É. V. Érgma and A. D. Kudryashov. ***Thermonuclear bursts on neutron stars.*** In 1975, Grindlay and Heise[1] discovered a new class of x-ray sources, the x-ray bursters. The principal observational characteristics of bursters are as follows: a constant x-ray luminosity L_0 larger than 10^{36} erg/sec, time of development of burst $\lesssim 1-2$ sec, duration of burst $t_D \sim 3-100$ sec, depending on the source, recurrence of bursts $t_b \sim 10^4-10^5$ sec, maximum burst luminosity $L_b \sim 10^{37}-10^{38}$ erg/sec, and amount of energy released during a burst $\sim 10^{38}-10^{39}$; for most sources $L_0/\langle L_b\rangle \gtrsim 100$, where $\langle L_b\rangle \equiv E_b/t_b$ and E_b is the energy released during the burst.

To explain the observed properties of bursters, we use a thermonuclear model, which seems to be the soundest one at this time. Explosive thermonuclear burning occurs in the matter accumulated during steady accretion in this model. A simple analytic procedure has been developed for calculation of the principal thermonuclear-explosion characteristics: time of recurrence, total amount of energy released in explosion, etc. Calculations of the explosive burning of helium in a pure helium shell confirm the earlier results of Joss[2] to the effect that the principal observational properties of x-ray bursters are reproduced sufficiently faithfully in this case. However, the formation of a pure helium shell is only hypothetical. It has been shown from numerical calculations that at $\lg \rho > 5.7$ (where ρ is the density at the bottom of the shell), hydrogen burning ignites helium in the shell of a neutron star. The temperature increases rapidly as a result, and when $T > 4\cdot 10^8$ K, the β^+-active elements O^{14} and O^{15} disintegrate in the reactions $O^{14}(\alpha, p)F^{14}$ and $O^{15}(\alpha, \gamma)Ne^{19}$, so that the hydrogen-burning process will proceed quite differently from the process in the case $T < 4\cdot 10^8$ K, when the hot CNO cycle operates. It is found that the hydrogen burning time now depends only on the rates of the β^+ decays and may be smaller than 100 sec.

A model of the γ-burster FXP 0520-66, which was discovered by Mazets *et al.*,[3] was presented. In the proposed model, the second γ burst (6 March 1979) can be explained in terms of explosion of a helium layer of matter that fell out during the first burst (5 June 1979). This case differs from the ordinary burster in two aspects:

1) the presence of a strong magnetic field (matter is

accumulated in a magnetic column); 2) the absence of steady accretion.

[1]J. E. Grindlay and J. Heise, IAU Circular No. 2879, 1976.

[2]P. C. Joss, Astrophys. J. (Lett) **225**, 123 (1978).

[3]E. P. Mazets, S. V. Golentskiĭ, V. N. Il'inskiĭ, V. V. Popov, R. L. Aktekar', Yu. A. Gur'yan, I. A. Sokolov, Z. Ya. Sokolova, and T. V. Kharitonova, Pis'ma Astron. Zh. **5**, 307 (1979) [Sov. Astron. Lett. **5**, 163 (1979)].