ences on recombination radiation, under the influence of a beam of fast electrons, from certain semiconductors grown at the Institute. These investigations add to the presently available information concerning the parameters of semiconducting materials. A study is made of the influence of impurities and growth methods on the spectrum, power, and temporal characteristics of the recombination radiation of the ternary compounds $CdIn_2S_4$, $CdGa_2S_4$, and $ZnIn_2S_4$. The influence of the quality of the crystal on the properties of the radiation of GaSe is investigated.

I. M. Kopylov. Results of Investigations on the Physics of Stars at SAO Observatory of the USSR Academy of Sciences During the Last Two Years.

Work on the physics of stars and nebulas at the SAO Observatory of the USSR Academy of Sciences was initiated in 1967, after organization of an appropriate topical group.

1. Wolf-Rayet stars. S. V. Rublev has developed theoretically the following: a procedure for determining the electron temperatures of the envelopes of Wolf-Rayet stars, a procedure for estimating the relative abundance of hydrogen and helium in the atmospheres of these stars. The absolute magnitudes of several dozen Wolf-Rayet stars have been determined.

2. Planetary nebulas. S. V. Rublev proposed a new method for calculating the theoretical Balmer decrement for planetary nebulas, which gives better agreement with observation than previously obtained.

3. A group of members of the SAO Observatory, headed by Yu. V. Glagolevskiĭ, carried out spectrophotometric studies of the so-called "magnetic stars." For several stars of this type, the chemical composition and the physical conditions in the atmosphere were determined by Yu. V. Glagolevskiĭ (temperatures, turbulent velocities, densities, etc.). The hydrogen spectrum of α^2CV_n was investigated; this is a remarkable star of this type (including the use of spectrograms with a dispersion of 1.3 Å mm). A connection was established between the changes of the intensity of the hydrogen lines (the nuclei of the lines in the last observed numbers of the Balmer series) with the period of variation of the magnetic field of the star. K. I. Kozlova and R. N. Gumaĭgorodskaya presented preliminary interpretations.

V. V. Lenshin is developing a system for quantitative three-dimensional spectral classification of stars of this type using several hundred spectrograms of 56 stars of this type.

4. A statistical study of the changes of the laws governing the rotation of hot stars during the course of evolution within the limits of the main sequence has shown that in the region of location of magnetic and peculiar A-stars the law of constancy of the (observed) angular momentum is violated.

The dependence of the average rotation velocity on the mass of the star (for recently formed stars) has a maximum for stars B with masses equal to 5—9 solar masses, but even the most rapidly rotating stars do not reach critical velocity (I. M. Kopylov).

5. An analysis of the Procyon spectrograms, obtained with high dispersion, has made it possible to determine, by the growth-curve method, the previously unknown oscillator strengths of more than 300 lines of ionized metals. The accuracy of such determinations is comparable with the laboratory accuracy (A. M. Bogudlov).

A thorough spectrophotometric study was made of four cold stars of spectral class K. The physical parameters of the atmospheres and their chemical composition have been determined (N. F. Voĭkhanskaya).

6. A Comparison of the "dynamic" accelerations of the force of gravity on the surfaces of supergiant stars, obtained from the masses and radii of these stars, with the "spectrocosmical" values, obtained from a comparison of the observed contours and intensities of the hydrogen lines with the theoretical ones, has shown good agreement. In earlier investigations, the discrepancies reached 1.5—2 orders of magnitude (I. M. Kopylov).

7. E. L. Chentsov has shown that large differential displacements of the lines of neutral helium compared with the lines of the metal ions in the spectra of the supergiants cannot be attributed to the Stark effect, but are due to the stratification and dynamics of the extended atmospheres of such stars.

8. Yu. P. Korovyakovskiĭ calculated theoretically the trajectories of gas streams in close binary stars of the dwarf type, determined the rates of encounter of the stream with the envelope of the principal stars, the coefficients of the encounter "points," and the dimensions of the so-called "hot spot."

9. Yu. P. Korovyakovskiĭ and A. A. Korovyakovskaya, during the time of their year and a half stay at the Crimean Astrophysical Observatory of the USSR Academy of Sciences, have carried out, in collaboration with the staff members of that observatory, investigations of exploding stars of the UV Ceti type.

In the first two volumes of the Izvestiya SAO AN SSSR and other publications, approximately 15 articles of the staff members of the SAO Observatory on physics of stars and nebulas have been published or submitted. The research work on these topics has been carried out at the Observatory with allowance for the forthcoming work on the large telescope. Light-receiving apparatus for the telescope has been developed in order to carry out investigations in this field.

G. F. Sultanov. Features of the Structure of the Planetoid Belt and Their Explanation.

Planetoids occupy a special place in the solar system. Their number increases every year, and their shapes are irregular and fragmentized. They move essentially in a belt and are contained between the orbits of Mars and Jupiter. Moreover, depending on the parameters of the motion, the entire aggregate of the planetoids is subdivided into a number of individual groups (families).

This structural feature of the family of planetoids is already of great interest among astronomers. The astronomers have long thought that the features of the structure of the planetoid belt can be explained to some degree by some hypothesis concerning the origin of the planetoids.

