The Hartmann constant for the principal mirror is 0.13, thus evidencing its good quality. At the present time two projects are being carried out with the telescope:

1. Investigation of magnetic stars.
2. Investigation of young nonstationary stars.

These two projects will continue to 1975. They have been considered and approved by the Council on the Coordination of the Operation of large Instruments of the Astronomic Council of the USSR Academy of Sciences.

These tasks will be carried out in collaboration with the German Academy of Sciences (East Germany), the principal astronomic observatory of the USSR Academy of Sciences, and the Astronomic Council of the USSR Academy of Sciences.

By now, approximately 800 observations have been carried out with the telescope both by our own staff members as well as by scientists of other soviet and foreign astronomic institutions.

The most important results, in our opinion, were obtained by the members of the ShAO of the Azerbaĭdzhan Academy of Sciences, namely:

Observation of planets. 1) Emission bands were observed on the night side of Venus, and were identified with $CO_2$, molecular nitrogen, $N_2$, and CN. These bands were previously observed by N. A. Kozyrev and identified as bands of $N_2$. 2) Absorption bands were observed in the Saturn ring, and are apparently due to water vapor. There are also several absorption bands whose identification is not yet complete.

Study of tight binary and other stars. The following were determined: a) the influence of the gas flow on the spectrum of the entire system; b) the influence of the possible physical variability of the component on the evolution of such systems; c) the presence of asymmetry of the contours of the hydrogen lines in the spectrum of RY Lac, obtained in the elongations.

Observations were made of novas in the constellations Delphinus and Vulpecula and the following was observed: a) second and third flashes of N Delphini; b) complex splitting of the lines, certain features of which were not previously noted; c) rapid variation of the ray velocities of the components; d) doubling of the absorption lines in the Velpicula nova.

The main results of the spectrophotometric investigation of magnetic and young nonstationary stars are as follows:

1) A rapid variation of the excess ultraviolet radiation and of the intensity of the emission lines 46686 He II, 4363 [OIII], and 4340 H were observed in the star AG Pegasi.

On one spectrogram, the hydrogen lines were split into two components of emission with absorption in the center, probably indicating that the star had an envelope at that instant.

It is interesting to note that six days prior to the observation of the envelope (20–26 October 1967), several emission components were observed in the hydrogen lines in the spectrum of AG Pegasi, with velocities from +530 to −600 km/sec.

2) As a result of the study of stars of the type T-Tauri, which started in before the installation of the 2-m telescope, motion of matter in the star RY Tauri was observed, with velocities exceeding 800 km/sec. Three stars were then investigated: RW Aurigae, RY Tauri, and CW Orionis. These investigations were continued with the 2-m telescope.

The results of the investigations, briefly, are as follows:

a) The previous conclusion that there is an inverse correlation between the changes of the brilliance and the intensity of the excess short-wave radiation was confirmed.

b) All the physical characteristics of the stars, which can be determined, vary in time, and these changes occur in random fashion.

c) Since 1964, an envelope has been produced in the star RW Aurigae; this envelope is sufficiently dense, with $n_e \approx 10^{10}$. Such a rapid formation of such an envelope indicates the presence of violent processes on the surface of the star.

d) These processes apparently continue even now, since the spectrograms obtained in 1969 reveal rapid changes of the contours, manifest in the vanishing of emission components in the hydrogen lines.

e) These data possibly confirm the recently advanced hypothesis that stars of the T-Tauri type presently undergo planet-formation processes.

The initiated investigations are continuing in the following directions:

1. In cooperation with other stellar telescopes of the observatory, and also with the colleagues from East Germany, comprehensive observations of nonstationary and magnetic stars are being carried out, namely simultaneous spectral, electrophotometric (in the UBV system, and subsequently in the color system), and polarometric observations.
2. Searches for new means and apparatus for high-accuracy measurement of the magnetic fields of stars.
3. Attempts to determine the evolution sequence of young non-stationary stars.
4. Development of a slitless quartz spectrograph for the primary focus, and its use for the investigation of weak nonstationary objects.

R. É. Guseĭnov. Dynamic Processes Leading to Generation of Coronal Formations.

At the present time the most likely mechanism for the generation of protuberances is assumed to be the mechanism of condensation of coronal gas by cooling via thermal conductivity and radiation, with allowance for the decrease of the thermal conductivity in a magnetic field.

We have studied this process comprehensively, applying the indicated mechanism to the generation of coronal formation, including coronal flares. On the basis of extensive observation material, obtained by many authors, we started from the following concepts:

1) The coronal flares and active protuberances are produced in coronal condensations. The process of generation of these formations is due to the flare-active groups of sun spots, the magnetic-field changes and motions of which serve as an external factor, and the instability of the condensation itself serves as an internal factor.

2) Quiescent protuberances are produced outside the coronal condensations, but above the active region, where the corona has a density higher than in the remaining unperturbed regions, but has approximately the same temperature; the process of formation of quiescent protuberances is due to local magnetic fields in periods in which the spot-forming and flare activities have essentially ceased, and the magnetic field has greatly weakened.

