA), Ryszard Szczerba (Nicolaus Copernicus Astronomical Center, Torun, Poland), Gennadi Milinevsky (National Taras Shevchenko University of Kyiv, Kyiv, Ukraine)* and *Eduardo Martin (Centro de Astrobiologia, Torrejon de Ardoz, Spain).*

From Armenia, **Satenik Ghazaryan** (Joint PhD student of BAO and Paris Observatory), **Knarik Khachatryan** (MSc student at YSU), **Ani Vardanyan** (MSc student at YSU) and **Anahit Vardazaryan** (BSc student at YSU) participated in the 19th Young Scientists' Conference. **Satenik Ghazaryan** presented a talk *"On the question of detecting granulation signal in A and B star's CoRoT light curves"*, other Armenian students contributed in the Conference with the poster presentations *"The spectral investigation of the WR galaxy PGC97542"* (**Knarik Khachatryan**), *"The chemical abundance gradient and star formation rate in the galaxy M101 "* (**Ani Vardanyan**) and *"Nature of intergalactic supernovae"* (**Anahit Vardazaryan**), respectively. **Gor Oganesyan**, BSc student of the Southern Federal University in Rostov-on-Don, Russia, attended the Conference with the poster presentation *"Afterglows of gamma-ray bursts with known redshifts"* also.

Participants are invited to post their manuscripts to the next issues of Advances in Astronomy and Space Physics journal which will be published twice a year, most probably in July/August and December/January. More information about the Conference is available at http://ysc.kiev.ua/.

***Satenik Ghazaryan**, PhD student*

SCHOOL ASTRONOMICAL OLYMPIAD in BYURAKAN



The final (Republican) phase of the Astronomical School Olympiad was held at the Byurakan Observatory on May 11. In total 25 pupils from Yerevan, Kotayk and Shirak provinces took part, including six International Astronomical Olympiads 2010-2011 medal winners (Levon Stepanyan, Virab Gevorgyan, Aram Mkrtchyan, Vahan Aslanyan, Karen Hambardzumyan and Vardges Mambreyan). *Dr.* Ashot Hakopian, BAO senior researcher, was the Chair of the Jury and the other members were Avetik Grigoryan, Marietta Gyulzadian, *Dr.* Emilia Karapetian, *Dr.* Areg Mickaelian, Tigran Nazaryan, *Dr.* Sergei Nersisyan, and *Dr.* Ararat Yeghikian.

Five problems were offered from the fields of celestial mechanics, astrometry and radiation theory. The participants showed deep knowledges and displayed high results. Pupils from Shahinyan Phys.-Math. School (PMS), *"Quantum"* college and the Armenian State Engineering University (ASEU) College and Anania Shirakatsi College showed the best results. As a result, First-rank diploma were awarded to 2 pupils: Virab Gevorgyan ("Quantum") Aram Mkrtchyan (PMS), Second-rank diploma to 2: Levon Stepanyan ("Quantum") and Vardges Mambreyan (PMS), Third-rank diploma to 7: Arsen Vasilyan (ASEU), Gevorg Martirosyan (PMS), Vardan Avetisyan (PMS), Hovsep Harutyunyan ("Quantum"), Karen Hambardzumyan (PMS), Vahan Aslanyan (PMS) and Hrachya Kocharyan ("Quantum"), and Certificates of Commendation to 5 pupils: Siranush Babakhanova (PMS), Davit Khechoyan ("Quantum"), Eduard Grigoryan ("Quantum"), Hrachya Davtyan (ASEU), and Elen Khachatryan (An. Shirakatsi College).

This Olympiad also was a qualifying phase for the International Astronomical Olympiad that will be held on Oct 16-24 in Gwangju, South Korea. Let us remind that the Armenian pupils have excellent traditions at the International Astronomical Olympiads, having 7 gold, 4 silver and 13 bronze medals in total and by team counts being one of the best during the whole 16-year history of Olympiads.

More information at: http://www.aras.am/Education/olympiads.html

***Areg Mickaelian**, member of Jury of the Astronomical Olympiad*

SPACE CLUB STARTS its WORK in ARMENIA

Since March 14, 2012 the sole planetarium in Armenia started its activities. It is situated at Media centre of Mkhitar Sebastatsi educomplex and is a part of the **Space club** founded in 2011 by astronomer, former BAO researcher Avetik Grigoryan.

