Isaac Newton Institute of Chile in Eastern Europe and Eurasia

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The Isaac Newton Institute, (INI) for astronomical research was founded in 1978 by the undersigned. The main office is located in the eastern outskirts of Santiago. Since 1992, it has expanded into several countries of the former Soviet Union in Eastern Europe and Eurasia.

As of the year 2002 the Institute is composed of fourteen Branches in nine countries. (See figure on following page.) These are: Armenia (19), Bulgaria (30), Crimea (29), Kazakhstan (18), Kiev (11), Moscow (15), Odessa (35), Petersburg (25), Poland (13), Pushchino (18), Special Astrophysical Observatory, ''SAO'' (44), Tajikistan (9), Uzbekistan (23), Yugoslavia (22). The quantities in parentheses give the number of scientific staff, the grand total of which is 311 members.

1. RESEARCH IN CHILE

The primary research program of the Institute in Chile continues to be observational studies of globular clusters in the Galaxy and the Magellanic Clouds. In addition, a number of open clusters have been observed. In this field around 200 papers have been published.

Besides the above named Branches, following the Convention of Scientific Collaboration with the Rome Observatory of February 2000, Gonzalo Alcaino and Franklin Alvarado are involved with italian astronomers in several research projects using data secured from telescopes in Chile.

Preliminary results from VLT (FORS1) photometry of the globular cluster NGC 6397 obtained by Alcaino and associates, have been presented by Gloria Andreuzzi, at the globular cluster meeting held in Padova July 2002. The results are now in press, at the ASP conference series: *New Horizons in Globular Cluster Astronomy*. Collaborators are, Gloria Andreuzzi, Vincenzo Testa, Gianni Marconi, Gonzalo Alcaino, Franklin Alvarado and Roberto Buonanno. The obtained CMD shows a narrow MS extending down to $V \simeq 27$, much deeper than any previous ground based study and comparable with previous HST photometry. The comparison between observed MS Luminosity Functions (LFs) derived for 2 annuli at different radial distance from the center of the cluster shows a clear-cut correlation between their slope before reaching the turn-over, and the radial position of the observed fields inside the cluster area: the LFs become flatter with decreasing radius, a trend that is consistent with the interpretation of NGC 6397 as a dynamically relaxed system.

CCD photometric analysis has now been completed by Gonzalo Alcaino, Franklin Alvarado, Guiseppe Bono and Gianni Marconi, for the globular clusters NGC 1261, NGC 1851 and NGC 3201. In the frame of the joint collaboration with the Rome Observatory, Fabrizio Giorgi, presented his PHD thesis on the globular cluster NGC 6752 from CCD data obtained at Las Campanas by Gonzalo Alcaino and Franklin Alvarado.

As from 2002, a systematic programme of CCD data reduction obtained at La Silla and Las Campanas by Gonzalo Alcaino and Franklin Alvarado is ongoing with Jordanka Borissova and Radostin Kurtev, staff members of the INI Bulgarian Branch. The study on the SMC cluster NGC 458 has been completed, and the objects Lindsay 1 and NGC 330 are now in process of reduction. Around 50 stars clusters will compose the envisaged project in the forthcoming years.

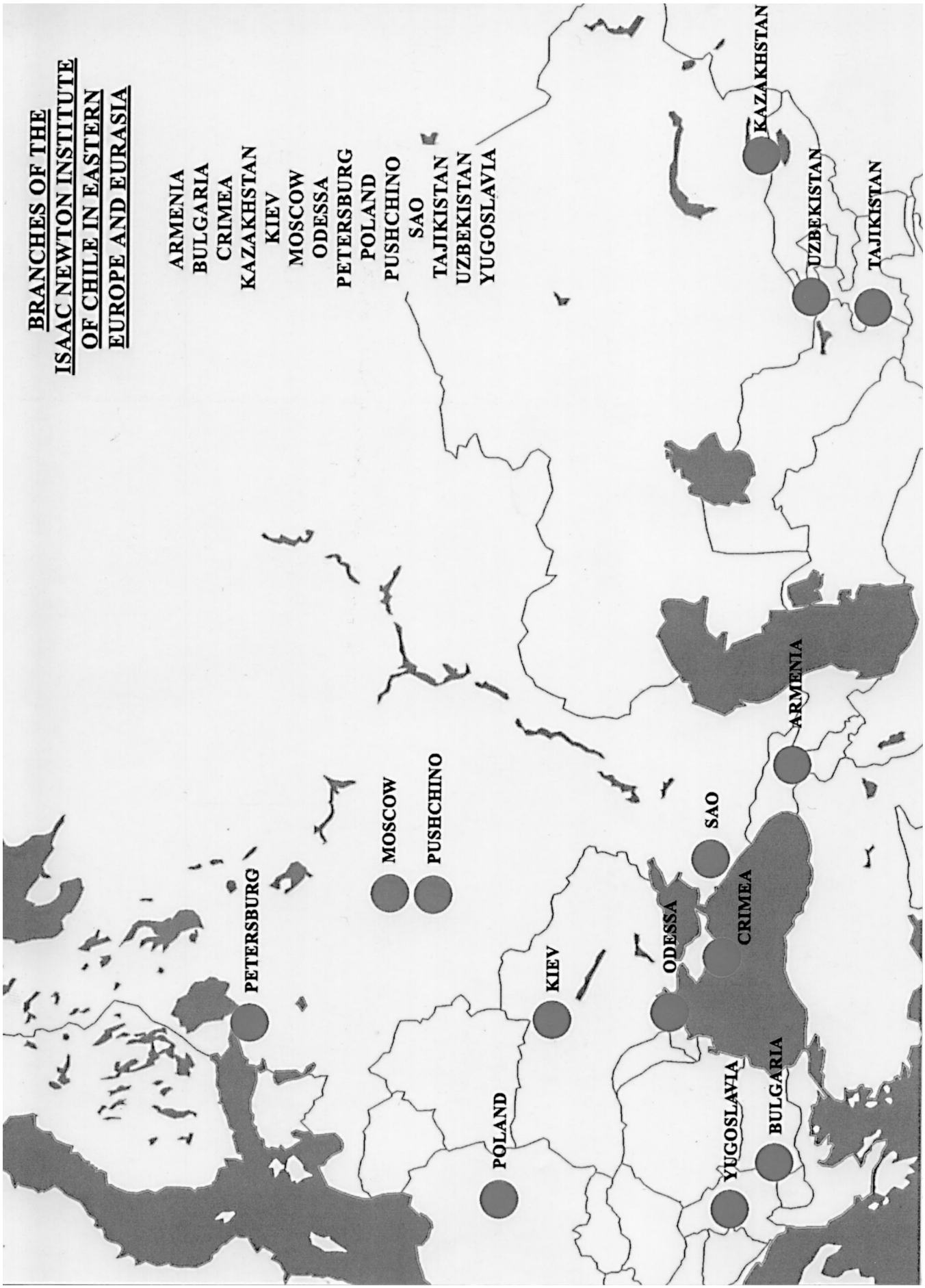
2. THE INI ARMENIAN BRANCH

The Isaac Newton Institute opened its Branch in June 2000. The formal Agreement has been signed with Prof. Edward Khachikian, Director of the Byurakan Astrophysical Observatory of the Armenian National Academy of Sciences.

The staff of the Isaac Newton Institute in Armenia are: Hamlet Abrahamian, Smbat Balayan, Kamo Gigoyan, Armen Gyulbudaghian, Lidia Erastova, Misak Eritsian, Susanna Hakopian, Haik Harutyunian, Arthur Karapetian, Edward Khachikian, Tigran Magakian, Norair Melikian, Areg Mickaelian, Tigran Movsessian, Hripsime Navasardian, Arthur Nikoghossian, Elena Nikoghossian, Artashes Petrosian and Norair Yengibaryan. The Resident Director of the INI Branch is Areg Mickaelian.

The Byurakan Astrophysical Observatory (BAO) is the main astronomical institution in Armenia and one of the most important observatories of the Former Soviet Union. It was founded by the outstanding scientist Victor Ambartsumian in 1946. First studies at BAO related with the instability phenomena taking place in the Universe, and this trend became the main characteristic of the science activity in Byurakan. Discovery of the stellar associations (1947), the hypothesis about activity of galactic nuclei (1958), the famous First and Second Byurakan surveys (FBS, 1965-80, and SBS, 1978-91), discovery and study of many QSOs and Seyfert galaxies, discovery of some 1000 flare stars, dozens of Supernovae, hundreds of Herbig-Haro objects and cometary nebulae, works in the field of radiation transfer theory, are the main scientific achievements of the Byurakan astronomers. Markarian, Arakelian and Kazarian galaxies are known to all astronomers working in the field of extragalactic astronomy. Among the most well-known astronomers who have worked at BAO are V.A. Ambartsumian, B.E. Markarian, G.A. Gurzadian, M.A. Arakelian, L.V. Mirzoyan, E.Ye. Khachikian, V.A. Ambartsumian has been the IAU President (1961-64), IAU Vice-President (1948-55), twice the ICSU President (1968-72), he was the President of the Armenian Academy of Sciences during 1947-1993 and the Director of BAO during 1946-1988.

At present, BAO has some 70 researchers, including 11 Doctors of Science and 38 Candidates of Science (Ph.D.). Many are members of IAU, EAS, EAAS (Euroasian Astron. Soc.), and other international societies and organizations. Since 1999, the Director is Edward Khachikian. There are 3 scientific divisions and 21 small research groups.


BRANCHES OF THE
ISAAC NEWTON INSTITUTE
OF CHILE IN EASTERN
EUROPE AND EURASIA
ARMENIA
BULGARIA
CRIMEA
KAZAKHSTAN
KIEV
MOSCOW
ODESSA
PETERSBURG
POLAND
PUSHCHINO
SAO
TAJIKISTAN
UZBEKISTAN
YUGOSLAVIA
PETERSBURG
MOSCOW
PUSHCHINO
KIEV
ODESSA
SAO
CRIMEA
ARMENIA
POLAND
YUGOSLAVIA
BULGARIA
UZBEKISTAN
TAJIKISTAN
KAZAKHSTAN

The main fields of scientific activity at BAO are: search and multiwavelength studies of AGN and starburst galaxies, infrared and radio galaxies, young stellar objects, variable stars, clusters of galaxies, observational cosmology, theory of compact cosmic objects, and astrophysical applications of mathematical physics. The traditional methods for investigations are surveys, spectroscopic, photometric and polarimetric observations, statistics, direct and inverse theoretical problems. The Byurakan astronomers collaborate with scientists of France, Germany, Italy, UK, Spain, Russia, USA, Mexico, Japan, China, India, Chile, and other countries. Though the funding of science in Armenia is at very low level, however the Byurakan astronomers work actively due to the international collaboration and grants, and valuable contribution in science. The main scientific instruments at BAO are: 2.6m telescope, and the 1m Schmidt telescope.