We have shown that the formation of condensations in the corona cannot be explained by the hitherto employed method. It turns out that this method, first, cannot lead to cooling, since the stage of compression at a temperature lower than the surrounding temperature should be accompanied by heat related from the corona; second, in such a case it is difficult to explain the features of the magnetic field responsible for the compression, but such a field should first increase and then decrease, at a rather rapid rate.

So far, no one has considered the cause of the compression. Inasmuch as such a compression can be due only to magnetic forces, we started the solution of the problem primarily with a perfectly feasible character of the variation of the general local magnetic field in the corona. Then the solution of the energy-balance equation

$$\frac{3}{2}k\frac{dT}{dt}=kT_0\alpha(1+\alpha t)^{-1/3}-\left\{\frac{2\cdot10^{-6}}{n_0l^2}T_0^{7/2}(1+\alpha t)^{2/3}[(1+\alpha t)^{2/3}-1]\right.$$
$$+n_0(1+\alpha t)[4{,}8\cdot10^{-28}T_0^{1/2}(1+\alpha t)^{1/3}$$
$$\left.+C(T)T_0^{-1/2}(1+\alpha t)^{-1/3}+3\cdot10^{-21}T_0^{-1/2}(1+\alpha t)^{-1/3}+7{,}5\cdot10^{-25}]\right\} \quad (1)$$

should be obtained subject to certain initial conditions. Such repetitions of the solution physically denote repetition of the compression process that ensures the aforementioned possible behavior of the magnetic field responsible for the compression and cooling of the gas in the force tube. The initial conditions are the temperature $T_0$ and the density $n_0$, which correspond during the first stage of the solution of (1) to the conditions in the region of the corona where the compression begins; in the succeeding compression stages, the initial conditions correspond to the conditions inside the compressing force tube at the instant of the repetition of the compression; $l$ is the length of the tube and is specified. Also specified is the parameter $\alpha$, which characterizes the weight of compression, and consequently determines, in a certain sense, the character of variation of the intensity of the magnetic field. $C(T) = 5.2 \times 10^{-22}$ at $T = 7 \times 10^{5\circ}K$ and $C(T) = 9.25 \times 10^{-22}$ at $T = 2.5 \times 10^{6\circ}K$.

By repeated numerical integration of Eq. (1), we obtained T(t) and, knowing that $n(t) = n_0(1 + \alpha t)$, we determined the field H(t), which has singularities that are superimposed on the field and ensure the compression and cooling of the coronal gas, i.e., the generation of the corresponding coronal formation.

Further development of the coronal formation will depend on the internal magnetic field which, on the one hand, prevents heating, and on the other hand, with allowance for the internal and external factors, ensures development of the phenomena in the formations.

**G. I. Abbasov.** Use of Electronic Digital Computers for the Reduction of Spectrograms.

As is well known, the reduction of spectrograms is a very laborious, tedious, and time consuming process. It is possible to automatize this process completely by using modern electronic digital computers.

The main problems of automatization of spectrogram reductions are the determination of the wavelengths, of the equivalent widths, of the parameters of the spectral-line contours.

To determine the wavelengths of the spectral lines, the computer plots the dispersions on the basis of the initial lines and determines the wavelengths of the emitted lines from their previously measured positions of the spectrogram. The accuracy of the results satisfies the requirements of most astrophysical problems. Simultaneously with the wavelengths, one determines the values of the dispersions corresponding to locations of the investigated lines, which are then punched out on tape[1]. The latter is used to determine the equivalent widths of the investigated lines.

To determine the equivalent widths $W_\lambda$ of the investigated lines, the analog quantities such as the characteristic curve of the photographic plate and the plot of the spectrum in terms of photographic density are transformed by means of an analog-code converter and introduced into the computer. The latter finds the intensities corresponding to all the discrete points of the line contour. We note that the intensities in discrete form and in analog form are of interest also for certain other problems. The obtained discrete values of the intensities are therefore transformed by a code-diagram converter, and an analog plot in terms of intensities is obtained.

Once the discrete values of the intensities are obtained, the computer determines the section of the continuous spectrum (corresponding to the given contour) from the remote wings of the line by the method of least squares and quadratic interpolation. The discrete values of the residual intensities are then obtained, and are printed and are produced in parallel in the form of punched tape to obtain the line contour by means of the code-diagram converter. $W_\lambda$ is then determined from the formula

$$W_\lambda = S\, d\lambda/dx, \quad (1)$$

where S is the area of the contour and $d\lambda/dx$ is the linear dispersion[2]. In addition to $W_\lambda$, one determines the half-widths $l$ and the central depths $R_{max}$ of the lines.

The accuracy with which $W_\lambda$ is determined is ~10% for weak lines and 5% for strong ones. The accuracy of $l$ is ~14% and 5% for weak and strong lines, respectively, and that of $R_{max}$ is 7% and 2.5% for weak and strong lines, respectively.

The Minsk-22 computer was used, and the analog-code and code-analog converters were developed at the Azizbekov Institute of Petroleum Chemistry and have an accuracy of 1%.

The initial materials used were the spectra obtained by S. M. Azimov with ShAO two-meter telescope and by E. L. Chentsov at KrAO.

[1] G. I. Abbasov, Astron. zh. (1969).
[2] G. I. Abbasov, Astron. zh., No. 5, 1077 (1969).

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