It aims to give society a science based knowledge, increase the popularity of astronomy in Armenia and for teachers of physics and astronomy provide a new tool to make the education process more effective. The planetarium is ready to show movies also for individuals and small groups. Planetarium contains special technique, which provides possibility to project special videos on semisphere dome. It makes real 3D feelings better than other well-known types of 3D presentations. Via this technique it is possible to project the night sky on the dome and show the

constellations which are visible in different seasons, as well as point out the brightest stars of the sky and present their names.

During these 2 months more than 400 people watched a movie there and they all expressed their admiration about it.

***Levon Aramyan**, Junior researcher*

ANNIVERSARIES

Benik TUMANIAN – 95. Recently we celebrated the 95th anniversary of *Prof.* Benik Tumanian, an astronomer and the greatest Armenian specialist of the history of astronomy. Benik Yesa Tumanian was born on May 1, 1917 in village Dsegh, Lori province, Armenia. In 1940 he graduated from the Yerevan State University (YSU) Department of Physics and Mathematics. In 1941-1945 he participated in the Great Patriotic War. Since 1957 to the end of his life he led the Yerevan Observational Station of Earth's Artificial Satellites and the YSU Observatory. In 1970 he successfully defended the PhD thesis and obtained a degree of Doctor of Phys.-Math. Sciences. For long years *Prof.* Tumanian was teaching at YSU (he was a Professor since 1972). In 1974-1980 he was the Dean of the YSU Physics Department. His scientific works were devoted mainly to the History of Astronomy. His two-volume book (1964, 1968) summarizing the history of the Armenian astronomy includes the history of the development of astronomical mind in Armenia from ancient times till the first quarter of the 20th century and it was awarded the USSR National Committee for the History of Natural Science and Technology Diploma. *Prof.* Tumanian studied the History of Calendar (monograph, 1972), the evolution of the distribution of geocentric and heliocentric systems in Armenia (monograph, 1973), as well as he has also investigated the visible and real distribution of the Galactic star clusters by types. *Prof.* Tumanian has published numerous scientific papers, as well as he is an author of numerous textbooks and scientific-popular books and brochures. In particular, together with L.V. Mirzoyan, he has published in 1978 the textbook *"Astronomy"* for the university students. In 1980 he was awarded a title of the Deserved Figure of Science of the Armenian SSR. He was also awarded Mesrop Mashtots medal for the important publications based on the study of Matenadaran manuscripts, as well as Khachatur Abovian and Copernicus medals. Benik Tumanian passed away on February 10, 1980 in Yerevan leaving unfulfilled many creative initiatives.

Books by B.E. Tumanian *(all in Armenian):*

Tumanian B.E., Earth's artificial satellites, Haypethrat, Yerevan, 112 p., 1958
Tumanian B.E., Newly-found Armenian astronomical device, Haypethrat, Yerevan, 31 p., 1958
Tumanian B.E., Geocentric and heliocentric systems in Armenia, Yerevan, 1962
Tumanian B.E., History of the Armenian astronomy, Vol. 1, Yerevan, 1964
Tumanian B.E., Mnatsakanyan H.H., Belt-calendar of bronze epoch, Mitq, Yerevan, 56 p., 1965
Tumanian B.E., History of the Armenian astronomy, Vol. 2, Yerevan, 1968
Tumanian B.E., History of chronology, Publ. House of the Armenian Academy of Sciences, Yerevan, 1972
Tumanian B.E., Geocentric and heliocentric systems in Armenia, Yerevan, 1973
Tumanian B.E., Interesting questions on astronomy, Luys, Yerevan, 92 p., 1978
Tumanian B.E., Mirzoyan L.V., Astronomy (textbook for University students), YSU, Yerevan, 338 p., 1978
Tumanian B.E., History of the Armenian astronomy, YSU Publishing House, Yerevan, 286 p., 1985
Tumanian B.E., Separation of parts of the day in ancient and medieval Armenia, YSU, Yerevan, 37 p., 1990

