

ArAS News

NEWSLETTER OF THE
ARMENIAN ASTRONOMICAL SOCIETY (A r A S)

No. 59 (November 25, 2012)



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

IAU Symposium 304 “MULTIWAVELENGTH AGN SURVEYS and STUDIES”



As it was informed before, the IAU Symposium #304 “**Multiwavelength AGN Surveys and Studies**” will be held on 7-11 October 2013 in Armenia. It is dedicated to the 100th anniversary of the famous Armenian astronomer Benjamin Markarian. We will celebrate Markarian's 100th anniversary in 2013, and the IAU S304 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 Register. 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 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)

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 and other models of AGN, 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
- Binary AGN and Merging Super-Massive Black Holes
- Physics between AGN and microquasars
- Study of unique AGN and AGN variability
- Future large projects
- The Phenomena of Activity

A number of outstanding scientists have already agreed to give invited talks. The list of the **confirmed invited speakers** is as follows:

Dave Alexander: *AGN in the distant galaxy population*
 Amy Barger: *Obscured AGN*
 Bob Becker: *A Massive Sample of Radio Spectral Indices for AGN in the JVLA FIRST Survey*
 Roger Blandford: *The current state of our understanding of AGN and MBH formation*
 Francoise Combes: *AGN-galaxy formation and/or AGN feedback*
 Darren Croton: *Simulations and modelling of feedback processes in galaxies*
 Ric Davies: *Imminent understanding of the structure of nearby AGN from IFUs*
 George Djorgovski: *AGN discovery in observable parameter spaces*
 Eilat Glikman: *Dust Reddened Quasars*
 George Helou: *Black Hole Growth and Star Formation: Modeling the Connection*
 Zeljko Ivezic: *Optical selection of quasars and AGNs: SDSS and LSST*
 Ken Kellermann: *Relativistic Beaming in Blazars*
 Lisa Kewley: *Photoionization, line emission diagnostics*
 Nancy Levenson: *Compton thick AGN*
 Laura Maraschi: *High energy radiation of Blazars from X-ray to Gamma-ray*
 Areg Mickaelian: *Markarian survey and Markarian galaxies*
 Felix Mirabel: *The accretion-ejection connection in black holes of all mass scales*
 Ray Norris: *The Evolutionary Map of the Universe (EMU) Survey*
 Paolo Padovani: *AGN content of deep radio surveys and their relevance to the AGN/Starburst connection and the radio-quiet/radio-loud dichotomy*
 Bradley Peterson: *Measuring the masses of black holes in AGNs*
 Huub Roettgering: *LOFAR surveys*
 Elaine Sadler: *Observational tests of radio-mode feedback in galaxies out to $z \sim 1$*
 Vicky Sarajedini: *AGN variability*
 Nick Scoville: *COSMOS survey*
 Helene Sol: *Gamma-rays from blazars*
 Daniel Stern: *Multi-wavelength AGN stuff from ground and space, from FIR to high-energy*
 Yervant Terzian: *Galaxies with Binary Nuclei*
 Ezequiel Treister: *Multiwavelength AGN Population and the X-ray Background*
 Yoshihiro Ueda: *Evolution of X-ray Selected AGN*
 Megan Urry: *Cosmic growth of SMBH, from $z \sim 0$ to $z \sim 6$, and/or AGN feedback on galaxies, from $z \sim 0$ to $z \sim 2$*
 Edward (Ned) Wright: *WISE*

Many other scientists, including many young astronomers will participate to give contributed talks and present posters, altogether some 200 people expected.

The Symposium Proceedings will be published by the IAU publisher, Cambridge University Press (CUP). The proceedings will be published both electronically and in print, and both a hardcopy and online access to the proceedings are included in the proceedings cost. This cost is included in the registration fee of the symposium.

The important dates and deadlines are:

1 Dec 2012	First Announcement with a call for Early Online Registration (with reduced fee), Abstract Submission, Travel Grant Application, and Hotel Reservation
1 Dec 2012	Opening of Early Online Registration (with reduced fee), Abstract Submission, Travel Grant Application, and Hotel Reservation
28 Feb 2013	Deadline for Abstract Submission and Travel Grant Application
31 Mar 2013	Abstract Notification to Submitters (Confirmation of Acceptance) and Travel Grant Notification to Applicants
30 Apr 2013	Deadline for Early Online Registration (with reduced fee) and Hotel Reservation (with reduced rate)
1 May 2013	Opening of Regular Online Registration
30 June 2013	Final Submission of Abstracts of accepted papers for the Abstracts book
10 July 2013	Second Announcement with detailed Program

The Chair of LOC is **Areg Mickaelian** (Byurakan Obs., Armenia). You can find further contacts and information at the IAU S304 webpage at <http://iaus304.aras.am>.

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

ArAS PRIZE for YOUNG ASTRONOMERS (YERVANT TERZIAN PRIZE)



A few days are left till the deadline of the **ArAS Annual Prize for Young Astronomers (Yervant Terzian Prize) 2012**. The prize will be awarded to a young scientist under 35 working in astronomy or related field and showing significant results in research and/or other scientific activities connected anyhow with the Armenian astronomy. **Nominations** may be made by ArAS members or any research organization from Armenia or elsewhere and should be sent to one of the ArAS Co-Presidents. They should include personal data for the nominee and a brief description of his/her achievements during the year, including important scientific results, all published papers, participation in meetings, given talks, etc., whatever is considered to be important. At least one refereed publication is required to qualify for the Prize.