Galactic Astronomy. On the basis of cross-correlation of X-ray sources with blue optical objects, and further inspection in the First Byurakan Survey (FBS) low-dispersion plates, a new bright (V=12.6) cataclysmic variable has been discovered having properties of SW Sex type nova-like variables and a non-standard period. The object has been studied spectroscopically and photometrically with the Byurakan Observatory 2.6m and Observatoire de Haute Provence 1.93m and 1.2m telescopes (Mickaelian *et al.* 2002). Long-slit and integral-field spectroscopy of young stellar objects with the Byurakan Observatory 2.6m telescope and Special Astrophysical Observatory (SAO, Russia) 6m telescope allowed reveal new jets and study their fine details. An indication of presence of helical shock structure in the jet of R Mon has been obtained and the precession of the outflow has been suggested on the basis of the observed kinematics of the system (Magakian *et al.* 2002; Movsessian *et al.* 2002).

Extragalactic Astronomy. Detailed studies of the Second Byurakan Survey (SBS) galaxies have been undertaken, including study of mergers, interacting systems and close pairs, comparison of UV-excess and emission-lines selected samples, etc. Samples of 110 SBS galaxies in 107 mergers, 58 SBS galaxies in 47 interacting systems, and 49 SBS galaxies in 30 close pairs have been chosen to provide information for studies of the relation between galaxy interactions and galaxy star formation activity (Petrosian *et al.*, 2002a; 2002b). A multi-pupil integral field spectroscopy of 18 Blue Compact Dwarf Galaxies (BCDGs) has been carried out with the SAO (Russia) 6m telescope. An atlas of emission-lines intensity distribution, the excitation parameters, the continuum maps and the velocity fields has been produced and a classification of the sample has been made (Petrosian *et al.* 2002c). High-dispersion long-slit spectroscopic observations of 13 extragalactic star-forming regions (SFR) have been obtained for two BCDGs (IZw18 and IZw36) for bright SFR in the spiral galaxies M101 and M51, and the irregular starburst galaxies Mrk171 and NGC4449. H-gamma and H-delta absorption lines have been observed to constrain the Initial Mass Function (IMF) and age of the young stellar populations (Sinanian *et al.* 2002).

3. THE INI BULGARIAN BRANCH

The Isaac Newton Institute of Chile established its Bulgarian Branch in July 2000. The formal Agreement was signed with Prof. Georgi Ivanov, head of the Department of Astronomy and the University Astronomical Observatory at the St. Kliment Okhridski University of Sofia. The staff of the Isaac Newton Institute in Bulgaria includes representatives of all astronomical institutions in Bulgaria. These institutions are: the Department of Astronomy at the St. Kliment Okhridski University of Sofia, the Institute of Astronomy and National Astronomical Observatory at the Bulgarian Academy of Sciences, and the Department of Physics, St. Konstantin Preslavski University of Shoumen.

The staff of the Bulgarian Branch of Isaac Newton Institute consists of: Aleksander Antov, Ina Barzova, Jordanka Borissova, Peter Duchlev, Tsvetan Georgiev, Valeri Golev, Ilian Iliev, Ljubomir Iliev, Georgi Ivanov, Dimitar Kolev, Renada Konstantinova-Antova, Radostin Kurtev, Diana Kjurkchieva, Dragomir Marchev, Haralambi Markov, Neviana Markova, Bojko Mihov, Petko Nedjalkov, Georgi Petrov, Tatiana Russeva, Evgeni Semkov, Liuba Slavecheva, Nedka Spassova, Ivanka Stateva, Nikolai Tomov, Mima Tomova, Todor Veltchev, Ivanka Yankulova, and Radoslav Zarnanov. The Resident Director of the INI Branch is Valeri Golev.

Founded in 1894, the Astronomical Observatory and Department of Astronomy of Sofia University is the oldest astronomical institution in Bulgaria. To the moment the Department is the only one responsible for the university education in the field of astronomy and astrophysics in Bulgaria. The scientific activities of the Department staff members are in the fields of stellar content of Local Group galaxies, OB associations, WR stars, AGNs, stellar pulsations and variable stars.

The Institute of Astronomy together with its National Astronomical Observatory at Rozhen, Rodopa Mountain, is the biggest astronomical institution in Bulgaria. The Rozhen Observatory is the only major observatory in Bulgaria with its 2m Ritchey-Chretien-coude reflector and three smaller telescopes.

The main activities of the staff of the Institute of Astronomy are: to carry out fundamental research in a broad range of fields in astronomy and astrophysics, and to maintain and secure the observational programs at Rozhen Observatory. The Institute of Astronomy of the Bulgarian Academy of Sciences was established in 1954. Its staff also maintains a smaller observatory around the sity of Belogradchik where two small telescopes operate. The University of Shoumen was established 40 years ago as a regional university for North-East part of Bulgaria. Since 30 years some essential astronomical courses are offered there by the Department of Physics.

So far 12 papers are published in 2002 by the staff of the Bulgarian Branch of the Isaac Newton Institute of Chile. During the year the staff members of the Bulgarian Branch are actively working in differend fields of astrophysics. The scientific highlights of the most significant papers can be summarised in two main broad fields:

1) Astrophysics of the star clusters in our Milky Way and nearby galaxies as well as the astrophysics of the Local

Group galaxies. Alcaino *et al.* (2002) performed a new UBVI photometric study of the SMC star cluster NGC 458. On the basis of 2MASS calibration and application to the 2MASS cluster GC01. Ivanov & Borissova (2002) discussed the possibility for red giant branch stars to serve as probes of stellar populations. Ivanov *et al.* (2002) discovered a new Milky Way star clusters candidates using the 2MASS Point Source Catalog. Catelan *et al.* (2002) discussed the Color-Magnitude diagram of M75, a globular cluster which horizontal branch is proved to be trimodal. Valdez-Gutierrez *et al.* (2002) have unveiled the kinematics and dynamics of the ionized gas in the nearby Irr galaxy NGC 4449. Nedialkov *et al.* (2002) established the first optical identification of a supersoft X-ray source in M31.

2) High-resolution astrospectroscopy of Be-stars, compact binaries, cataclismic variables, symbiotic stars. Iliev *et al.* (2002) were determined the orbital elements for the Lambda Bootis spectroscopic binary systems HD84948 and HD171948. Duemmler *et al.* (2002) performed a study of the radial velocities and physical parameters of HD553. Markova (2002) and Muratorio *et al.* (2002) investigated the spectral variability of luminous early type supergiant Alpha Cam as well as the properties of the P Cygni wind using the Self Absorption Curve method. Tomov & Tomova (2002) discussed the hydrogen and helium emission of the symbiotic binary AG Draconis during its active phase. Kjurkchieva *et al.* (2002) report the spectroscopic observations of the RS CVn-type star SV Cam. Harmanec *et al.* (2002) continued to work on properties and nature of Be stars investigating the long-term and the orbital variations of 59 Cyg.

4. THE INI CRIMEAN BRANCH

The Isaac Newton Institute opened a Branch in Crimea, in September 1997. The formal Agreement was signed by Gonzalo Alcaino in Nauchny with Prof. Nikolay Steshenko, Director of the Observatory. Thereafter, the agreement, between the Crimean Astrophysical Observatory of Ukraine and the Isaac Newton Institute of Santiago, Chile, was endorsed in an official document signed in Kiev by the Ministry of Sciences and Technology of Ukraine, represented by the Vice-Minister, Y.Dotsenko.

In June 2001, 14 new members were incorporated into the staff of the Crimean Branch, therefore it was doubled. The current staff of the Isaac Newton Institute in Crimea are: Ilya Alekseev, Valery Bochkov, Natalya Bondar, Elena Dmitrienko, Valentina Doroshenko, Vasily Haneychuk, Lyudmila Karachkina, Olesya Kozlova, Valery Kotov, Victor Malanushenko, Nelly Merkulova, Lubov Metik, Marina Mitskevich, Elena Pavlenko, Sergei Plachinda, Nina Polosukhina, Valentina Prokof'eva-Mikhailovskaja, Iraida Pronik, Vladimir Pronik, Igor Savanov, Sergey Sergeev, Elena Sergeeva, Nikolai Shakhovskoy, Alina Streblyanskaya, Anatoly Tarasov, Taisiya Tarasova, Teodor Tsap, Yuri Tsap and Yuri Yefimov. The Resident Director of the INI Branch is Nelly Merkulova.

The Crimean Observatory was the first major observatory of the former Soviet Union (FSU) to enter the age of astrophysics. The beauty of the observatory site, the telescopes and the instruments together with a rich history and the current scientific activity of the astronomers make the Observatory a quite attractive place. For many years it was unique in combining active scientific research with teaching for students and tutorials in astrophysics. Many astrophysicists of FSU were trained at the Crimean Observatory. Now the Crimean Astrophysical Observatory (CrAO) remains one of the largest scientific centers in the Ukraine and the FSU.

CrAO possesses modern equipment for astrophysical observations over a wide spectral range from gamma-rays to meter radio waves of stars and galaxies as well as the Sun and solar system. The main part of the observatory is located at Nauchny, at an altitude of 600 meters. The instruments in use are: the 2.6-m Shajn telescope, two 1.25-m telescopes, the 1.0-m Solar Tower telescope as well as a few other instruments. There are 350 employees including about 100 scientists.

The members of the Crimean Branch are actively working in different fields of astrophysics. Due to scientific interests, they entered on the 8 scientific projects:

Project 1: ''Compact binaries: Cataclismic variables, black holes, symbiotic stars.'' Investigators: Elena Pavlenko, Elena Dmitrienko, Anatoly Tarasov, and Natalya Bondar'. The aim of this project is to investigate the behaviour of binaries in order to study pecularities of their evolution. Active in photometric, polarimetric and spectroscopic observations using the 2.6-m telescope equipped with a CCD Camera and a 1.25-m telescope equipped with a 5-channel, UBVRI photometer-polarimeter as well as a few other small telescopes.

Project 2: ''Surface anomalies of the chemically peculiar stars.'' Investigators: Victor Malanushenko, Igor Savanov, Marina Mitskevitch, and Nina Polosukhina. The aim of the project is to broaden the knowledge of the pecularities of the atmospheres of the chemically peculiar stars of the upper main sequence, using the coude spectrograph of the 2.6-m telescope.