Areg Mickaelian*, Leading researcher*
Gohar Harutyunyan*, Junior researcher*

Nina IVANOVA – 90. We celebrated the 90th anniversary of *Dr.* Nina Ivanova, one of the oldest researchers at BAO who worked there since 1950 till the last days of her life. *Dr.* Nina Leonidovna Ivanova was born on May 1, 1922 in St. Petersburg (former Leningrad), and graduated from the Leningrad State University (LSU). Even during her student years she visited Armenia a few times to conduct observations. Her Ph.D. thesis was devoted to spectrophotometry of B type stars in Pleiades and Orion; the observations were carried out during the special expedition on the Mt. Aragatz at 3250 meters altitude. After that N.L. Ivanova decided to become resident and associate of BAO, at that time as a postgraduate student under the supervision of V.A. Ambartsumian. During her work at BAO she published 60 papers, mainly on the investigation of non-stable processes in the early spectral type and various types of variable stars: Be and shell stars, P Cyg stars, symbiotic stars, novae stars (from flares to nebular stage), eclipse variables with extent atmospheres, T Tauri stars. Using mainly spectral method of investigation (spectrophotometry of lines, continuum, radial velocities, measuring of shifts of the lines not connected with the kinematics of star), Ivanova investigated physical conditions in the atmospheres of stars and their changes with time. For solving these problems she obtained a large observational material, more than 3000 spectrograms, observing with various telescopes, starting from the 10″ ASI-5 of BAO and then with the big telescopes of the Soviet Union, including the 6m BTA of the Special Astrophysical Observatory (SAO, Russia). The papers of Ivanova are rich with observational information and are devoted to solution of actual problems of modern astrophysics. Dr. Ivanova always held a great authority and respect among her colleagues in Byurakan and abroad. She was a member of International Astronomical Union (IAU) and the Armenian Astronomical Society (ArAS), she participated in several General Meetings of IAU, many symposia and colloquia and she was a member of various coordinating commissions. *Dr.* Ivanova passed away on November 16, 2011 at the age of 89.

Mamikon MNATSAKANIAN – 70. *Dr.* Mamikon A. Mnatsakanian, an Armenian well-known astronomer, celebrated his 70th anniversary. Mamikon Mnatsakanian was born on April 17, 1942 in Yerevan, Armenia (former USSR). In 1965 he graduated from the Yerevan State University (YSU) and obtained B.Sc. degree. In 1969 he successfully defended the PhD thesis in the field of “Generalized General Theory of Relativity” at YSU and in 1984 obtained a degree of Doctor of Science in Phys.-Math. Sciences in “Theoretical and Mathematical Physics and Astrophysics” (topic: “New Apparatus in Radiation

Transfer Theory") by USSR Supreme Ministry' Highest Accreditation Commission, Moscow. In 1985 he obtained a Diploma of Senior Scientific Researcher by USSR Academy of Sciences. In 1965-1991 he worked as a Researcher (Junior, Senior, Major, Leading, Laboratory Head) in Theoretical Astrophysics at Byurakan Astrophysical Observatory (BAO). In 1972-1985 he was the Scientific Secretary of BAO, responsible for scientific projects, publications, conferences, external relationships of the Observatory. In 1975-1985 he was a Scientific Secretary of Specialized Board awarding USSR Doctoral Degrees in Astrophysics (over 50 cases). In 1977-1991 he worked as an Associate Professor, Professor at Departments of Theoretical Physics, Astrophysics, and Mathematical Modeling at YSU. In 1988-1991 he worked as Director of Center for Mathematical Modeling of Physical Processes at Armenian Academy of Sciences. He was the Founder and Head of Dept. of Mathematical Modeling at YSU (Division of Physics). In 1991-1992 he worked as a Mathematics Education Consultant, creating problems for CA Assessment Program at California State Department of Education, Sacramento. 1993-1996 he worked as a Researcher, co-author, creating problems and Investigations for High School Textbooks "CPM" (Eisenhower grant) at UC Davis, Davis, CA (Experimental teaching of own course "Visual Calculus" at UC Davis and Davis Senior High School). In 1996-1997 he was a Manipulative curriculum developer and experimental teacher of "Visual Calculus" for Elementary Schools, South Land Park Montessori School, Sacramento, CA. Since January of 1997 still present he is a Project Associate, "Project Mathematics" at California Institute of Technology (Caltech) (Designing "Visual Calculus" and interactive educational animations). He was awarded USSR Academy of Sciences Distinction Medal for Excellence in Sciences and AAS Distinction Award for "Generalized Theory of Gravity" in 1985, AAS Distinction Award for "Radiation Transfer Theory" in 1986, Lester Ford triple Award (Mathematical Association of America) for three papers in the American Mathematical Monthly in 2005, California Department of Energy Grant for development of the Mamikon Spinner in 2005, Lester Ford triple Award (Mathematical Association of America) for a paper in the American Mathematical Monthly in 2008 and Pearson "International Conference in use of Technology in Collegiate Mathematics" Award for computer interactive mathematics educational games and activities in 2011. Mamikon Mnatsakanian has published more than a hundred refereed papers in USSR and in USA on Generalized General Theory of Relativity with variable gravitational constant; Stellar Statistics and Dynamics of pulsars, flare stars, stellar associations and aggregates; New Methods and their Applications in Radiation Transfer Theory; Mathematics: visual calculus, geometry, integral and integro-differential equations; Popular mathematics, "Kvant" magazine of Soviet Academy of Sciences. He has published over 30 papers with Tom Apostol on new elementary solutions, with use of no formulas, equations or integration machinery, of advanced problems of calculus and their various generalizations. These works are included in "New Horizons in Geometry", a 500-page book with 500 illustrations to be published by the Mathematical Association of America.