The **deadline** for applications is **December 1**. The winner will be announced in the last issue of ArAS Newsletter (#60) at the end of the year. A **diploma** and sum of **\$500** will be awarded to the winner. The Prize was established in 2004 and is being sponsored by one of ArAS Co-Presidents **Prof. Yervant Terzian** (Cornell University, USA). Since 2009 the Prize is named after Yervant Terzian.

Previous ArAS Annual Prize Winners

- 2011 Marine AVTANDILYAN (ASPU)
- 2010 Parandzem SINAMYAN (BAO)

- 2009 Lusine SARGSYAN (BAO)
- 2008 Vardan ADIBEKYAN (YSU) and Artur HAKOBYAN (BAO)
- 2007 Igor CHILINGARIAN (OBSPM, France)
- 2006 Lilit HOVHANNISYAN (BAO) and Parandzem SINAMYAN (BAO)
- 2005 Artak HARUTYUNYAN (BAO) and Elena HOVHANNESSIAN (BAO)
- 2004 Lusine SARGSYAN (BAO)

INTERNATIONAL ASTRONOMICAL OLYMPIAD in KOREA



The 17th International Astronomy Olympiad has come to an end. It was an amazing time, and we hope that all participants liked it and will remember it for a long time.

The 17th International Astronomy Olympiad (IAO XVII) was held in Gwangju (Korea) on October 16-24, 2012. Gwangju is located in the south-western part of the Korean Peninsula and is famous for its rich cultural heritages, delightful cuisine, and dynamic urban life in the backdrop of MuDeung Mountain as well as its warm hospitality.

The IAO provides the opportunity for the students between the ages of 14 and 18 to compete in knowledge and skills in Astronomy as well as to develop friendship with each other. There were 23 teams of the following states participated on the Olympiad: Armenia, Bolivia, Bulgaria, China, Czech Republic, Estonia, Ghana, India, Indonesia, Iran, Italy, Kazakhstan, Korea, Lithuania, Mongolia, Moscow Land, Romania, Russia, Serbia, Sri Lanka, Sweden, Thailand, and Ukraine.

Following the educating style of the IAO the Organizers invited famous scientists to give lectures for the participants. There were total 5 lectures during the all programme of the Olympiad. On October 22, at the conclusion of all the rounds the results being available, the Jury Board members had a meeting to look at the overall performance of all the students without knowing their names or nationalities (the so-called "blind minutes"). As the usual procedure at this meeting, we decided on the cut off level for the Golden medal, Silver and Bronze Medals and Diploma of Participation. But, as per convention, the names should not be announced till the Closing Ceremony. The Closing Ceremony took place on October 23.

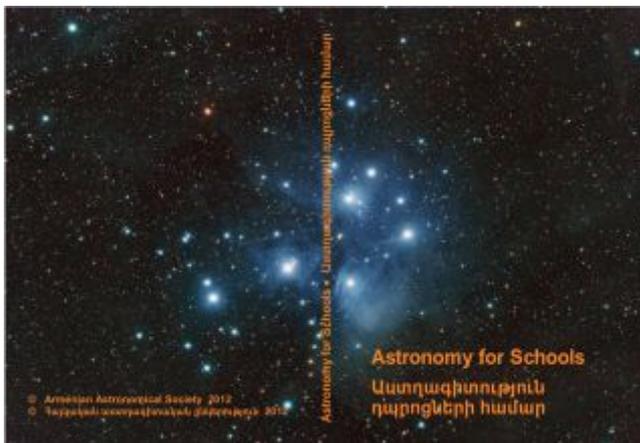
This year 6 Arminian students took part in IAO. Four of them became owners of different medals. They are **Gevorg Martirosyan (Gold medal and Special Diploma for the best result in group Alpha)**, **Arsen Vasilyan (Silver Medal)**, **Vardges Mambreyan (Bronz Medal)** and **Siranush Babakhanova (Bronze Medal and Special Diploma for the Best Picture of Bear and Penguin in solutions)**. Vahan Aslanyan (owner of Bronze Medal in IAO-2010) and Levon Stepanyan (owner of Gold Medal in IAO-2011) received diploma of participant. Gevorg, Vardges, Siranush and Vahan are students of Physical and Mathematical specialized school after Artashes Shahinyan at Yerevan State University, Arsen is a student from SEUA Base Gymnasium, and Levon is a student from "Quantum" college.

Armenian book publishing and the astronomical books published by EditPrint”), the Secretary of the Union of Publishers of Armenia (“International activities by the Union of Publishers of Armenia”), former BAO researcher Robert Sargsyan (the book “Viktor Ambartsumian descendants”) and former BAO researcher and head of the astronomical group Avetik Grigoryan (the book “From the Deep of Ages to the Universe”), books presentations, the exhibition itself, reception and excursion to BAO 2.6m telescope.

It is worth mentioning that ArAS maintains a webpage with a database of all books published in Armenia somehow related to astronomy (<http://aras.am/Books/books.html>). This database was made up at the beginning of 2012 in connection to the 500th anniversary of the Armenian book publishing and contains 164 books and booklets in Armenian, Russian, English and other languages.