Project 3: ''Continuum and emission lines variability in active galactic nuclei.'' Investigators: Vladimir Pronik, Sergey Sergeev, and Elena Sergeeva. The objective of this project is to investigate in detail the variability of emission lines in the spectra of active galactic nuclei. The observations are performed on the 2.6-m telescope with a CCD detector.

Project 4: ''Variability of active galactic nuclei in optical and infrared continuum.'' Investigators: Iraida Pronik, Nelly Merkulova, and Lubov Metik. The objective of the project is the detailed investigation of the continuum variability of active galactic nucei in time scales of hours, days, months, and years using tight series of the observations which have been carried out at the Crimean Observatory since 1989 using the 1.25-m telescope equipped with the UBVRI double- image chopping photometer-polarimeter.

Project 5: ''Study of selected blazars structure from photometry and polarimetry.'' Investigators: Yuri Yefimov and Nikolai Shakhovskoy. The main purpose of the project is to study the structure of some bright blazars using prolonged (several years) simultaneous photometric and polarimetric observations in optical regions from ultraviolet to near infrared. The observations are carried out with the 1.25-m tele-

scope equipped with UBVRI double-image chopping photopolarimeter.

Project 6: ''Seismology of the Sun and stars.'' Investigators: Valery Kotov, Teodor Tsap, and Vasily Haneychuk. The aim of this project is to improve our knowledge about the Solar interior, rotation, magnetic activity and cycle using the observations of the global Solar oscillations and mean magnetic field of the Sun obtained with the Solar Tower telescope.

Project 7: ''Solar and stellar activity.'' Investigators: Sergei Plachinda, Taisiya Tarasova, Ilya Alekseev, Olesya Kozlova, and Yury Tsap. The aim of the project is to study magnetohydrodinamical processes and magnetic activity on the Sun and on the main- and pre-main sequence cool and red stars. Investigations are based on the theoretical researches, numerical simulations, direct measurements of stellar magnetic fields, photometric and spectrophotometric observations, obtained with the use of the 2.6-m Shajn telescope equipped with Stokesmeter, and 1.25-m telescope equipped with a 5-channel, UBVRI photometer-polarimeter.

Project 8: ''Physical researches of Solar system small bodies.'' Investigators: Valentina Prokof'eva-Mikhailovskaja, Lyudmila Karachkina, and Valery Bochkov. The aim of this project is to broaden the knowledge on structures and surface characteristics of asteroids belonged to different spectral types and different asteroid's families. The 0.5 meter meniscus telescope coupled with the high sensitive digital television system is used for photometric and spectrophotometric observations of asteroids.

E.P.Pavlenko and S.V.Antipin (2002) presented the discovery and first investigation of the new red dwarf nova Var 73 Dra. The observed features (several normal outbursts detected with a recurrence time of about 7-8 days, one slightly brighter superoutburst with a ''plateau'' phase that lasted 13 days, and the presence of superhumps during this superoutburst with the period 0.0954 day) allows authors to classify Var 73 Dra as a new SU UMa-type dwarf nova within the well-known gap of orbital period distribution of cataclysmic variables.

YY Dra is found to be unique in showing decreased X-ray spin pulce amplitude close to outburst, rather than the large increase evident in the other intermediate polars (GK Per, XY Ari, and EX Hya). The differences in YY Dra are likely due to its unique geometry, with two relatively equal poles located near the white dwarf equator. E.P.Pavlenko participated in this investigation (Szkody *et al.*, 2002).

I.Alekseev and O.Kozlova (2002) described completely the photometric variability of the single active spotted star LQ Hya by a zonal spottedness model where starspots are localized at the low and middle latitudes. For the first time the broad-band linear polarization of the stellar light and its rotational modulation connected with the local magnetic fields on the stellar surface were found.

N.M.Shakhovskoy and his co-authors (A.V.Halevin, N.M. Shakhovskoy *et al.*, 2002) have detected variations of the shot noice decay time during the orbital period in the magnetic cataclysmic variable QQ Vul, which allow them to estimate the physical size of the accretted blobs.

The most prominent characteristics in the variability of OJ 287 is the continuous rotation of the polarization position angle in 1994-1996 with the mean rate about 4.92 deg/day. It is considered as direct evidence for helical magnetic field structure in the jet of OJ 287 (Efimov, Shakhovskoy *et al.*, 2002).

Sergeev S.G., Pronik V.I., Sergeeva E.A. and their co-authors (Sergeev *et al.*, 2002) supposed that the observed evolution of the Balmer line profiles in the Seyfert galaxy 3C 390.3 may be a result of the rotational redistribution of matter in a Keplerian disk and changes in the relative strength of an additional line component that dominates in the red central part of the profile. They conclude that the evolution of the broad-line profiles in 3C 390.3 in the context of the current models of the broad-line region remains unclear.

It was shown (N.Merkulova, 2002), that continuum variability of Seyfert 1 galaxies NGC 5548, NGC 4151, NGC 7469 and NGC 1275 (a BL Lac type object) may be a result of random processes at different timescales: a mixture of flicker noice and shot noice is attributed to variations on timescale of years; flares with different durations are observed on timescales of from days to hundred of days; intranight variations are mostly due to shot noice. The intranight variability is transient in character and manifests itself with different probabilities for different galaxies.

5. THE INI KAZAKHSTAN BRANCH

The Isaac Newton Institute opened its Branch in April 2000. The formal Agreement has been signed with Prof. Anatoliy Kurchakov, Director of the Fesenkov Astrophysical Institute of Kazakhstan.

The staff of the Isaac Newton Institute in Kazakhstan are: Gauhar Aimanova, Leonid Chechin, Edward Denissyuk, Sergey Efimov, Vladimir Kardopolov, Andrey Kharitonov, Ludmila Knyazeva, Ludmila Kondratyeva, Anatoliy Kurchakov, Tuken Omarov, Chingiz Omarov, Larisa Pavlova, Marina Rud, Lubov Shestakova, Vladimir Tereshchenko, Rashit Valiullin and Emmanuil Vilkoviskij. The Resident Director of the INI Branch is Anatoliy Kurchakov.

The beginning of the history of astronomy in Kazakhstan was connected with the such remarkable event as the Solar eclipse, that has taken place in September 21 of 1941. When the observations of the solar eclipse were completed, some astronomers from Moscow and Leningrad stayed in Alma-Ata and organized The Institute of Astronomy and Physics. Then, in 1950 the Astrophysical Institute was distinguished from as a self-maintained organization.

The actual staff of Institute consists of 122 members, 60 of them are scientific researches. The major activities are: physics of nebulae and star-forming regions, dynamics of gravity systems, absolute spectrophotometry of stars, study of active Galaxies, physics of the Moon and planets, Solar physics, the artificial Earth's satellites.

The Institute manages the following two observatories: (1) The Observatory (Almaty, Kamenskoe Plato) which possesses: - 70 cm telescope (Cassegrain), equipped with spectrograph for study of emission objects, such as galaxies with active nuclei, planetary nebulae, stars with emission spectra. - 60 cm telescope (Cassegrain) of ''Karl Zeiss'' enterprise. It is used for the study of planets. (2) Assy-Turgen Observatory

(Zailijskoe Ala-Tau, Assy-Turgen plato) possesses: - 1-m telescope of ''Karl Zeiss'' enterprise, which is in use since 1981; This instrument is equipped with electrophotometer for measurement of polarization of object's radiation, and a spectrograph for a study of nebulae and stars. It has as well a 1.5m telescope.

The main scientific achievements can be summarized as: The atlases of nebulae, which became the world standards; -The spectrophotometric catalogue contained the data on the energy distribution in the spectra of thousands of stars; -The spectral Catalogue of some dozens of Planetary Nebulae; -The discovery of some peculiar objects representing the transient stage between a star with extended atmosphere and a planetary nebula; -The multicolor photoelectric observations of more than twenty irregular stars; -The estimation of the formation epoch of the galactic clusters. The new method of structure dynamics based on the corresponding generalization of the Infeld's method in the common relativity; -Discovery of some moving features in spectra of some Seyfert galaxies; -The revealing of the altitude variations, dividing stratosphere aerosolize into layers, based on monitoring of atmosphere; -The large cycle of the searches on analysis of the zonal structure of Jupiter's cloudy cover.

6. THE INI KIEV BRANCH

The Isaac Newton Institute opened its Branch in August 2000. The formal Agreement has been signed with Prof. Peter Berczik, Deputy Director, Main Astronomical Observatory in Kiev of the National Academy of Sciences of Ukraine.

The staff of the Isaac Newton Institute in Kiev are: Peter Berczik, Yurij Fedorov, Victor Khalack, Pavel Korsun, Yurij Kyzyrov, Pavel Malovichko, Sergey Nosov, Yakiv Pavlenko, Boris Shakhov, Leonid Shulman and Boris Zhilyaev. The Resident Director of the INI Branch is Boris Zhilyaev.

The Main Astronomical Observatory (MAO) of the National Academy of Sciences of Ukraine came into being in 1944. The Observatory is situated 12 km from the centre of Kiev, in the Golosiiv forest. Since 1975 MAO is headed by Ya.S. Yatskiv, Member of the NAS of Ukraine. The departments of fundamental astrometry, photographic astrometry, solar physics, and astrophysics were organized in 1958. At present MAO includes the departments of astrometry, physics of stars and galaxies, cosmic geodynamic, cosmic plasma physics, physics of bodies of the solar system, solar physics, the department of experimental astrophysics and atmospheric optics, astrospace information and computing centre. The Observatory offers postgraduate studentship and has a special academic council for conferring candidate's and doctor's degrees in astronomy, astrophysics and engineering sciences. The Observatory Library contains some 66,000 printed books and journals. MAO has a publishing department, experimental designing subdivisions. etc. MAO publishes the journals Kinematics and Physics of Celestial Bodies and Space Science and Technology and the Astronomical Calendar.

In 1970-1991 the Astrophysical Observatory on Peak Terskol in the Northern Caucasus (altitude 3100 m, near mountain Elbrus) was constructed by MAO as its high-altitude observation station. At present this observatory is a joint venture of the NAS of Ukraine and the Russian Academy of Sciences. It forms part of the International Research Centre for Astronomy, Medicine and Ecology. This Centre is headed by Dr. V. Taradii. The equipment of the Terskol Station consists of the 2-meter Ritchey-Chretien telescope, the Zeiss-600 telescope and two solar telescopes.

7. THE INI MOSCOW BRANCH

The Isaac Newton Institute opened its Branch in Moscow in June 1992. The formal Agreement was signed with Prof. A.A. Boyarchuk, Director of the Institute of Astronomy of Russian Academy of Sciences and, at that time, the President of the IAU, and Prof. Anatoly Cherepashchuk, Director of the Sternberg Astronomical Institute of Lomonosov Moscow University.