***Gohar Harutyunyan**, Junior researcher*

Felix AHARONIAN – 60. *Dr.* Felix A. Aharonian, an Armenian well-known physicist, celebrated his 60th anniversary. Being a physicist-theorist, he has a significant contribution in the solution of astrophysical problems. Felix Aharonian was born on May 23, 1952 in Yerevan, Armenia (former USSR). In 1975 he graduated from the Moscow Engineering-Physics Institute (MEPI, with distinction) and obtained M.Sc. degree. In 1979 he successfully defended the PhD thesis in the field of Nuclear and Particle Physics at MEPI and in 1987 obtained a degree of Doctor of Sciences at Yerevan Physics Institute (YerPhI). In 1979-1991 he worked as a Junior/Senior/Leading scientist at YerPhI and was Deputy-Chairman of the Institute's Science Council. In 1993-2006 he was the Leader of High Energy Astrophysics Theory group of Max-

Planck-Institute for Nuclear Physics Heidelberg, Germany. In 2006 he was elected as an External Scientific Member with a status of Auswärtige Wissenschaftliche Mitglieder by the Senate of the Max Planck Society. Since 2006 he is working at Dublin Institute for Advanced Studies (DIAS), School of Cosmic Physics (Professor of Astronomy and Astrophysics) and he is the Director of the Center for Astroparticle Physics and Astrophysics (CAPPA). He was awarded Best Master Thesis in Physics (Ministry of Education of USSR) in 1995, Prize of the President of Armenia in 2005, EU Decartes prize (as a member of the HESS collaboration) in 2006, Rossi Prize (shared with W. Hofmann and H. Völk) for the HESS project in 2010. Aharonian's works refer to Astroparticle Physics, Cosmology, Theoretical Astrophysics, Gamma-ray Astronomy, X-ray Astronomy, Neutrino Astronomy, and Cosmic Rays. He published some 350 papers in peer-reviewed international journals with more than 16,000 citations. He is a Co-Director of LEA – European Associated Laboratory on High Energy Astrophysics jointly supported by CNRS (France) and MPG (Germany), Member of the International Review Board of the Helmholtz Association (Germany), Member of the European ASTRONET Infrastructure Roadmap Panel A: "High energy astrophysics, astro-particle physics and gravitational waves", Adjunct Professor at School of Physics, University College Dublin (USD), Member ("Supervisor") of the International Max Planck Research School for Astronomy and Cosmic Physics at the University of Heidelberg, Co-Director of the Dublin Summer School on High Energy Astrophysics, Editor of the International Journal of Modern Physics D. He has been an invited lecturer at many physics and astronomy colloquia and seminars and has tens of invited review talks at top international meetings. He is an organizer of many scientific meetings (Heidelberg International Symposia on High Energy Gamma-Ray Astronomy, biannual workshops series HEPRO – High Energy Phenomena in Relativistic Outflows, the 25th ("Texas") Symposium on Relativistic Astrophysics). Since 2008, Felix Aharonian is a foreign member of the Armenian National Academy of Sciences (NAS RA), ArAS member since 2004 and member of the Royal Irish Academy since 2012.