Areg Mickaelian

“ASTRONOMY for SCHOOLS” DVD



“**Astronomy for Schools**” DVD containing a lot of useful information for pupils has been produced recently in connection with the ArAS school lectures program initiated by *Prof. Yervant Terzian*. It was distributed to the schools where lectures were given by BAO astronomers. The DVD is a collection of necessary materials for the school astronomy program, including 38 digitized or electronic textbooks, problem books, encyclopedia, thesauri, and other books, exercises, 16 popular astronomical software, more than 1000 photos,

movies, materials on BAO, Viktor Ambartsumian (including 14 books by or about him, photos and films) and other Armenian astronomers, and the CD “3D Atlas of the Universe”. The DVD may be used for educational and popular purposes and will be granted to other schools as well for further free distribution. It may serve as an example for other subjects to produce similar DVDs.

SEARCH and STUDIES of the FIRST BYURAKAN SURVEY LATE-TYPE STARS

Fifteen lists of late-type stars (LTS) were published in 1990-2010. These LTS have been found in the low-dispersion (ld) spectroscopic plates of the First Byurakan Survey (FBS), spectral range is 3400-6900 Å, with a sensitivity gap at 5300 Å, dispersion is 1800 Å/mm near H_γ (Markarian B.E. et al. 1989, Communication of the Special Astrophys. Observ., Vol. 62, p. 5). The systematic search and selection was carried out on a surface ~16 000 sq. deg. on almost the whole area of the FBS. As a result, a comprehensive catalogue of the LTS (C – carbon stars, selection of which is based on the presence of absorption bands of C₂ molecule, M-type stars are identified based on presence of the TiO absorption bands and S-type stars on the presence of the ZrO bands) of the FBS was generated. Its preliminary version has been available at the Centre de Données Astronomiques de Strasbourg (CDS) since 2007. We have revised and updated the FBS catalogue of LTS 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-correlation with the Digitized First Byurakan Survey (DFBS, Mickaelian et al. 2007, A&A, Vol. 464, p. 1177, on-line available at the <http://byurakan.phys.uniroma1.it>, or <http://www.aras.am/dfbs>), the United State Naval Observatory – B1.0 (USNO-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 (WISE), 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. The FBS revised and updated catalogue lists a large number (1045) of completely new objects, M giants, faint C stars at high Galactic latitudes, M and C dwarfs in the vicinity of the Sun, up to 16.0^m - 16.5^m in visual.

“The Revised and Updated Catalogue of FBS LTS” is fully described in paper by Gigoyan & Mickaelian 2012, MNRAS, Vol. 419, p. 3346, and on-line version is available since July 2012 at the (<http://webviz.u-strasbg.fr/viz-bin/VizieR?-source=III/266>).

Since 1987, the new FBS C stars have been studied spectroscopically and photometrically with the Byurakan Astrophysical Observatory 2.6 m telescope (BAO, UAGS, ByuFOSC2 and SCORPIO spectrographs), with the Observatoire de Haute-Provence 1.93 m telescope (OHP, CARELEC spectrograph), at the 1.83 m Cima-Ekar telescope of the Padova Astronomical Observatory (AFOSC spectrograph), with the 1.52 m Cassini telescope of the Bologna Astronomical Observatory (spectrograph BFOSC), and with the 3.6 m ESO NTT telescope.

Among the newly detected FBS C stars we found new carbon dwarfs (dC), located approximately at distances of 60 and 70 pc ($M_V \approx +10.0$, Gigoyan et al. 2008, 2010, Astrophysics, Vol. 51, p. 209; Vol. 53, p. 123; see Figure 1 and 2). The object FBS 2213+421 with a very large colour index ($J-H = 3.011$, and $H-K_s = 2.408$) belongs to the group of extreme carbon star (ECS). It is a post-AGB star with a mass-loss rate $\approx 1.5 \times 10^{-5} M_{\text{Sun}}/\text{yr}$, and it is located ≈ 7.2 kpc from the Sun. A more distant C star in the FBS sample is found at $d \approx 45$ kpc – FBS 1502+359 (Gigoyan et al. 2001, A&A, Vol. 371, p. 560; Fig. 3).

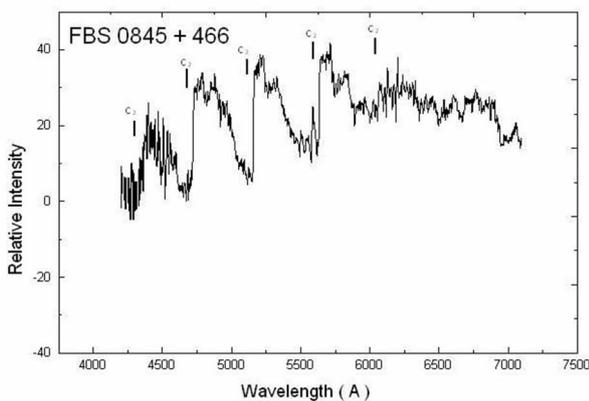


Fig. 1. BAO 2.6 m ByuFOSC2 spectrum of the new dC star FBS 0845+466 at a distance 72 pc.