The Institute of Astronomy was established as the Astronomical Council of the USSR Academy of Sciences on December 20, 1936. Originally, this organization had mainly coordination functions in the Soviet astronomy. After the 2nd World War, it started its own scientific research. Together with the Sternberg Institute, the Astronomical Council participated in the work on the General Catalogue of Variable Stars, on behalf of the IAU. The scientific activity of the Astronomical Council considerably expanded after the launch of the first Sputnik, the Council became responsible for observations of artificial satellites and their use for space geodesy, geodynamics, and geophysics. Besides, it was engaged in basic research in the fields of physics and evolution of stars, solar activity, physics of the Moon, stellar spectroscopy. In 1958, it established an observatory near Zvenigorod (Moscow Region). In December 1990, the Astronomical Council, already being in fact a scientific institute for many years, was formally reorganized into the Institute of Astronomy of the USSR Academy of Sciences (since 1991, the Institute of Astronomy of Russian Academy of Sciences).

The history of Sternberg Astronomical Institute begins as early as in 1831, when the Moscow University established an observatory in Presnya district of Moscow. The present name of the Institute is after P.K. Sternberg, Professor of Moscow University and Director of its observatory, an expert in photographic observations of the sky as well as in geodesy, and also an active participant of the 1917 revolutionary events in Russia. In 1931, three astronomical institutions of Moscow: Research Institute for Astronomy and Geodesy, State Astrophysical Institute, and the University Observatory merged to form Sternberg Astronomical Institute. This research institute is the base for astronomical education in the Moscow University. Its fields of research cover practically all fields of modern astronomy and astrophysics.

The staff of the Isaac Newton Institute Moscow Branch now includes Sergei Antipin, Leonid Berdnikov, Dmitry Bizyaev, Alexander Ipatov, Alexander Khoperskov, Sergei Lamzin, Oleg Malkov, Alexey Mironov, Anatoly Piskunov, Sergei Popov, Nikolai Samus, Sergei Shugarov, Olga Silchenko, Gregory Tsarevsky and Boris Yudin. The Resident Director of the INI Branch is Nikolai Samus.

In 2001–2002, Berdnikov was continuing photoelectric and CCD observations of Galactic Cepheids. Silchen- ko was

studying chemically distinct nuclei in disk galaxies on the base of observations with the Russia's 6-meter telescope (Special Astrophysical Observatory - SAO, Northern Caucasus). Samus was participating in spectroscopic studies of individual stars in globular clusters, in collaboration with the members of the Isaac Newton Institute SAO Branch. Ipatov, Mironov, Piskunov and Samus also continued reductions of CCD photometry in globular clusters.

After eight years of assessing and reducing data obtained at La Silla and Las Campanas by Alcaino and his collaborators, astronomers at the Russian Branch of the Instituto Isaac Newton have succesfully produced more than thirty papers, basically, on CCD photometry of stars in stellar clusters and also in the field of chemically decoupled nuclei of galaxies.

S.V. Antipin discovered a new cataclysmic variable, Var73 Dra, and photometrically studied it in detail, in cooperation with E.V. Pavlenko (Crimean Branch). The star belongs to SU UMa-type dwarf novae; the period of its superhumps, observed during superoutbursts, shows that the star is, beyond doubt, a new example of a dwarf nova with the orbital period in the well-known ''period gap'' of cataclysmic binary systems.

L.N. Berdnikov, together with D.G. Turner (Saint Mary's University, Canada), acquired (in 2001) a total of 2097 photometric observations in the BVIc system for 117 Cepheids located in the southern hemisphere. The main purpose of the photometry is to provide new epochs of maximum brightness for studying Cepheid period changes, as well as to establish current light elements for the Cepheids.

D. Bizyaev, together with S. Mitronova (Special Astrophysical Observatory, Russia), analyzed the vertical structure of edge-on galaxies using images of a large uniform sample of flat galaxies that have been taken during the 2MASS all-sky survey. They found a strong correlation between the central surface brightness and the ratio of the vertical scale height to the vertical scale length: the thinner the galaxy, the lower the central surface brightness of its disk.

S.Yu. Shugarov and B.F. Yudin, together with J. Mikolajewska (Copernicus Astronomical Center, Poland) and E.A. Kolotilov (Sternberg Astronomical Institute, Russia), presented and analyzed quiescent UBVRI light curves of the classical symbiotic binary YY Her. The secondary minimum was shown to be due to ellipsoidal variability of the red giant component. A self-consistent phenomenological model of YY Her was suggested.

O.K. Sil'chenko, with V.L. Afanasyev (Special Astrophysical Observatory, Russia), obtained new results on the chemically distinct galactic nuclei with the Multi-Pupil Field Spectrograph of the 6-m telescope. Circumnuclear stellar rings with high metallicity and young mean age of the stars were found in the lenticular galaxies NGC 4429 and NGC 7013. The chemically distinct resolved stellar core of the spiral NGC 5055 is shifted with respect to the galaxy's center; this ''lopsidedness'' is confirmed by an asymmetric kinematic picture. Together with V.L. Afanasyev and with V.H. Chavushyan and J.R. Valdes (Instituto Nacional de Astrofisica, Optica y Electronica, Mexico), she demonstrated that in two S0 galaxies, NGC 5574 and NGC 7457, not only the chemically distinct nuclei were young, 2 - 3 Gyr old, but the bulges were also significantly younger (5 - 7 Gyr) than commonly known for the bulges of S0s (10 - 15 Gyr).

8. THE INI ODESSA BRANCH

The Isaac Newton Institute opened its Branch in May 2000. The formal Agreement has been signed with Prof. Valentin Karetnikov, Director of the Astronomical Observatory of Odessa National University.

The staff of the Isaac Newton Institute in Odessa are: Sergey Andrievsky, Ivan Andronov, Kirill Antonyuk, Alexej Baklanov, Yuri Beletsky, Stanislav Belik, Vladimir Bezdenezhnyi, Osman Chahrukhanov, Nikolaj Chernykh, Irina Chernyshova, Lidia Chinarova, Nikolay Dorokhov, Tatyana Dorokhova, Irina Egorova, Anastasiya Gamarova, Lyudmila Glazunova, Vera Gopka, Nadiya Gorlova, Alexander Halevin, Sergey Kolesnikov, Sergey Korotin, Valery Kovtyukh, Larisa Kudashkina, Vladislava Marsakova, Tamara Mishenina, David Mkrtichian, Victor Nazarenko, Alexander Pikhun, Vasilij Rumyantsev, Leonid Shakun, Fedor Sirotkin, Sergey Udovichenko, Igor Usenko, and Alexander Yushchenko. The Resident Director of the INI Branch is Valery Kovtyukh.

Odessa is a rather large town (with more than one million citizens) situated on the Black Sea coast. Founded in the end of XVIII century Odessa is full of beautiful sights and cultural traditions. Many famous people lived there. Pushkin, Mendeleev, Mechnikov and Korolev are among them. Moreover Odessa is the hometown of one of the greatest astrophysicists of XX century - George Gamow.

Odessa Astronomical Observatory (OAO) was established on August 3, 1871 as a part of Novorossijsky (now- Odessa National) University. It was first headed by Prof. L.F. Berkevich, a distinguished specialist in celestial mechanics. An exceptional instrument was acquired to perform astrometrical observations - meridian circle by famous Repsold's company. Astrophysical research began in 1881 with the advent of a new director- astrophysicist Prof. A.K.Kononovich. Under his directorship, the OAO was turned into a truly research institution equipped with first-class instruments. A.K.Kononovich was one of the Russian pioneers in astrophysics. He conducted active research of Sun, photometry of Solar system small bodies, etc. Many of his students became well known scientists like A.P.Ganskij, A.S.Vasil'ev, R.Orbinskij, N.N.Donich and others. In 1912 a distiguished astronomer, later academic A.Ya.Orlov, initiated exploring an astro-geophysi- cal direction at OAO: tidal deformations of the Earth and gravimetry. At that same time monitoring of variable stars began (G.A. Lange, V.P. Zesessevitch, V.V. Sharonov). Prof. K.D. Pokrovsky, who came after A.Ya.Orlov, continued to expand the range of scientific research: comets, asteroids, double stars, photometry and spectroscopy of stars of different types were added to the list of activities of Odessa astronomers.

In 1945, a famous astronomer, talented organizer and popularisor of science, Prof. V.P.Zessevitch took the directors' chair. His primary interest lay in variable stars. He conducted more than 200,000 observations of variable stars of various types, published more than 600 papers and monographs. Just at the end of World War II the number of obser-

vatory staff was only 5 people, but steadily grew since 1950. OAO occupied one of the first places in the USSR in variable stars search as well as other fields. V.P.Zessevitch initiated construction of several field observational stations and later-mountain observatories on the Caucasus and Pamire. Systematic observations on the 7- camera astrograph began, and at present OAO possesses a unique collection of sky negatives. Hundreds of papers on variable stars were made using this material. In 1993 the staff of OAO grew up to 150 scientists, considerably increased the spectrum of scientific research: physics and evolution of stars, physics of small bodies of the Solar System, precise stellar photometry, etc.

Contacts with foreign colleagues are largely extended. International conferences are held each year: dedicated to variable stars and Gamow memorial conference. In 1999 an annual summer schools for young scientists started to operate. At present OAO is a modern research organization. Being involved in fruitful collaboration with Isaac Newton Institute of Chile Odessa Astronomical Observatory has significantly risen level of its scientific investigations in modern astrophysics.

The investigators incorporated to the Isaac Newton Branch are actively working in the following six fields of research:

Project 1: ''Periodic and Aperiodic processes in stars'': Investigators: Ivan Andronov, Larisa Kudashkina, Sergey Kolesnikov, Alexander Halevin, Vladislava Marsakova, Lidia Chinarova, and Kirill Antonyuk. The aim of the project is to elaborate additional criteria for classification of variable stars of different types-cataclysmic (highly magnetized, polars, intermediate polars, weakly magnetic positive and negative superhumpers, nova-likes) based on the polarimetric observations of these stars at a time resolution from seconds to years; long-periodic on time scales from months to decades; to elaborate corresponding mathematical methods. Multisite observational programs of polars. This group uses the observations of artificial satellites.

