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

$$\frac{3}{2}k\frac{dT}{dt} = kT_0\alpha(1+\alpha t)^{-1/3} - \Big\{\frac{2\cdot 10^{-6}}{n_0 l^2}T_0^{7/2}(1+\alpha t)^{2/3}[(1+\alpha t)^{2/3}-1] + n_0(1+\alpha t)[4,8\cdot 10^{-28}T_0^{1/2}(1+\alpha t)^{1/3} + C(T)T_0^{-1/2}(1+\alpha t)^{-1/3} + 3\cdot 10^{-21}T_0^{-1/2}(1+\alpha t)^{-1/3} + 7,5\cdot 10^{-25}]\Big\} \quad (1)$$

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 α, 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 $T = 7 \times 10^{5}$°K and $C(T) = 9.25 \times 10^{-22}$ at $T = 2.5 \times 10^{6}$°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_λ 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_λ 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_λ, one determines the half-widths l and the central depths R_{max} of the lines.

The accuracy with which W_λ 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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