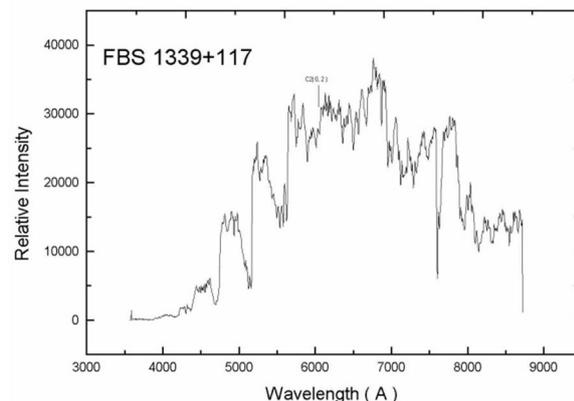


Fig. 2. The 1.52 m Bologna telescope spectra for new dC star FBS 1339+117 at a distance 60 pc.

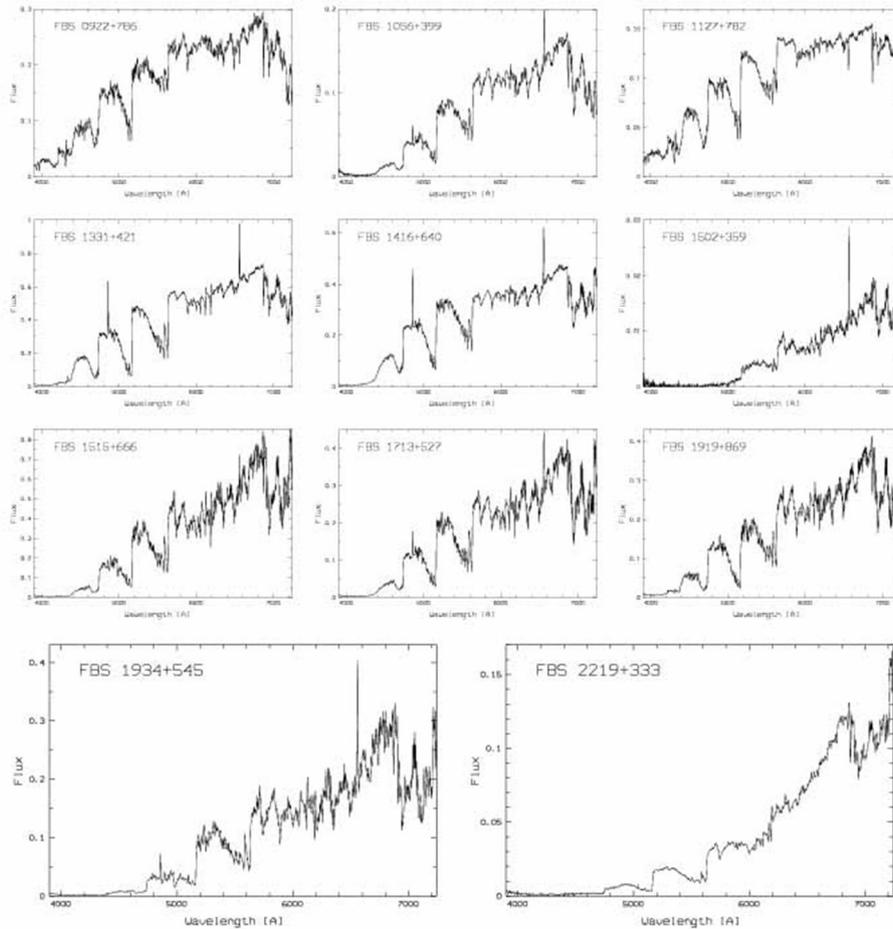


Fig. 3. OHP 1.93 m telescope CARELEC spectrum of the FBS C stars.

A very high proper motion star, FBS 0250+167 (Gigoyan & Mickaelian 2006, *Astrofizika*, Vol. 50, p. 73; Fig. 4) among the FBS objects, was revealed (PM = 5.13 arcsec/yr). It is an M7-M8 type dwarf, with 13.5÷14.0 mag on the, and $M_{\text{Abs}} = +17.89$. Its distance is estimated as 2.8 pc, and the tangential velocity is 68.1 km/s. Fig. 5 shows its relative motion compared to the neighboring stars from 1951 to the present.

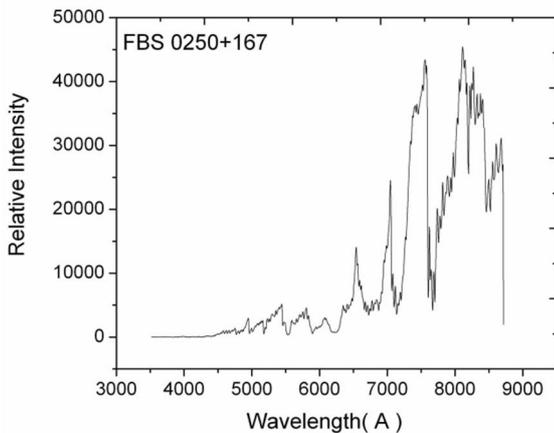


Fig. 4. Asiago 1.8m tel. AFOSC spectrum of the high proper motion star FBS 0250+167.