Project 2: ''Spectral investigations of different type stars'': Investigators: Sergey Andrievsky, Valery Kovtyukh, Tamara Mishenina, Sergey Korotin, Igor Usenko, Irina Chernyshova, Nadiya Gorlova, Yuri Beletsky, and Irina Egorova. The aim of the project is the investigations of chemical composition of stars of intermediate masses on different stages of evolution: cepheids, nonvariable supergiants and their ancestors, B-stars of the Main Sequence and also metal-poor stars, blue stragglers and lambda Bootis type stars. Methods: high dispersion spectral observations from western observatories and Russian 6 m telescope. LTE and non LTE analysis of chemical composition.

Project 3: ''Astroseismology of single and eclipsing binary stars'': Investigators: David Mkrtichian and Victor Nazarenko. Studies of pulsating roAp, lambda Boo, delta Scutti and eclipsing binary stars using the asteroseismic and numerical hydrodynamical methods. Asteroseismic methods are based on high-precision multisite photometry and high-resolution spectroscopic observations of roAp, lambda Boo and delta Scutti stars and also for precise determinations of mass transfer rates in eclipsing binaries. Hydrodynamical simulations of masstransfer in different binary systems is being used for quantitive study of morphology of gas streams and its observational manifestations.

Project 4: ''Heavy elements in Stellar Atmospheres'': Investigators: Alexander Yushchenko, Vera Gopka and David Mkrtichian. The main aim of this group are the investigations of abundances of heavy and superheavy elements in the atmospheres of stars of different types. Determinations of evolutionary stages and ages of these stars using cosmochronology. Investigations of chemical evolution of the Galaxy. Investigations of surface inhomogeneities in the atmospheres of B and A stars. Methods: High and superhigh resolution spectroscopy from UV to IR.

Project 5: ''Photometrical Investigations of Variable Stars'': Investigators: Sergey Udovichenko, Nikolay Dorokhov, Tatyana Dorokhova, Vladimir Bezdenezhnyi, and Alexander Yushchenko. The main aim of group is photometrical and spectral investigations of RR Lyraes, delta Scutti and other types of variable stars. Special attention will be devoted to RR Lyraes. Fourier analysis of photometric observations of RR Lyrae on the 15 years time interval perfomed in Odessa Observatory.

Project 6: ''Gravitational Lensing'': Investigators: Alexander Yushchenko, Nikolay Chernyh, Vasilij Rumyantsev, and Osman Chahrukhanov. The main aim of this group are the investigations of lensing properties of globular clusters. We predicted observational tests that can confirm the important role of lensing by globular clusters. It will help us to observe high-redshift objects with middle class telescopes, investigations of weak gravitational lensing by galaxies on the observation of quasi-stellar objects.

In a series of 3 papers, members of INI Odessa Branch Drs. S. Andrievsky, V. Kovtyukh and Yu. Beletsky have reported about the results of a high-accuracy study of the radial metallicity gradient based on the use of Cepheid stars.

Van den Bergh in 1958 was perhaps the first to provide a strong theoretical argument that a metallicity gradient should exist in the Galactic disc. During the following almost fifty years many observational studies were performed with the intent of determining the gradient. Astronomers have analyzed the spectra of B stars, late-type supergiants, old disk giants, and H II regions, frequently producing rather contradictory results. According to some authors, a quite steep present-day metallicity gradient exists in the disc (from -0.05 to -0.10 dex/kpc), but much lower gradient values have also been reported, and even no dependence of the abundances upon the galactocentric distances was found in several surveys.

Cepheids are stars with well-defined distances that can provide radial elemental distributions for chemical elements from carbon to gadolinium. According to these results, the elemental distributions display a complicated structure indicating that a single gradient value may be insufficient to represent the observational data over the large observed range of galactocentric distances. One of the prominent features of the radial distributions is the abrupt discontinuity in metallicity seen at Rg=10 kpc. All 25 stars with galactocentric distances from 10 kpc to 15 kpc are metal deficient with a mean [Fe/H]=-0.20.

These improved data on the metallicity distribution in the

Galactic disc over the galactocentric distance range 10-15 kpc support the existence of a discontinuity at Rg=10 kpc. Such a discontinuity could be a consequence of the specific initial conditions of the Galaxy formation (thick and thin disc separation), and might have survived over the long-term period if the mixing process smoothing the metallicity differences was not efficient in this particular region near Rg=10 kpc.

These new observations of metal-poor outer disc Cepheids will also be very useful in an investigation of the metallicity dependence between Cepheid absolute magnitudes and infrared surface brightnesses.

In the work Drs. S. Andrievsky, I. Chernyshova, S. Korotin and Yu. Beletsky the detailed elemental abundances were derived for twenty Lambda Boo stars. Aside from LTE abundances, for ten chemical elements (including C and O), the NLTE values for Na were determined. The group of this stars consists of non-magnetic, Population I, late B to early F-type dwarfs with a typical abundance pattern (Fe-peak elements being underabundant whereas C, N, O and S being almost solar abundant). Since classification resolution spectroscopy in the optical domain is not capable to determine the abundance of the light elements, a detailed abundance analysis is the ultimate test for the membership of an object to this group. Another important point is the detection of apparent spectroscopic binary systems in which two solar abundant object mimic one metal-weak star as proposed as a working hypothesis by Faraggiana and Bonifacio. One very important result is the apparent overabundances found for Na which can not be explained by accretion or mass-loss alone.

Drs. S. Andrievsky, I. Egorova and S. Korotin investigated the sodium enrichment of the supergiant atmospheres - one of the long-standing problem of the stellar astrophysics is linked with the sodium enrichment of the supergiant atmospheres. 70 supergiants and bright giants have been observed in order to investigate the sodium enrichment of their atmospheres and its connection with the stellar parameters.

Drs. A. Halevin, I. Andronov and S. Kolesnikov report the results of an investigation of unstable processes in the magnetic cataclysmic variable QQ Vul. The detected range of the short time-scale variations is likely caused by a sequence of different small flares, due to a non-coherence of this type variability. They report that there is practically no quasi-periodic variability in this system. Also they have detected variations of the shot noise decay time during the orbital period. Investigations of the shot noise decay time allow us to estimate the physical size of the accreted blobs.

9. THE INI PETERSBURG BRANCH

The Isaac Newton Institute opened its St. Petersburg Branch in September 2000. The formal Agreement has been signed with Prof. Veniamin Vityazev, Director of the Astronomical Institute of St.Petersburg State University in Russia. The staff members belong to all major astronomical centers in St.Petersburg, such as the Pulkovo Observatory and the Institute of Applied Astronomy.

The staff of the Isaac Newton Institute in St.Petersburg are: Ekaterina Aleshkina, Anisa Bajkova, Yurij Baryshev, Nina Beskrovnaya, Yulia Chernetenko, Alexander Gromov, Vladimir Hagen-Thorn, Vladimir Il'in, Vsevolod Ivanov, Tamara Ivanova, Alexander Kholtygin, Iraida Kozlova, Alexei Kritsuk, Valeri Larionov, Leonid Parfinenko, Elena Pitjeva, Mikhail Pogodin, Vladimir Reshetnikov, Yuriy Rusinov, Elena Skurikhina, Michail Sveshnikov, Olga Vasilkova, Nikolai Voshchinnikov, Eleonora Yagudina and Ruslan Yudin. The Resident Director of the INI Branch is Vladimir Reshetnikov.

The Astronomical Institute of Petersburg State University is one of the best known astronomical organizations in Russia. It was established in 1881 as Astronomical Observatory at the Chair of Astronomy of St. Petersburg University (the Chair was orgzanized in 1819). Since 1999 it is entitled as Sobolev Astronomical Institute. The staff of the Institute include about 60 scientists. The main fields of research are cosmology, observations of active galaxies and variable stars, physics and evolution of stars, solar physics, dynamics of gravity systems, celestial mechanics, astrometry, cosmic hydrodynamics, theory of radiation transfer, light scattering theory, astrospectroscopy and development of special astronomical software.

The Main Astronomical Observatory (Pulkovo Observatory) opened in 1839 was the first astronomical institution in Russia. For a long time, it was the principal observatory in Russia and USSR. The current staff of the observatory consist of 160 scientists. The research areas are radioastronomy, physics of galactic nuclei, X-ray sources and young stars, solar physics, solar-terrestrial relations, celestial mechanics and stellar dynamics, astrometry, geophysics, development of astronomical methods and construction of optical devices. The observatory also develops cosmic projects such as: ''Struve,'' ''Geobs'', ''Stereoscope''.

The Institute of Applied Astronomy was founded in 1987 due to the decree of the Academy of Science of USSR for realization of the biggest national astronomical project-establishment of the very long baseline radio interferometrical network ''QUASAR''. Over 130 scientists work in the Institute. Main field of research are in radioastronomy, relativistic celestial mechanics, radioastrometry, ephemerides astronomy, cosmic geodesy, geodynamics, development of astronomical software, data processing methods, creation of hardware for radioastronomy.

On the 13th of May 2002, supernova 2002cv was discovered using a near-infrared camera working at the AZT-24 1.1m telescope at Campo Imperatore, Italy (Di Paola *et al.* 2002). The preliminary results confirm a heavily obscured object with a V-K color not lower than 6 magnitudes, making SN 2002cv the most reddened supernova ever observed. The light curves analysis indicate that SN 2002cv observations are the earliest available for a type-Ia supernova at IR wavelengths.

Ikhsanov *et al.* (2002) have analysed possible sources of circularly polarized radiation from the unique close binary AE Aqr. It was found that the contribution of the white dwarf to the optical radiation of the system is too small. This indicates that the polarimetric data on AE Aqr cannot be used for the evaluation of the surface magnetic field strength of the white dwarf in this system. Ikhsanov & Beskrovnaya (2002) have discarded a possibility that the observed rapid break of

the white dwarf in AE Aqr can be due to the emission of gravitational waves.

Yudin & Evans (2002) presented broadband optical polarimetry of 3 RS CVn stars and 3 Mira variables, including the symbiotic star R Aqr, which contains a Mira component. Polarimetric variability has been studied on time-scales from hours to years. Combining original data with previously published ones, Yudin & Evans concluded that most of RS CVn-type and Mira Ceti-type objects show evidence of large polarimetric variability at wavelengths shorter than 0.5 mu m, whereas the level of polarization is more stable in the red. This behaviour is consistent with episodic mass ejection and formation of small dust particles in the circumstellar environment.

Reshetnikov *et al.* (2002) presented a statistical study of the presence of galaxy warps in the Hubble deep fields. The result is that warps were very frequent in the past, and they were of larger amplitude. This is easily interpreted in terms of higher galaxy interactions and matter accretion at redshift about 1.

