CHRONICLE

In April and November 1998 two conferences of 6 m telescope users attended by over 80 astronomers of Russia and the CIS countries were held.

The programmes of the two conferences and the abstracts of most of the reports are given below.

CONFERENCE OF 6 m TELESCOPE USERS
April 21, 1998, MAO RAS, St.Petersburg

PROGRAMME

1. **Director's report**

Yu.Yu.Balega (SAO RAS)
The 6 m telescope in the second half of 1997

2. **Scientific reports**

Yu. N. Gnedin (MAO RAS)
6mTPC and International Scientific Community

Yu. N. Parijskij (SAO RAS)
Search for primeval galaxies

A. A. Kiselev (MAO RAS)
New proposal for the BTA

3. **Accounts of applicants for observing time**

V. L. Afanasiev
Kinematics and morphology of circumnuclear regions of Seyfert galaxies

Yu. I. Glushkov (SAI, MSU)
Star formation regions

O. P. Bykov (MAO RAS)
Kuiper belt objects

Yu. Yu. Balega

The 6 m telescope in the second half of 1997

BTA observing time

Record of BTA observational time is kept in two ways: 1) the Telescope Maintenance Service (MS) registeres the total telescope operation time with the dome slit open; 2) the observers keep a record of the time a research programme is carried out (this is described in detail in Bulletin of SAO, v.44, p.135). The observational time distribution for 1997 is given in Table 1 and Fig. 1.

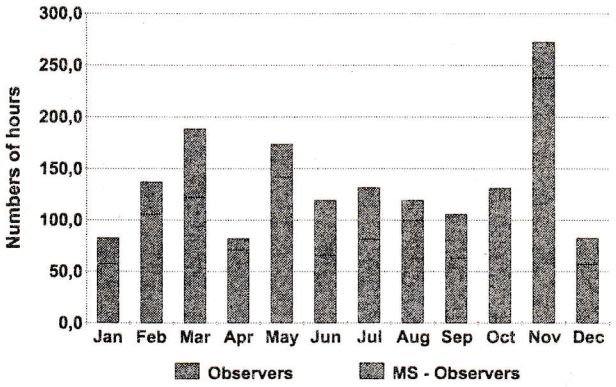

Figure 1: *Observational time at BTA in 1997.*

Table 1: *Observational time at BTA in 1997 (hours)*

1997	BTA MS data	Observers' data	Difference	%
Jan	82.5	57.5	25.0	70
Feb	137.0	105.5	31.5	77
Mar	188.5	122.0	66.5	65
Apr	82.0	71.0	11.0	87
May	173.5	142.0	31.5	82
Jun	119.0	66.0	53.0	55
Jul	131.5	81.5	50.0	62
Aug	119.0	100.0	19.0	84
Sep	105.5	63.0	42.5	60
Oct	131.0	78.5	52.5	60
Nov	272.5	238.0	34.5	87
Dec	82.5	57.0	25.5	69
Total	1624.5	1182.0	442.5	73

Telescope and equipment

In the updating of the BTA automatic control system (ACS) the following work was done in 1997: the control computer based on SM-2M was replaced by a commercial personal computer; the position of the telescope focus was digitized and entered into the computer; the sensors of the prime focus turn-table were updated.

In 1997 the oil supply system was in the state of modification. The Z-axis oil supply unit was withdrawn from the support of the telescope, which made possible forced cooling of the oil to ambient temperature and diminished vibrations of the telescope to 0.″2.

The fiber optics lines that connect the facilities of the telescope foci with the operation rooms will essentially speed up the transmission of data in the acquisition systems.

New observational techniques at BTA

A new prime focus speckle interferometer based on a fast Kodak 1280 × 1024 CCD was devised. The completion of the optical-mechanical work made it possible to approach quite closely to the creation of an echelle spectrometer with a large collimated beam diameter for the Nasmyth-2 focus.

In 1997 a new multipupil integral spectrophotometer whose slit is formed by means of a fiber-optics block was created. In order to make the best use of the device, a new CCD system was established on the basis of the detector TK 1024.