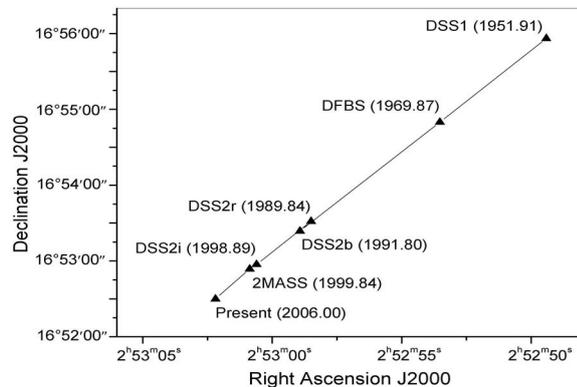


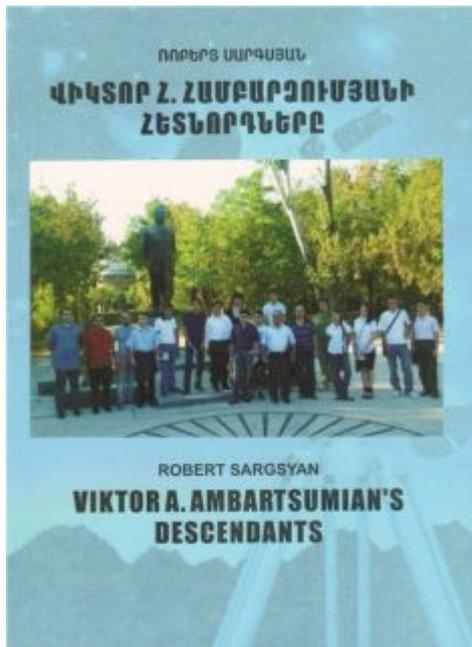
Fig. 5. The relative motion of FBS 0250+167 compared to the neighboring stars in 1951-2006.

Recently, the DFBS plates are searching to select very faint late-type star candidates, close to limit to each plate, by help of FITSView and SAO Image ds9 software. The search ~ 4030 sq. deg. area

gives data for 13 new faint high latitude C stars, from which 3 are new dC stars (Gigoyan et al. 2012, A&A, Vol. 545, A95). Data about two new DFBS CH type stars on the distances 5.2 and 6.3 kpc from the Sun, are presented by Gigoyan et al. (2012, Astrophysics, Vol. 55, p. 424). Having searched all DFBS plates, we plan to present in the near future the new catalogue of the totally selected LTS at high Galactic latitudes.

Kamo S. Gigoyan, Senior research associate, BAO

V.A. AMBARTSUMIAN'S DESCENDANTS. PREFACE OF THE BOOK



The Armenian nation is most likely distinguished by the flight of creative thought and the flexibility of way of thinking. For creative and especially scientific work the Armenians could and can always display themselves on the best sides in lack of favourable conditions as well. Unlike many other nations, the history of the Armenian people is not a history of achievements, but that of creation. Our whole national wealth are the historical-cultural values created during many centuries. In accordance today the importance of Armenian intellectuals, clever youth and juveniles and the support displayed to them is very necessary for ensuring of the future of our nation.

Our greatest scientist of all times and one of the outstanding astronomers of the 20th century Viktor Ambartsumian left a huge heritage both in the form of scientific works and his influence on future scientific generations.

Perhaps all our great astronomers as well as the youth of a few generations are inspired by his concepts and scientific achievements. It's not casual that astronomy has become a national science in Armenia, and our astronomers and the pupils of International Astronomy Olympiads continually keep high the honour of both Viktor Ambartsumian and our entire nation.

Taking active part both in the organization and holding of 1995 Olympiad and since 1999 always participating in the work of the jury of Republican Astronomy Olympiads (first as a president, then as a jury member) I kept an eye on the growth, progress, successes of our pupils and I can prove that in case of appropriate treatment and support we will have new Ambartsumians. From this point of view I attach much importance to the initiatives of creating V. Ambartsumian Fund for the publication of astronomer R. Sargsyan's book "V.A. Ambartsumian's Descendants", as well as for the support of young astronomers.

The book "V.A. Ambartsumian's Descendants" is a thankful work from the point of view of appreciating our winners' merit in the International Olympiads, as well as our astronomers' merit that did great work in the Olympic movement and in the realization and success of the astronomical Olympiads in Armenia. It's also gratifying that great scientists with international recognition such as Yervant Terzian, Michel Mayor and Brian Schmidt promote the realization of this book and the fund.

Areg Mickaelian, Leading Research Associate, BAO

PARAMETER CHARACTERIZING the EXISTENCE of PROTOSTELLAR MATTER in the UNIVERSE

V.A. Ambartsumian lived and created in the century of rapid development of physics and astrophysics. Especially in the middle of last century new phenomena were revealed in astrophysics, which are not interpreted by the acting laws of today's physics. The registering powerful explosive phenomena in young dwarfs, novae, Supernovae and in nuclei of galaxies are particularly inexplicable, which are different on their scales as from change of brightness from a few times up to dozen millions of times.

In his scientific works V.A. Ambartsumian initially paid a special attention and thoroughly investigated non-stationary phenomena in the Universe from the Sun up to the activity of flaring stars, Novae, Supernovae, nuclei of galaxies and quasars.

V.A. Ambartsumian's long-term and fundamental scientific activities were the basis for the conclusion of quite new ideas according to which the star formation in the Universe (including the formation of galaxies and their clusters) is a continuous process which goes on up till now, moreover, from a matter still unknown to physics which V. Ambartsumian called protostellar matter. The protostellar matter hasn't been registered so far, but it is approved by numerous models that it should have a very high density, close to the density of atom nucleus.

Any galactic phenomenon is first observed, and then it is understood, which has been registered in the observed object, and then the reason of the phenomenon is theoretically explained. Otherwise the investigation of astrophysical phenomenon consists of observations, interpretations and theoretical explanation.