An analysis is performed of polarimetric and photometric observations of BL Lac carried out in 1969-1991 at the Astronomical Institute of St.-Petersburg State University (Hagen-Thorn *et al.* 2002). The distribution of polarization directions certainly points to the existence of the preferred direction of polarization close to the direction of the jet observed by VLBI. High polarization degree and colorimetric data are evidence of the synchrotron nature of the variable source. There is an evidence for periodicity of the same period (308 days) for variations in both total flux and relative Stokes parameter in the second half of the data (1980-1991). This is the first time that the same periodic component - over more than 10 cycles - has been found in two observational sets obtained independently.

10. THE INI POLISH BRANCH

The Isaac Newton Institute opened its Branch in Poland in May 2001. The formal Agreement has been signed with Prof. Janusz Gil, Director of the Kepler Astronomical Center of Zielona Gora and Resident Director Prof. Andrzej Maciejewski in charge of inviting a group of selected astronomers from main Polish Astronomical Organizations. Among these centers are the Warsaw University Observatory, Nicolaus Copernicus Astronomical Centre, Turun Centre for Astronomy and Astronomical Units from Universities.

The staff of the Isaac Newton Institute in Poland are: Krzysztof Belczynski, Slawomir Breiter, Janusz Gil, Krzysztof Gozdriewski, Tomasz Kwiatkowski, David Khechinashvili, Jacek Kreiowski, Andrzej Maciejewski, George Melikidze, Maciej Mikolajewski, Michal Ostrowski, Krzysztof Rochowicz and Toma Tomov. The Resident Director of the INI Branch is Andrzej Maciejewski.

This Branch was established following the suggestion of Prof. Andrzej Maciejewski, in his position as Chair of the Department of Astronomy and Astrophysics of Torun Centre of Astronomy. This organization is a part of the Faculty of Physics and Astronomy of the Nicolaus Copernicus University, created in 1997 by a union of Torun Radio Astronomy Observatory and the Institute of Astronomy.

The Nicholas Copernicus University in Torun set up in 1945, is the biggest university in Northern Poland and outstanding in terms of scientific potential. Torun is one of the oldest and, in the past, one of the richest cities in Poland, lying on the river Vistula, about 200 km north-west of Warzaw.

11. THE INI PUSHCHINO BRANCH

The Isaac Newton Institute opened its Branch in Pushchino in May 2002. The formal Agreement was signed with Prof. R.D.Dagkesamanskii, Director of the Pushchino Radio Astronomy Observatory, Astro Space Center of the Lebedev Physical Institute of the Russian Academy of Sciences. Pushchino Radio Astronomy Observatory was established as the Radio Astronomy Station in 1956 and became one of the greatest radio astronomical centers in the world.

Three radio telescopes operate here up to now. The first of them RT-22, the parabolic reflector with its main dish of 22 m in diameter, was constructed in 1959 for investigations of the interstellar medium, planets, and discrete radio sources in the centimeter and millimeter ranges. The first line of excited hydrogen H90-alpha was discovered with this telescope in 1964.The second instrument DKR-1000, the meridian telescope consisting of 2 arms (East-West and North-South), began to operate in 1964. The main problems for this telescope were spectra of discrete sources and dynamics of the interplanetary plasma. Since 1968 many pulsars were observed by using DKR-1000. The third radio telescope BSA, the phased array comprising 16384 dipoles, was constructed in 1974 and was intended for investigations of pulsars at frequency 102.5 MHz. Since 1999 BSA operates at 111 MHz. This reconstruction was caused by strong interferences at 102 MHz. Several new pulsars were discovered with BSA, and more than 300 known pulsars were investigated by using this antenna. Moreover it gives the possibility to study the interplanetary and interstellar media, many distant galaxies and quasars and the structure of the Universe. BSA is the most sensitive telescope in the world in the meter wave range up to now.

The staff of the Isaac Newton Institute Pushchino Branch includes now Vadim Artyukh, Igor Chashey, Alexander Glushak, Vera Izvekova, Sergei Kutuzov, Arkady Kuzmin, Boris Losovsky, Valerij Malofeev, Igor Malov, Oleg Malov, Vladimir Potapov, Alexey Pynzar', Vladimir Shishov, Vladimir Shoutenkov, Grigori Smirnov, Tatiana Smirnova, Svetlana Souleimanova, and Sergei Tyulbashev. The Resident Director of the INI Branch is Igor Malov.

In 2002 Tyulbashev has investigated the structure of magnetic fields in active galactic nuclei at distances $>1kpc$ from a supermassive black hole. Shoutenkov took part in observations of total and polarized radio emission from 20 bared galaxies and in an analysis of obtained data.

The total and polarized radio continuum emission of 20 barred galaxies was observed with the Very Large Array at 3, 6, 18 and 22 cm and with the AustraliaTelescope Compact Array at 6 and 13 cm. Maps at 30'' angular resolution were obtained. Polarized emission was detected in 17 galaxies, and their large-scale regular magnetic field was investigated (V. Shoutenkov).

The structure of magnetic fields at distances $>1kpc$ from active galactic nuclei was analysed. Two models of fields ($\sim 10^{10}$ G and $\sim 10^4$ G) around a supermassive black hole were tested (S.Tyulbashev). Giant pulses were detected in the millisecond pulsar PSR B1937+21 (A.Kuzmin & B.Losovsky). The estimates of the turbulence outer scale in the inner regions of the solar wind and in the regions of heliocentric distances between 10 and 80 solar radii were obtained on the base of radio occultation data from GALILEO and ULYSSES spacecrafts (I.Chashey).

The correlation between the level of small-scale density fluctuations and the solar wind velocity found from interplanetary scintillation observations was analysed. It was shown that the constancy of the mass flux density took place in the solar wind but not the momentum flux density (I.Chashey).

The analysis of diffractive and refractive scintillations of pulsars showed that electron density fluctuations in the interstellar medium were described by the Kolmogorov spectrum with the turbulence outer scale L = 0.03 pc (T.Smirnova & Shishov).

The kinetic equation for the distribution function of relativistic electrons was solved taking into account their quasilinear interactions with waves and radiative processes. It was shown that particles of the primary beam emitted synchrotron radiation with the spectral index $ALPHA = 3/2$, and the spectrum of the secondary plasma consisted of two parts with $ALPHA1 = +1$ and $ALPHA2 = -0.5$. Such behaviour was similar to that observed in the spectrum of X-rays and optical emission of the pulsar PSR B0656+14 (I. Malov).

Four events of transitions from the normal mode to abnormal one were detected in the pulsar PSR B0329+54 at 111.4 MHz and were analysed in detail (S. Souleimanova).

Integrated profiles and polarization characteristics were obtained for a dozen of pulsars at frequencies 40, 60 and 103 MHz. These data were used to test some pulsar models (S. Souleimanova).

12. THE INI SAO BRANCH

The Isaac Newton Institute opened its Branch in May 2000. The formal Agreement has been signed with Prof. Yuri Balega, Director of the Special Astrophysical Observatory (SAO) in Russia.

The staff of the Isaac Newton Institute in SAO are: Irina Acharova, Mashhoor Al-wardat, Gregory Beskin, Tatyana Borkova, Alexander Burenkov, Victor Bychkov, Eugene Chentsov, Sergei Ermakov, Sergei Fabrika, Timur Fatkhullin, Yuri Glagolevskij, Gazinur Galazutdinov, Olga Galazutdinova, Valentina Klochkova, Alexei Kniazev, Victoria Komarova, Alexander Kopylov, Flera Kopylova, Vladimir Korchagin, Dimitry Makarov, Lidia Makarova, Vladimir Marsakov, Yuri Mishurov, Faig Musaev, Igor Naselsky, Natalia Orlova, Alexander Panferov, Inna Panferova, Vladimir Panchuk, Vladimir Plokhotnichenko, Eugene Pluzhnik, Alexander Pramsky, Simon Pustilnik, Iosif Romanyuk, Alla Shapovalova, Margarita Sharina, Yuri Shchekinov, Zalikha Shkhagosheva, Vladimir Sokolov, Nikolai Tikhonov, Andrei Ugryumov, Eduard Vorobyov and Maksim Yushkin. The Resident Director of the INI Branch is Zalikha Shkhagosheva.

The Special Astrophysical Observatory (SAO) was established in June 1966 as a research institute of the Department of General Physics and Astronomy of the USSR Academy of Science. The principal instruments of the Observatory are the optical telescope BTA (Big Telescope Azimuthal) with the 6 meter main mirror and the radio telescope RATAN-600 (Radio Telescope of the Academy of Science) with the ring multi-element antenna 600 meter in diameter. The observatory performs telescope observations under programs approved by the Allocation Committee and carries out its own fundamental research in the field of astrophysics.

At present SAO is the only Russian center for ground-based observations of the Universe. In Russia the observatory furnishes 80 percent of observational data in the field of optical and radio astronomy. The telescopes BTA and RATAN-600 have the common use status allowing a broad integration with the world astronomical community. Research activity in SAO is conducted by 110 researchers in 15 groups. The investigators incorporated to the Isaac Newton Branch are working in the following fields:

The Laboratory ''Structure'' performs the CCD photometry and the spectroscopic study of Blue Compact Galaxies (BCG) from the First Byurakan Survey. The main goal of the project is the investigation of the spatial distribution of low-mass galaxies and modeling of the formation of the large scale structure of the Universe. Many new emission-line and blue compact galaxies were discovered with the 6-m telescope.

The Stellar Spectroscopy Laboratory studies the chemical composition and the evolution of the stellar population in our Galaxy. The main attention is devoted to objects on the latest stages of stellar evolution.

The Gamma Burst Study Group performs the CCD photometry of optical afterglows of gamma ray bursts and their host galaxies using the standart Johnson photometric system. From the comparison of the spectral energy distribution in nearby galaxies and the observed afterglows photometry the researchers define probable types of parent galaxies.

Main aims of the Laboratory of Relativistic Astrophysics are focused on studying the energy transformation mechanisms taking place in strong gravitational and magnetic fields. These fields are assosiated with nonstationar processes in black holes, pulsars, white dwarfs and flashing stars.

The Laboratory of Large Scale Structure is mainly concentrated on the CCD photometry of nearby dwarf galaxies. From the study of their distances, kinematics and structure, the main characteristics of the Local Group of galaxies are derived.

The Laboratory of High Angular Resolution Methods performs the speckle interferometric study of binary and multiple stars with the diffraction-limited resolution of the 6-m telescope in the visible and in the infrared spectral region. Stellar fundamental parameters are derived for different types of stars from computed speckle interferometric orbits and magnitude differences. The main attention is given to stars at the lower end of the main sequence.