***Gohar Harutyunyan**, Junior Researcher*

Alex LAZARIAN – 50. *Dr.* Alex Lazarian, one of the most productive Armenian astronomers, celebrated his 50th anniversary. Alex Lazarian was born on April 25, 1962. In 1989 he graduated from the Moscow Institute of Physics and Technology and obtained M.Sc. degree in Theoretical Physics. In 1995 he defended the PhD thesis in the field of Applied Mathematics from University of Cambridge (UK): his thesis title was "Statistical Study of Astrophysical Processes". He has been a Postdoctoral Researcher at University of Texas, Austin (1994-1995); CfA, Harvard (1995); Princeton University Observatory (1995-1998); CITA, Toronto (Sept. 1998- Aug. 1999). In 1999-2004 he worked as an Assistant Professor at University of Wisconsin-Madison and since 2004 still now he is an Associate Professor at the same university. Alex Lazarian was teaching many years following courses: Interstellar Medium, General Astrophysics, General Astrophysics, Physics of Interstellar Medium, Galaxies II etc. He has been the Supervisor of many graduate students and 2 Postdocs. Alex Lazarian is the Winner of "Technology is the Vehicle of Progress" TV contest (1986) and he was awarded The Best Inventor of Moscow Institute of Physics and Technology (MIPT, 1987); The Honored Inventor, USSR (1987); The Best Young Inventor Prize (1988); Soros Foundation Visiting Scholarship (Award to the winner of an All-Soviet Union Competition of Young Scientists, 1990-1991); Cambridge Overseas Trust Award (1991-1994); The Isaac Newton Scholarship at Cambridge University (1991-1994); Vilas Professorship Award (2005). Dr. Lazarian was a Reporter to Russian popular science magazines "Nature" and "Inventor and Rationalizer" in 1987-1990; Editor of the Physics & Technology Section of the Russian popular science magazine "Quantum" in 1989-1991; Co-Chair at "Magnetic Fields in the Universe" (Angra dos Reis, AIP Brazil) in 2004; Co-

Editor at “Magnetic Fields in the Universe” (AIP) in 2005. Alex Lazarian had more than 40 invited talks at conferences during last few years. He is a member of the International Astronomical Union (IAU), American Physical Society, and American Astronomical Society (AAS). *Dr.* Lazarian has more than 250 publications in the following fields: MHD Theory: Reconnection, Dynamo Theory; Interstellar Dust: Alignment, Microwave Emission; Interstellar Turbulence: Statistical Studies; Circumstellar Regions and Comets: Polarization; Molecular Clouds: Dynamics.

***Gohar Harutyunyan**, Junior Researcher*

OBITUARIES

Romela SHAHBAZIAN (1925-2012). *Dr.* Romela Karapet Shahbazian**,** the oldest BAO associate, passed away on April 12 at the age of 87. She was born in September 1925 and she worked at BAO for 42 years, from 1953 until 1995. In 1970 Shahbazian defended her PhD thesis under the supervision of V.A. Ambartsumian. Her fields of interest were extragalactc studies: photometry of galaxies, superassociations in galaxies and extragalactic supernovae, groups of galaxies and their morphology. Shahbazian’s most important contribution was the discovery of compact groups of compact galaxies (published in 10 lists in 1973-1979 by R.K. Shahbazian, M.B. Petrosian, F.W. Baier and H. Tiersch, altogether 377 objects), named **Shahbazian groups**. The Catalog of the Compact groups of compact galaxies was included in Vizier in 1996 (catalog VII/89B). Altogether, Shahbazian has published some 50 papers. She was a member of IAU.

R. Shahbazian (on the left) with N. Ivanova, E. Hovhannesian, E. Parsamian and R. Mnatsakanian

NEW ArAS MEMBERS

We are happy to inform that ArAS has two new members, ***Dr.*** **Ashot Melkonian** and ***Mr.*** **Vardan Elbakyan**. Ashot, 59, is a former researcher of BAO (1980-1995), PhD 1989 (supervisor: V.S. Oskanian), presently the Scientific Secretary of the Militaty Institute of Ministry of Defense of Armenia. His fields of interest are: astrophysics, physics, mathematics, education, military education. Vardan, 21, is a Junior Researcher at the Space Research Department, Southern Federal University in Rostov-on-Don, Russia. His fields of interest are: physics of galaxies and stars and physics of cosmic plasma.