For instance, it has turned out from the observations that the satellite of Sirius has low luminosity, but from the observation of spectra follows that its temperature is over 10000^0 K, which is characteristic to hot stars. The contradiction can only be explained by the fact that the area and consequently the sizes of the surface of the satellite of Sirius are very small. Hence in case of an ordinary mass (the mass of the Sun) very high density is received (10^8kg/m^3). Such objects are called "white dwarfs", the number of which in the Galaxy is estimated up to one billion. And what refers to neutron stars, the mass of which is estimated as the mass of the Sun, and the radius is only a few kilometers, then the density becomes too high (10^{18}kg/m^3). Such stars are the pulsars, which are registered in the explosive remains of Supernovae (e.g. Cancroid nebulae).

Small scale explosive phenomena are called flares. The energies emitted during the explosions are different, for example, in case of UV Ceti $\approx 10^{24}$ joule, in case of T Tauri $\approx 10^{32}$ joule, and what refers to the energy emitted from the explosion of quasars and nuclei of active galaxies, it is estimated $\approx 10^{53}$ joule. All the explosive phenomena are closely connected with powerful energetic sources where the protostellar matter should be encircled. For the purpose of its discovery it is necessary to collect observational data of various and diverse facts as possible which can prove the existence of protostellar matter even from the external point of view and after which to examine the forms of expression.

One of the confirming facts of the existence of protostellar matter (yet not of an identified object) can become the most applicable magnitudes deeply characterizing the astronomical objects: the mass and the luminosity, especially their relation $\frac{L}{m} = R$. This magnitude characterizes the radiated

energy of the unit mass in the unit time by astronomical objects which is a consequence of the integral radiation. For instance, the full power of radiation for the Sun (luminosity) is $L_0=4\cdot 10^{26}$ wt, and the mass is $m_0=2\cdot 10^{30}$ kg, from which follows that $R_0=2\cdot 10^{-4}$. A small value of R also results for objects having low luminosity and big mass. There can be different classes of stars, the luminosity and the mass of which are the same, for example, the masses and the luminosities of cold supergiant stars of M type and hot stars of O and B types are the same, hence $R_M = R_O = R_B$. This magnitude can be the same for different types of space objects as well. So that R doesn't monovalently characterize stationary objects.

The value of radiation factor increases sharply in case of non-stationary objects (great scale explosions), for instance, for a Supernova $R_{\text{Supernova}} = \frac{10^8 L_0}{10 m_0} \approx 10^3$, and for a quasar $R_{\text{quasar}} = \frac{10^8 L_0}{10 m_0} \approx 10^3$.

It is necessary to mention that during all explosions the mass changes a little, whereas the luminosity changes from ten to a few million times, then it becomes clear that the value of radiation factor will change with the same magnitude, that is to say $R=10\cdot 10^6$. Big values results for R when it is considered that thermonuclear reaction takes place in the depth of young stars, meaning that $L = \frac{mc^2}{t}$ we will have $R = \frac{c^2}{t}$ where taking for $t=10^4$ years (an age of a young star), we will have $R \approx 10^5$, from which follows that the younger the space object is, the bigger the radiation integral factor is. Hence the probable place of the protostellar matter should be searched in the family and environment of non-stationary active young objects.

Robert Sargsyan, former BAO researcher

ANNIVERSARIES



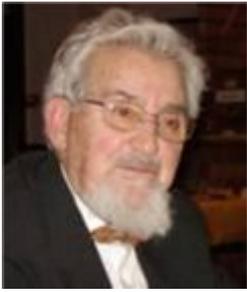
Vagharshak Sanamian – 95. *Dr. Vagharshak Sanamian is the founder of the Armenian radioastronomy. He was the teacher of almost all Armenian radioastronomers: Hrant Tovmassian, Vigen Malumian, Vazgen Panajian, Rafik Kandalian, Martik Hovhannisyan, Gabriel Ohanian, et al. He was born on 17 November 1917. Since October 1950 he worked at BAO and participated in the works of the construction and development of the observatory. Since the same year he headed the newly established BAO Radioastronomy Laboratory (reorganized in 1955 to Radioastronomy Department). In 1950s, he supervised the construction and installation of the first BAO radio telescopes, 2 synphase*

antennas working on 4.2m and 2 synphase antennas working on 1.5m wavelengths. In 1950-1960s he led the radioastronomical investigations at BAO. In 1957, under the supervision of the outstanding Russian radioastronomer S.Ye. Khaykin, Sanamian defended his Ph.D. thesis. In 1960s he participated in the VLBI observations, in 1960-1970s – observations with a number of radiotelescopes (including the Russian RATAN-600). He worked at BAO until his retirement in 1989. Sanamian passed away on 30 June 2010. His fields of interest were: Galactic radio sources (masers, nebulae, Herbig-Haro objects, etc.), Markarian galaxies, QSOs, compact groups of compact galaxies, and radio instrumentation. Sanamian has published 74 research papers (the last one in 2007 at the age of 90!), including the book “Radioastronomy” (1967, in Armenian) and the chapter “Radio Astronomy at the Byurakan Astrophysical Observatory, the Institute of Radio Physics and Electronics of the Academy of Sciences of the Armenian SSR and Other Armenian Organisations” in the book “A Brief History of Radio Astronomy in the USSR” (2012). He was an ArAS member since 2004.