A. Kniazev, A.Pramsky, S.Pustilnik, and A.Ugryumov continued to work on the search for and study of extremely metal-deficient blue compact galaxies (BCGs), as the local

objects best approximating the properties of high-redshift young galaxies. In particular, in collaboration with the Hamburg Observatory, they prepared the first list of 46 strong-lined BCGs with determined on observations with the 6-m telescope oxygen abundance from the new project HSS-LM (Hamburg/SAO Survey for Low Metallicity BCGs).

V. Klochkova, M. Yushkin, V. Panchuk in collaboration with Miroshnichenko A.S., Bjorkman K.S.(Toledo, USA) studied the high-resolution 6-m telescope spectroscopic data for the proto-planetary nebula candidate IRAS01005+7910. For the first time a careful spectral line identification is carried out and a significant variability of the optical spectrum is detected. Both absorption and emission components are found for the Balmer lines, NaI resonance D1,D2 lines, HeI, and FeIII lines. The HeI line profiles vary from straight to inverse P Cyg-type on a timescale of days to months. The resonance NaI lines show 5 absorption components at a resolution of R=60000. Additionally, the NaI D2 line exhibits a variable emission component with a width comparable to that of the Balmer line emission components. The effective temperature about 21500 K, the metallicity [Fe/H]=-0.3, and the ratio $C/O>1$ were determined using the model atmospheres method within the LTE-approximation. Authors suggested that IRAS01005+7910 is a carbon-rich post-AGB star with a luminosity log(L/Lsun)=3.6 at a distance about 3 kpc.

M. Sharina and D. Makarov took part in study of structure and kinematics of the nearby groups of galaxies in the Local Volume (no more than 10 Mpc) carrying out under guidance of I.D.Karachentsev. In particular, they and coauthors derived accurate distances to 18 dwarf galaxies in the vicinity of the Local Group (LG), found the radius of the zero-velocity surface and total mass of the Local Group independently from the virial theorem.

M.Sharina and A. Burenkov in collaboration with O. Sil'chenko (SAI) presented the results of moderate resolution spectroscopy for a globular cluster in the M81 group dwarf spheroidal galaxy DDO78. The DDO78 globular cluster, 4 Milky Way globular clusters, spectroscopic and radial velocity standards were observed with the Long-slit spectrograph of the 6-m telescope. They derived age and metallicity for the globular cluster in DDO78, located at a distance of 3.7 Mpc.

L. Makarova and M. Sharina with collaborators derive quantitative star formation histories of the four tidal dwarf galaxies in the M81 group, HolmbergIX, BK3N, Arp-loop (A0952+69), and Garland, using Hubble Space Telescope/ Wide Field Planetary Camera 2 images in F606W and F814W obtained as part of a Snapshot survey of dwarf galaxies in the Local Universe. All the galaxies show evidence of continuous star formation between about 20 and 200 Myr ago with star formation rates . A possible scenario is that all four dwarf galaxies were formed from material in the metal-poor outer part of the giant spiral galaxy M81 after the tidal interaction between M81, M82, and NGC3077 about 200 Myr ago.

E. Pluzhnik, Z. Shkhagosheva and collaborators published the results of diffraction-limited optical speckle interferometry of 111 double and 10 triple systems performed with 6-m telescope. New companions were first resolved in 4 systems: HIP 5245, ADS 3179, Kui 99, and ADS 16138.

A. Kopylov and F. Kopylova have recently completed paper which present the results of a study of streaming motion of galaxy cluster around the Giant Void in the distribution of rich Abell clusters.

N. Tikhonov and O. Galazutdinova investigated the stars of the disks of two galaxies - IC1613 and NGC404 -to determine of the sizes of disks and metallicity of its stars and published the results. Finally, after 2 years SAO Branch of INI succefully produced nearly fifty papers.

13. THE INI TAJIKISTAN BRANCH

The Isaac Newton Institute opened its Branch in July 2000. The formal Agreement has been signed with Prof. Pulat Babadzhanov, Director of the Institute of Astrophysics of the Academy of Sciences of Tajikistan.

The staff of the INI Tajikistan Branch are: Obid Alimov, Pulat Babadzhanov, Khursand Ibadinov, Subhon Ibadov, Gulchehra Kokhirova, Natalia Konovalova, Nasridin Minikulov, Firouz Sakhibov and Fanisa Tupiyeva. The Resident Director of the INI Branch is Pulat Babadzhanov.

The modern astronomy in Tajikistan began in 1932 after the end of the work of Tajik-Pamir complex expedition (1928-1932) which appreciated rather favorable astroclimatic conditions and advantageous geographical location of Tajikistan. In 1932 a Tajik Astronomical Observatory (TAO) was organized in the outskirts of Dushanbe. The principal directions of scientific research for the Observatory, namely, meteors, comets, and variable stars, were chosen taking into account the geographical location and climatic conditions of Tajikistan. These direction, alongside with others, remain as the main to this day.

In 1958 on the base of the observatory, the Institute of Astrophysics of the Tajik Academy of Sciences was created. It consisted of three departments: Department of meteor astronomy, Deparment of comets, Department of variable stars. Afterwards the Department of theoretical astrophysics (1962), Laboratory of experimental astrophysics (1972), and Department of astrometry (1975) were created. For subsequent 30 years after the creation of the Institute, the following three of its modern observational bases were built:

1. In 1963-1971 the Gissar astronomical observatory (GissAO) was build at a distance 14 km south-west from Dushanbe. It domes houses: a 70-cm reflector supplied with electron-optical, electrophotometric and polarimetric receiving apparatus, intended for observations of variable stars and comets and a 40-cm Zeiss astrograph for observations of asteroids, comets and variable stars.

2. Sanglokh observatory, the construction of which was completed in 1980, is located in a south-east of Dushanbe at a distance of about 90 km. It was build at the top of Sanglokh Mountain, the astroclimatic conditions of which have been widely recognized with a Ritchey-Chretien 1-m telescope.

3. Pamir high-mountain observatory, the so-called ''Solar'' ground-based astronomical complex ''Pamir'' (situated at an altitude of 4350 m above sea levet and enjoing 250 clear nights per year). It is located in the Murgab district

(East Pamir) of the Gorno-Badakhshan Autonomous Region of Tajikistan. There a 70-cm telescope RT 700 (with Cassegrain optical system) and solar telescope are installed. Pamir observatory, with its unique astroclimate, is an excellent long-term site for astronomical submillimeter, IR and optical observations.

Nature of meteoroids and phenomena accompanying flight of these bodies in the Earth atmosphere, atmospheric trajectories, meteor radiation and ionization, heliocentric orbit of meteoroids, distribution of meteor matter in the near-Earth space and, at last, origin and evolution of meteoroid streams and meteor showers - all of these problems are the area of scientific interest of scientist of the Institute of astrophysics of the Tajik Academy of sciences.

Physics of comets is the other important direction of scientific research at the Institute of Astrophysics, Tajik Academy of Sciences. These researches covers all sections of cometary physics and an extensive observational and experimental material on comets is obtained there.

Observations of variable stars in Tajikistan have begun from the earliest days of the formation of the Astronomical Observatory in Dushanbe. A unique photo-archives, a ''Sky Survey'', consisting of almost 70.000 sky negatives is preserved. Based on this archive several novaes and more than 100 variables were discovered in T-associations, than Features of light curves, variability of period of variables of different types, and the oscillations in brightness of novae have been studied.

Theoretical investigations of the dynamical phenomenon of the collective gravitational interactions of stars in galaxies have been widely developed at the Institute. Investigation of star formation in galaxies have shown, that spiral waves of density in galaxies counted not only in the features of motion of stars and interstellar gas, but also in peculiarity of late star-formation processes.

14. THE INI UZBEKISTAN BRANCH

The Isaac Newton opened its Branch in August 2000. The formal Agreement has been signed with Prof. Shukhrat Ehgamberdiev, Director of the Ulugh Beg Astronomical Institute of the Uzbekistan Academy of Sciences.

The staff of this Branch is also composed by scientists of the Astronomy Department of the National University of Uzbekistan. The staff of the Isaac Newton Institute in Uzbekistan are: Abdikul Ashurov, Venera Batirshinova, Otabek Burkhonov, Shukhrat Ehgamberdiev, Manzura Eshankulova, Olga Ezhkova, Evelina Gaynulina, Konstantin Grankin, Alisher Hojaev, Mansur Ibrahimov, Sabit Ilyasov, Shukur Kholikov, Oleg Ladenkov, Stanislav Melnikov, Karomat Mirtadjieva, Muydinjon Muminov, Salakhutdin Nuritdinov, Israil Sattarov, Aleksander Serebryanskiy, Fazliddin Shamshiev, Chori Sherdanov, Yusuf Tillaev and Mamnun Zakirov. The Resident Director of the INI Branch is Salakhutdin Nuritdinov.

Ulugh Beg Astronomical Institute of the Uzbekistan Academy of Sciences (UBAI) is one of the oldest astronomical institutions of the Former Soviet Union. It was founded in 1873. The Central Asian area where Uzbekistan lies has absolute maximum of clear sky time for the whole Euroasian continent. This makes the area particularly important for optical astronomical observations. As a result of the site testing expeditions organized by UBAI and Sternberg Astronomical Institute (Moscow) at the early 70s Maidanak mountain (2700m) located 120 km south of the famous historical city of Samarkand was selected for an observatory. In August 1996 a seeing monitoring at Mt. Maidanak was started with Differential Image Motion Monitor of ESO, designed by M.Sarazin and used for Paranal and La Silla sites testing. After one year the results of the seeing measurements showed a very high quality seeing conditions at Mt. Maidanak.

The currently four main research groups are in the topics of: theoretical and observational research in galaxies, photometric observation of eclipsing binaries, observational studies of young stars, and the study of solar activities.

Project 1: ''Theoretical and observational research in galaxies'': Investigators: Salakhutdin Nuritdinov, Muydinjon Muminov, Karomat Mirtadjieva, Abdikul Ashurov, Evelina Gaynulina, and Venera Batirshinova. This group studies early evolution stages of spiral and other disk galaxies, gravitationally lensed quasars, as well as kinematics and photometry of open star clusters. Observations of gravitationally lensed quasars are carried out with 1.5 m telescope at the Maidanak Observatory using modern CCD-camera.

Project 2: ''Photometric observation of eclipsing binaries'': Investigators: Mamnun Zakirov, Alisher Hojaev and a number of post-graduate students. They observe and research young close binary systems in OB 96 associations and star forming regions, as well determinate physical parameters of components.

Project 3: ''Observational studies of young stars'': Investigators: Konstantin Grankin, Olga Ezhkova, Stanislav Melnikov, and Mansur Ibrahimov. The main aim of this group is observation of young stars in our Galaxy. The group created the most multicolor data base.