Observational programmes

68 time requests were submitted to the 6 m Telescope Programme Committee (6mTPC), 41 of which were granted.

The following programmes were accomplished to the best advantage in the second half of 1997: O. K. Sil'chenko (SAI) — "Decoupled nuclei of galaxies", D. I. Makarov (SAO) — "The amplitude of rotation of galaxies", G. Hasinger (Germany) — "AGN candidates from the ROSAT list", V. A. Hagen-Thorn (St.Pb.) — "Galaxies with polar rings", V. V. Sokolov (SAO) — "Optical identification of gamma-bursters", A. F. Kholtygin (St.Pb) — "Variability of hot stars", Yu. I. Glushkov (SAI) — "Investigation of star formation regions".

Time allocation in 1995–1997 (925 nights):

SAO RAS	—	41.1 %
Russia (without SAO)	—	21.2 %
Former USSR states	—	10.2 %
Other countries	—	27.5 %

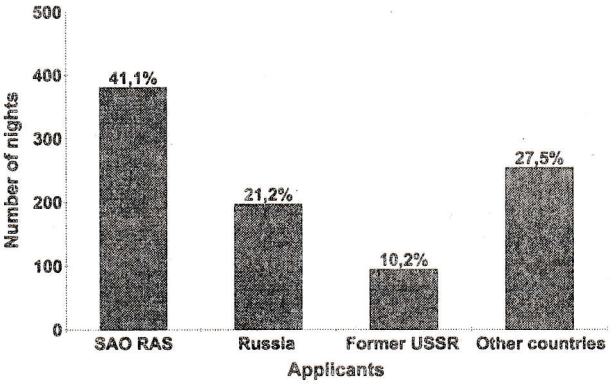

Figure 2: *Time allocation in 1995–1997 (925 nights).*

The top-ten list of applicants for the period of 1995–1997 (the number of nights granted) is as follows:

D.A. Varshalovich (FTI, St.Pb.)	—	47
Yu.N. Parijskij (SAO)	—	43
Yu.V. Glagolevskij (SAO)	—	33
G. Weigelt (MPI Radioastron.Bonn)	—	32
V.E. Panchuk (SAO)	—	31
G. Hasinger (Potsdam)	—	25
S.N. Fabrika (SAO)	—	24
V.A. Hagen-Thorn (SPb.Univ.)	—	22
I.D. Karachentsev (SAO)	—	20
O.K. Sil'chenko (SAI)	—	20

Achievements of fundamental importance for the year 1997

1. The most detailed light curve of an optical star-like source correspondin to the gamma burst of May 8, 1997 was derived using the 6 m telescope CCD data. The new observational facts affect considerably the present-day knowledge of physical nature of gamma bursts.

2. Using the BTA data, optical radiation variations of the X-ray and gamma pulsar GEMINGA — the faintest of all the known optical pulsars — were first revealed.

Yu. N. Gnedin

The 6 m telescope and the International Scientific Community

This communication is to list in brief the principal results of the 6 m telescope observational programmes which had considerable appeal to our foreign colleagues during my talk at a traditional seminar at the Princeton Institute for Advanced Study, USA (Director Prof. D. Bahcall).

This is primarily the programme for investigation of absorption spectra of quasars to check possible variation of fundamental physical constants in the course of evolution (the programme of D.A. Varshalovich and V.E. Panchuk). The goal of this programme is to obtain the most reliable (currently) upper limits to the velocity of possible cosmological variation of the fine structure constant and of the electron–to–proton mass ratio.

Another scientific result of world-wide significance is the most reliable optical identification of the gamma burst of May 8, 1997 and the confirmation of its cosmological nature, which was obtained in the course of four-band photometric monitoring of the optical echo resulting from the event.

Now I will report a short list of other programmes that attracted the greatest interest of the seminar participants.