Grigor Gurzadyan – 90. Gurzadyan is one of the distinguished persons of the Armenian astronomy whose courageous ideas and interesting scientific results always delighted the scientists. He is known as one of the founders of space astronomy. Gurzadyan's work is wide and extensive; besides astronomy he is known as a talented artist, as well as an author of numerous literary works. Grigor Aram Gurzadyan was born on 15 Oct 1922 in Baghdad (Iraq) to a family of parents fled from Western Armenia in 1915. In 1944 he graduated from the Hydrotechnical and Constructional Depts of Yerevan Polytechnic Institute

(YerPI). The same year he became the post-graduate of Viktor Ambartsumian, and in 1948 at the age of 26 he defended his Ph.D. thesis on the topic *"The Radiation Balance of Interstellar Gas Matter"* in Moscow State Univ. In essence Gurzadyan was one of the main scientists of the founding team of BAO. In 1955 (at the age of 33) he defended his Doctorate thesis. In 1950-1966 Gurzadyan was the Head of BAO Dept of Physics of Stars and Nebulae, in 1967-1973 he headed the branch of space researches, in 1973-1978 he headed Garni Astronomy Laboratory, in 1978-1992 he was the Head of Extra-atmospheric Astronomy Lab. of the Byurakan Observatory, in 1992-2004 he was the Head of Garni Space Astron. Inst.. Since 1979 he was the Head of the Chair of Space Instrument-Making of YerPI as well. For decades he lectured theoretical astrophysics at YSU and precise mechanics at YerPI, in 1962 he was awarded a professorship, in 1965 he was elected a corresponding member of Arm. SSR Academy of Sciences, in 1986 a full member. Gurzadyan's works refer to the problems of radiation equilibrium of interstellar space, the morphological and kinematical investigations of stellar associations, diffuse and planetary nebulae, space instrument-making. He worked out the theory of formation of double-envelope nebulae, investigated the meaning of the magnetic field in formation of planetary nebulae forms, worked out a theory of star flares based on non-thermal phenomena occurring in them. He created a number of scientific devices and optical systems as well. The formation of automatic operation method, of the principle of optical system work of Orion Space Obs. is connected with his name. In 1990s he worked out the theories of common chromospheres (roundchromes) of close binary stars and of evolution of binary globular clusters. He was among the founders of space astronomy. In 1960s using ballistic rockets R-5, he directed the UV and X-ray observations of the Sun and stars (the first launch was on 15 Feb 1961 from Kapustin-Yar base). His paper *"A Powerful X-ray Flare on the Sun"*, published in *commun. Arm. SSR Acad. Sci.* in 1966 is among the earliest papers on space astronomy. Then he moved to design space orbital observatories; Orions were the most famous ones. In Apr 1971 the first space station Salyut 1 carried Orion 1 onto the orbit, the first space telescope with an objective prism. But the highlight was Orion 2, which was operated onboard the spacecraft Soyuz 13 in Dec 1973. Spectra of thousands of stars to 13th stellar magnitude, the first satellite UV spectrogram of a planetary nebula were obtained revealing spectral lines of aluminum and titanium – elements not previously observed in planetary nebulae, two-photon emission from nebula was directed for the first time. For comparison, the US Skylab's UV telescope, which was on the orbit at the same time, could only observe stars down to 7.5th magnitude. The obtained results were published in the most important astronomical journals, including 3 articles in the high-ranked journal "Nature". He authored the most significant theoretical papers devoted to PNe, interstellar matter and flare stars. He published more than 200 sci. papers and a number of monographs: *"Radioastrophysics"* (1956, Rus), *"Planetary Nebulae"* ("Nauka" 1962, Rus, "Gordon and Breach" 1970, Eng), *"Flare Stars"* ("Nauka" 1973, Rus, "Pergamon" 1980, Eng), *"Stellar Chromospheres"* ("Nauka" 1984, Rus), *"Physics and Dynamics of Planetary Nebulae"* ("Nauka" 1988, Rus, "Springer" 1997, Eng), *"Theory of Interplanetary Flights"* ("Gordon & Breach" 1996, Eng) and *"Space Dynamics"* ("Francis & Taylor" 2002, Eng). Numerous paintings and literary works belong to Gurzadyan's creative heritage. Gurzadyan is an IAU member (1950) and an Honored Scientist of the Arm. SSR (1975). He was awarded the order "Sign of Honor".



Agop Terzan – 85. Agop Terzan is one of the most important persons of Armenian Diaspora and French astronomy. The stellar clusters revealed by Terzan and named after him are known to all astronomers. With his perennial activity and essential results he has a serious contribution in observational astrophysics. Agop Terzan was born on October 31, 1927 in Constantinople (Istanbul). He graduated from the Constantinople University (he got his Bachelor degree on Mathematics in 1945 and Masters on Astronomy in 1949) and worked as a teacher of mathematics at Central Lyceum of Istanbul. In