Project 4: ''The study of solar activities'': Investigators: Shukhat Ehgamberdiev, Israil Sattarov, Shukur Kholikov, Aleksander Serebryanskiy, Oleg Ladenkov, and Yusuf Tillaev. This group carries out observations in helioseismology in the frame of a number of International research programs and studies mechanisms of the solar activity. Besides interior structure of the Sun is also the aim of this group.

Several members of the Branch deliver lectures in the Astronomy Department of the National University of Uzbekistan.. The University was founded in 1918. The Astronomy Department of the University trains Bachelors, Masters, Post-graduates and Post-doctoral students. The scientific activity of the Department members are in the fields of : Fomation and evolution of Elliptical galaxies, Physics of Globular Clusters, Dynamics of Galaxy clusters, Physics of Quasars, and Close binary systems.

I.Sattarov, A. Pevtsov, A.Hojaev, Ch.T.Sherdonov (Ap.J. v. 564, N 2, part 1, p.1042, 2002) used the Yohkoh soft X-ray telescope (SXT) full-disk images made from 1993 to 2000, the National Solar Observatory (Kitt Peak) full-disk longitudinal magnetograms made between 1992 April and 2001 April and an automatic procedure to identify photospheric bipoles whose magnetic field strength is above 20 G, with a

pole size (cross-section) between 5″ and 55.2″, and with pole separation between 5.5″ and 48.3″ to study statistical properties of X-ray bright points (XBPs) and photospheric bipoles during the declining phase of solar cycle 22 and the rising phase of cycle 23. The XBP number follows well-known anti-cycle variation. The average number of XBPs (∼ 10 per disk image) remained approximately the same from 1993 to 1994. Beginning in 1995 it grew, reached a maximum around 1996 December (∼ 50 XBPs per image), and then dropped back to pre-1995 levels in 1998. By contrast, the average number of photospheric bipoles remained approximately the same (∼ 250 per disk image) between 1992 and 2001, despite sunspot activity changes from high (1992, cycle 22) to low (1996, solar minimum) and a return to high activity again in 2000 (solar maximum, cycle 23). Since authors expect that a fraction of photospheric bipoles associated with XBPs is independent of solar activity, this as a clear indication that the anti-cycle variation of XBP numbers is not real. Most likely, the variation in XBP numbers is the result of a change in the background brightness of the quiet-Sun corona, which is affected by the presence of active regions. On the other hand, annual latitudinal histograms of XBPs show an excess of coronal bright points at active region latitudes, contrary to the effect of changing background brightness. Photospheric bipoles show no enhancement of their distribution at active latitudes. The authors consider two alternative explanations for this inconsistency.

Miroshnichenko, A. S., Ezhkova, O. V. *et al.* (A&A, 383, 171, 2002)presented the results of optical and near-IR spectroscopic and broadband multicolour photometric observations of the emission-line star AS 381. Its properties were found to be similar to those of Be stars with warm dust, a group of galactic objects recently defined by Sheikina et al. The spectrum of AS 381 indicates the presence of both a hot (early B-type) and a cool (K-type) star in the system. A high interstellar reddening (AV ∼ 7 mag) suggests that it is located at a distance of ge 3 kpc, and the companions have luminosity types II or higher. The emission-line profiles indicate that the system is surrounded by a flattened circumstellar envelope, which is viewed close to pole-on. The hot companion is found to be ∼ 2 mag brighter in the V-band and more massive (20 Msun) than the cool one (∼7 Msun). The strong line emission and position of the companions in the H-R diagram indicate that the system is experiencing mass exchange. We suggest that AS 381 is the first B[e] supergiant binary discovered in the Milky Way. The IRIS network has been operated continuously since July 1st 1989 (Salabert, D, Ehgamberdiev, S., Kholikov, S. *et al.*, A&A, 390, 717, 2002). To date, it has acquired more than a complete solar cycle of full-disk helioseismic data which has been used to constrain the structure and rotation of the deep solar interior. However, the duty cycle of the network data has never reached initial expectations. To improve this situation, several cooperations have been developed with teams collecting observations with similar instruments. This paper demonstrates that the authors are able to merge data from these different instruments in a consistent manner resulting in a very significant improvement in network duty cycle over more than one solar cycle initiating what they call the IRIS++ network.

15. THE INI YUGOSLAVIA BRANCH

The Isaac Newton Institute opened its Branch in Yugoslavia in April 2002. The formal agreement has been signed with Prof. Milan S. Dimitrijevic Director of the Belgrade Astronomical Observatory.

The staff of the Isaac Newton Institute in Belgrade are: Edi Bon, Srdjan Z. Bukvic, Zorica Cvetkovic, Miodrag Dacic, Milan S. Dimitrijevic, Stevan I. Djenize, Gojko R. Djurasevic, Sanja R. Erkapic, Ljubinko M. Ignjatovic, Predrag Jovanovic, Aleksandar Dj. Kubicela, Anatolij A. Mihajlov, Vladimir Milosavljevic, Nenad Milovanovic, Slobodan Ninkovic, Dragomir Olevic, Luka Ch. Popovic, Srdjan S. Samurovic, Zoran Simic, Aleksandar Sreckovic, Natasa M. Stanic and Dragana Tankosic. The staff of the INI Branch in Yugoslavia includes representatives of Belgrade Astronomical Observatory, Faculty of Physics of the Belgrade University and Institute of Physics. The Resident Director of the Branch is Milan S. Dimitrijevic.

The principal astronomical institution in Serbia is the Belgrade Astronomical Observatory, one of the oldest scientific organizations and the unique autonomous astronomical institute in Yugoslavia. Its past development forms an important part of the history of science and culture in these regions. The decree of its founding conjointly with the Meteorological Observatory was signed on 20 March (7 April) 1887 by the Minister of Education and Church Affaires of Kingdom of Serbia Milan Kujundzic on the initiative of Milan Nedeljkovic (Belgrade 27. Sept. 1857 - Belgarde 27 Dec. 1950), a professor of the Grand School (Belgarde University). Nedeljkovic was appointed first director of the newly founded Observatory. He governed Observatory until 1924, with a small break when 1899-1900 Director was Djordje Stanojevic (Negotin, 7 April 1858 - Paris 24 Dec. 1921), the first Serbian astrophysicist, later on the rector of Belgrade University. Dj. Stanojevic was a great popularizer of astronomy and science in general; he was the driving force in the introduction of electrical light in Belgrade and other cities in Serbia, the builder of the first hydro-electric power station in Serbia, a pioneer of industry of refrigerating appliances, the initiator of setting up a committee for cooling problems and of forming an international organization for cooling technique in Paris in 1903. He was also the pioneer of the color photogaphy in Serbia.

Apart from its importance for astronomy and meteorology, the Belgrade Astronomical Observatory was a cradle of the seismic and geomagnetic researches in Serbia. The instruments procured by Nedeljkovic from the Great war reparations, constitute still practically the only observing basis of the Observatory. Currently mounted in appropriate pavilions are the following instruments: 1. Large Refractor - ZEISS 650/10550mm equatorial; 2. Solar spectrograph (monochromatic) LITTROW, 9000 mm/100.000 developed by adapting to the ZEISS 200/3020 mm equatorial two astrocameras TESSAR and PETZVAL 160/800 mm; 3. Large Transit Instrument ASKANIA 190/2578 mm; 4. Large Vertical Circle ASKANIA 190/2578 mm; 5. Astrograph ZEISS 160/800

mm; 6. Photovisual Refractor ZEISS 135/1000 mm and 125/1000 mm; 7. Transit Instrument BAMBERG 100/1000 mm and 8. Zenith-telescope ASKANIA 110/1287 mm.

At present, there are 42 employees at the Observatory 32 of them are astronomers. The Observatory is divided in Department of Astrophysics, Department for Dynamical Astronomy, Department for Astrometry, and Time keeping and geographic coordinates determination service. Scientific activity on Observatory is organized in 9 projects:

1. Influence of collisional processes on astrophysical plasma lineshapes (principal invesigator Milan S. Dimitrijevic);
2. Solar Spectral irradiance variability (Istvan Vince);
3. Inverse problems in astrophysics: Doppler tomography (Slobodan Jankov);
4. Stellar physics (Gojko Djurasevic);
5. Astrophysical spectroscopy of extragalactic objects (Luka Ch. Popovic);
6. Position and motion of minor bodies of the Solar system (Zoran Knezevic);
7. Investigations of double and multiple stars (Georgije Popovic);
8. Structure, kinematics and dynamics of the Milky Way (Slobodan Ninkovic);
9. History of astronomy among Serbs (Slobodan Ninkovic)

Serbian Astronomical Journal publishing by the Belgrade Astronomical Observatory and Department of Astronomy of the Faculty of Mathematics of the Belgrade University is available on www through the Astrophysical Data System (ADS), thanks to the courtesy of the System's holders. The www address is: http://adswww.harvard.edu.BOBeo. During 1999, the web site of the Belgrade astronomical observatory has been made and the corresponding www address is: http://www.aob.bg.ac.yu. Moreover the database BELDATA has started to develop and it is available through internet with the address: http://www.aob.bg.ac.yu/BELDATA. The INI Yugoslavia Branch has as well the internet address: http://www.aob.bg.ac.yu.

In the course of its history the Belgrade Astronomical Observatory grew to an institution of great importance in the history of science and culture of the Serbian people, not only in the field of astronomy but also in meteorology, seismology and geomagnetics. Linked to this institution are the names of the famous personalities in the history of science who contributed to the Observatory, and the scientific achievements of Serbian astronomers in general, having earned esteem in the international scientific community as well as to the young having a good perspective, in our country too, in engaging in this beautiful and challenging science, in an ambience enabling them to achieve results of the highest value. Luka C. Popovic, Aleksandar Kubicela and Predrag Jovanovic have studied the Balmer line shapes of NGC 3516 in order to find the structure of central Emission Line Region (ELR) and physical parameters of emitting plasma. The shapes of these broad emission lines show evidences of a multicomponent origin and also features which could be identified as the peaks of a rotating disc. They have proposed a two component Broad Line Region (BLR) model consisting of an inner Keplerian relativistic disc and an outer structure surrounding the disc which is composed of Broad Line and Narrow Line Regions (BLR and NLR). They adopted the value of 40 millions solar masses for the central object and found that the emitting disc is located from 0.004 pc to 0.018 pc. Using a well known method for laboratory plasma diagnostic, the Boltzmann plot, they estimated the electron temperature and electron density of the disc and the surrounding region.

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