1. Speckle interferometry of stars and galaxies at the BTA (Yu.Yu. Balega).

2. Study of chemically peculiar galactic nuclei (O.K. Sil'chenko).

3. Stellar magnetism investigation (Yu.V. Glagolevskij, I.I. Romanyuk, V.D. Bychkov, S.N. Fabrika).

4. Determination of distances to nearby dwarf galaxies (I.D. Karachentsev).

5. Two-dimensional spectrophotometry of extended extragalactic objects (V.L. Afanasiev, S.N. Dodonov).

From the latest work performed at the BTA one should mention Russia's first observations of the Kuiper belt objects (K.L. Maslennikov), as well as the simultaneous polarimetric observations of SS 433 carried out in co-operation with the team of observers of the Hubble Space Telescope (HST). This work resulted in detection of a surprisingly abrupt increase in the degree of SS 433 linear polarization in the UV part of the spectrum. One of the HST observers-in-chief, prof. D. Dolan, cited this work as a model of possible future co-operation between the BTA and HST observers.

A.A. Kiselev

New proposal for the BTA

Observation of binary stars is one of the traditional directions of astronomical research at Pulkovo, which was initiated by V.Ya. Struve over 150 years ago. After World War II D.N. Deich resumed the observations of binaries using photographic technique. To serve the objective, a 26-inch Zeiss reflector having a focal length of 10.4 m was employed. The aim of investigation is the determination of orbits, parallaxes and masses of stars in the vicinity of the Sun, including stars with invisible companions of substellar mass. The method of investigation, which is a method of apparent motion parameters (AMP) developed at Pulkovo, determines the orbit of a binary star from high-precision positional observations of the short arc, provided that these observations are supplemented with the data on the relative radial velocity of the binary star and its trigonometric parallax.

This technique determines orbits of binary stars with an orbital period of more than 1000 years on the basis of series of positional observations for about 30–40 years. By the present time about 1500 plates have been taken with the 26-inch refractor in the course of the binary-star investigation programme. The method of AMP was employed to determine 16 orbits of visual binaries, to study 5 stars with invisible companions.

The radial velocities of the components of bright binary stars (m<7.0) were measured with the BTA at the SAO (supervision by E.L. Chentsov, device — MSS-2), those of the components of fainter stars (m<9.0) were estimated by A.A. Tokovinin in the Crimea, using his apparatus RVM (radial velocity meter). In both cases, an accuracy of relative radial velocity measurements, $\pm(0.1$–$0.2)$ km/s, necessary to determine the orbits, was achieved.

At present, photographic observations of binary stars are added by CCD observations with the 26-inch telescope, which were organized in 1995. The programme of observing visual binaries has considerably extended through inclusion of fainter (to 15^m) and closer (to $1''$) binaries. For the latter the CCD observations turned out to be quite effective, while the photographic observations were completely impossible. By the present time series of CCD observations have already been accumulated for faint (up to 12^m) and close ($1'' - 3''$) visual binaries whose orbits can be found by the AMP technique, provided that relative radial velocity measurements of the components are added to the data obtained. (The parallaxes of these stars have been determined by *Hipparcos*). The new technique for radial velocity observations seems to be capable of doing this. In connection with this we applied to the 6mTPC with a request to allocate a desired time to measure the radial velocities of several (up to 10) close and faint visual binaries. An official proposal will have been submitted to the 6mTPC by September 1998.

Yu.I. Glushkov

Investigation of star formation regions

The programme of observations at the BTA had two directions: 1) investigation into the structure of star formation regions; 2) spectral classification of stars in star formation regions. The objective of the programme is to study the fine structure of star forma-

tion regions, reveal the character of interaction of ionized gas with clouds and the stellar population of a nebula. Principal results are as follows. In NGC 6618, regions of the nebula ($5'' - 15''$ in size) with very high ionization, which is more likely to be typical of planetary nebulae than of star formation regions, have been detected. These regions are observed near the centres of radio radiation (in the optical range only faint patches of low luminosity are visible) at the border with a cloud where the ultracompact H II region is located. From examination of spectra of $15^m - 16^m$ stars in the regions of enhanced ionization, two centres of secondary star formation have been revealed in the nebulae S 152 and NGC 7538, the main exciting stars of which are by 3–4 magnitudes brighter. Except for our 6 m telescope observations, the spectra of stars fainter than 13^m in compact H II regions have not been obtained anywhere.