So far, there is no universally accepted hypothesis

for the solution of this difficult problem, although equally plausible arguments can be advanced in favor of all the existing hypotheses. Among these mention should be made both of the old hypothesis proposed by Olbers back in 1804, according to which the asteroids are fragments of a single planet broken up into parts under the influence of either internal or external forces, as well as the known theory of the origin of the solar system, developed by Academician O. Yu. Shmidt and his students, according to which the asteroids are fragments of primordial meteoritic matter, which various factors prevented from merging into a single mass and forming one of the large planets.

However, most astronomers support a hypothesis whereby the planetoids have been produced as a result of successive disintegrations of a few larger primordial bodies. This hypothesis was proposed by the American astronomer Kuiper in 1906 and was mathematically verified in a number of our papers.

It has been known for a long time that the distribution of the asteroids with respect to their diurnal motions has several minima and maxima, and various hypothesis have been proposed for their explanation. This property of the asteroid distribution is not possessed by other Kepler elements. This is probably due to the fact that the Kepler elements change in time by virtue of perturbations due to the attraction by the planets, especially Jupiter.

In our own investigations, we have refused to use the Kepler elements and decided to choose elements that are stable in a definite sense under constantly moving perturbations.

Using the theory of secular and long-theory perturbations, which is being developed in the Department of Celestial Mechanics and Gravimetry of the Moscow State University and is based on averaged variants of the limited three-point problem (Sun-Jupiter-asteroid), we have chosen the major semiaxes of the orbits, the angular momenta relative to the perpendicular to the plane of the orbit of Jupiter, and the constant of the Jacobi quais-integral. We have used also the rectangular coordinates of the central projections of the poles of the orbits of fragments on a plane tangent to the celestial sphere at the pole of the ecliptic, bearing in mind that these coordinates are connected with the invariant elements of Hiroyama.

In order to compile catalogs of the values of the indicated elements, we have carried out a detailed physical analysis, i.e., a study of the distribution of the asteroids with respect to elements that remain stable in time. It turned out that in all cases it is possible to subdivide all the asteroids into several groups. This revealed the interesting fact that the character of the empirical distributions, as well as all the revealed groups, remain constants, i.e., the presence of maxima and minima on the distribution curves is not the consequence of the lack of material, but represents an important distinguishing feature of the aggregate of asteroids, probably connected with their origin.

To explain the revealed singularities of the planetoid belt, we have carried out first a critical analysis of Olbers' hypothesis, i.e., that the planetoids were formed by disintegration of a single planet. It turns out that it is impossible to reconcile the empirical distribution of the planetoids with the disintegration of one planet.

We have then analyzed the hypothesis of consecutive disintegrations, assuming that the primordial large bodies move in the gravitational field of the sun and Jupiter. Three variants of the disintegration mechanism were analyzed, with different choices of the plane of motion of the primordial large bodies, and of directions and magnitudes of the relative velocities.

The analytic apparatus of celestial mechanics and probability methods make it possible to express the elements of the orbit of the fragments as functions of the elements of the orbit of the primordial large body, to determine the relative velocities (v) in terms of ecliptic coordinates (β, λ) and to obtain the distribution function of the fragments from these elements.

We have also obtained the distribution function of the system of quantities (a, e) and (Ω, i) and also $\tan i \cdot \sin \Omega$ and $\tan i \cdot \cos \Omega$.

The investigation of the distribution of the fragments of the primordial large bodies by orbit elements was supplemented by a comparison and investigation of the distribution of the fragments with respect to certain of the physical characteristics. We have chosen the mean (m_0) and proper (g) stellar magnitudes and as the investigated characteristics determined the distribution of the fragments with respect to their differences.

The form of the distribution curves of the fragments of the primary large bodies depends on the elements of the orbits of the primary large bodies, which have been calculated assuming that the asteroids making up the groups have a common origin.

It has been shown that the fragments obtained as a result of the successive disintegrations of the primordial large bodies move around the sun on elliptic orbits with different eccentricities, in different planes, in a ring between the orbits of Mars and Jupiter.

I. A. Aslanov, Z. A. Ismailov, N. B. Ibragimov, and S. M. Azimov, Some Results Obtained with the 2 Meter Telescope.

The investigation of the operation of the second telescope of the Shemakha Astronomical Observatory (ShAO) is already complete. The investigation of the receiving apparatus of the telescope is scheduled to be completed at the end of 1969. Let us list briefly the main technical data of the telescope.

The telescope operates in three optical systems:

1) In a primary focus f = 9 m, field $21' \times 21'$;

2) in Cassegrain focus f = 29.5 m, field $7' \times 7'$;

3) in a Coudé focus, f = 72 m, field $3' \times 3'$.

In the primary focus are located the following: a Cassette device for direct photographs and a diffraction spectrograph with dispersions 232, 137, 86, 79, 46, and 29 A/mm.

In the Cassegrain focus are contained the following: a cassette device for direct photography and two spectrographs—prism and diffraction, with dispersions: a) 90, 150, 180, 300 Å/mm at H and b) 10, 15, 25, 30, 37.5, and 75 Å/mm. In this focus there is also an electrophotometer.

In the Coudé focus there is a diffraction spectrograph with dispersions 4, 6, 8, 12, 16, and 24 Å/mm. Provision is made for installation of the spectroelectrophotometer.