1956 he moved to France. In 1957-1959 Terzan worked as a teacher of mathematics at technical lyceum and in 1959-1965 as an assistant astronomer, later as a scientist. In 1967-1998 he worked at the Lyon Observatory, in 1982-1983 he was the Deputy Director of that observatory. In 1965 he was awarded a doctorate of mathematical sciences by Lyon University; in 1980 he was awarded a professorship. Terzan's works mainly refer to variable stars, stellar clusters and problems of physics of stars. Since 1963 he made observations by a number of most significant telescopes of the world. He discovered 710 variable stars in the immediate vicinity of 14 globular clusters, 11 new globular clusters (named *Terzan 1*, etc. till *Terzan 11*), 158 diffuse nebulae, 124 galaxies (from which 25% appeared to be active galaxies of Sy2 type), 4430 red variable stars in direction to the Galactic center (including 458 ones which were later identified with the IRAS infrared sources), 1428 high proper motion stars ($\mu > 0''.1$ per year). 26 planetary nebulae, 122 diffuse galaxies in direction to the center of Our Galaxy. Later it was found out that those galaxies discovered by Terzan formed the cluster of galaxies of Ophiucus constellation, as well as the super-cluster of Sagittarius-Ophiucus, which was essentially discovered due to Terzan. On the basis of the observations recently made by European astronomers it was found out that Terzan 5 cluster was one of the main formations of the center of Our Galaxy; on its basis the Galaxy was formed. In essence it is the protogalaxy, which formed its central part (bulge) joining the Milky Way. As a result of the above mentioned works Terzan published more than 100 scientific papers in the most important astronomical journals. Terzan also has a serious contribution in the working out of astronomical devices (devices and photometers for comparing eclipses). He also has a considerable contribution in editorial and administrative works. Terzan is a member of International Astronomical Union (1967), European Astronomical Society and French National Astronomy Committee. In 1968-1978 he was the Head of Lyon Astronomical Society. He was awarded a Henry Rey prize of the French Astronomical Society (1977), prizes of French Ministry of Education (1979) and a number of medals. He was a Corona Prize winner of the French Academy of Sciences (1988). Agop Terzan visited Armenia for many times, including his official missions to the Byurakan Astrophysical Observatory in 1971, 1973, 1977, 1984 and 1989 on purpose of participating in conferences and scientific discussions.



Globular clusters Terzan 1, Terzan 3, and Terzan 7.



Daniel Weedman – 70. Daniel Weedman is a great friend of the Armenian astronomy, an ArAS member and the first US astronomer to collaborate with the Armenian astronomers. He was born on on 19 Oct 1942 in Nashville, Tennessee, USA. He received his Bachelor's degree from Vanderbilt University (1964) and PhD from the University of Wisconsin (1967). In 1967-1979 he held faculty appointments at the University of Texas, Vanderbilt University, and the University of Minnesota before joining Penn State in 1979. In 1979-1990 and 1995-1999 he was a Professor of Astronomy and Astrophysics at the Pennsylvania State University. While on leave from Penn State, he served two

years as Director of the Astrophysics Division at NASA Headquarters in Washington (1993-95). In that position, he was responsible for overseeing planning, development, and operations for all NASA astrophysics missions, including the Hubble Space Telescope, the Advanced X-Ray Astrophysics Facility (now Chandra X-ray Observatory), and various infrared missions including starts for the Stratospheric Observatory for Infrared Astronomy and SST. He had also spent two years previously at NASA Headquarters as Visiting Senior Scientist in the Infrared Branch of the Astrophysics Division (1990-92). Until Sep 2002, he was at the U.S. National Science Foundation (NSF) as Program Director for the National Optical Astronomy Observatories (NOAO) and the National Solar Observatory, having begun that position in Aug 1999. Since 2002 Weedman is a Senior Research Associate at Cornell University, working on the Infra-Red Spectrograph (IRS) Team for science programs with NASA's Spitzer Space Telescope (SST). Highlights of his research career include the first studies of the gas motions in giant hydrogen nebulae (working with Malcolm Smith), the initial spectroscopic observations of Markarian galaxies and resulting development of the original classification system for Seyfert galaxies (working with Edward Khachikian), the demonstration of continuity of physical properties between Seyfert galaxies and quasars, and the initial defining of starburst galaxies, the discovery of the largest IR/opt flux ratio galaxies and their study with the SST (together with Areg Mickaelian and Lusine Sargsyan), the discovery of the most powerful starbursts (up to 3200 Solar masses annually) and the study of the evolution of the most luminous (up to 10^{13} Solar luminosities) galaxies (together with James Houck). He wrote the book *"Quasar Astronomy"* (Cambridge University Press, 1986), which is a summary of the research techniques and accomplishments in the study of quasars. He also has extensive experience in the design and use of ground-based and space-based astronomical facilities. He was the original designer of the 9.2m Spectroscopic Survey Telescope (working with Lawrence Ramsey), now called the Hobby-Eberly Telescope (HET) at the McDonald Observatory in Texas, which is the largest optical telescope in the continental U.S. He has been participating on the SST spectrograph design team since activities began in 1984. Weedman is an author of 263 scientific papers. He is a member of IAU, AAS, and a number of other organizations. He was the first foreign ArAS member in 2002. He was the first US astronomer to collaborate with the Armenian astronomers, the US Co-P.I. of the largest grant ever received in BAO (CRDF 2007-2009, together with A.M. Mickaelian, for the Digitization of Markarian survey and the creation of the Armenian Virtual Observatory). He has visited Armenia 8 times (1970, 1978, 1998, 2006, 2009, 2010, 2011, and 2012). He was the encourager of the idea of the Byurakan International Summer Schools and essentially supported their accomplishment since 2006. Dan Weedman is married to Dr. Lusine Sargsyan.