the other binary component. It is shown that as mass is added to the hot star hydrogen burning takes place in a very thin, nondegenerate shell. Eventually this shell becomes thermally unstable. The high nuclear energy generation that accompanies the thermal instability is sufficient to make the star pulsationally unstable. The calculations are compared with observed novae light curves.

The present model for a nova outburst contains three basic features: (1) Mass exchange in a close binary system (Kraft, R. *Astrophys. J.* **139**, 457, 1964). (2) Thermal instability (Schwarzschild, M., and Härm, R., *Astrophys. J.* **142**, 855, 1965; Rose, W., *ibid.* **146**, 838). (3) Pulsational instability (Schatzman, E., *Ann. Astrophys.* **16**, 162, 1953; Rose, W., *Astrophys. J.* 1967, to be published).

Solar Abundance of Chromium. J. E. ROSS AND L. H. ALLER, *University of California, Los Angeles*.—The technique of synthesizing small regions of the solar spectrum enables one to obtain the product of the abundance and the gf values (gfA) for elements whose lines fall in this interval. By fitting the computed spectral region to the observed spectral region, one minimizes effects of uncertainties in the damping constants and effects of blends. We have assumed 1.3 km/sec microturbulence and 1.6 km/sec microturbulence. For the moderately strong lines ($W_\lambda \approx 30-70$ mÅ) employed in the present study, the assumption of local thermodynamic equilibrium seems justified. With the Corliss-Bozman gf values, we obtain from lines of Cr I

$$A = \log N(\text{Cr})/N(\text{H}) + 12 = 4.73 \pm 0.26$$

the scatter arises almost entirely from the uncertainty in the f values. One could also use this method to obtain a set of internally consistent "astrophysical" relative gf values.

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Radiative Transfer in H II Regions. ROBERT H. RUBIN, *Warner & Swasey Observatory (Case Institute of Technology)*.—Two aspects of the transfer of radiation which affect the structure and emission properties of H II regions are considered: the transfer of ionizing radiation produced by recombinations and the transfer of radiation in far infrared forbidden lines under optically thick conditions.

Numerical methods are used to solve the equations of ionization and thermal equilibrium for gaseous nebulae, allowing for an arbitrary density distribution. Absorption of ionizing photons by H and He is included, and ions of O, N, Ne, and C are considered as forbidden line coolants. It is shown that the "on the spot" absorption approximation (Zanstra, *Bull. Astron. Inst. Neth.* **11**, 341,

1951) can cause considerable error in the temperature structure and predicted emission properties. Models calculated using detailed solutions for the transfer of diffuse Lyman continuum radiation show that the temperature near the center may be increased by $\sim 2000^\circ\text{K}$.

It is also demonstrated that certain of the far infrared forbidden lines of the cooling ions undergo considerable self-absorption. The optical thickness for two of these lines, the 88μ and 52μ lines of O^{++} , which are among the most efficient nebular coolants (Hjellming, *Astrophys. J.* **143**, 420, 1966) decreases their cooling efficiency, raising temperatures up to $500-1000^\circ\text{K}$. A discussion of the predicted surface brightness in the important lines is discussed in the light of these results.

Variations in the Solar X-Ray Flux in the 1 to 13 Å Region. H. R. RUGGE AND A. B. C. WALKER, JR., *Aerospace Corporation*.—The solar x-ray flux in the 1 to 13 Å region has been measured from the satellite 1966-111B from the middle of December 1966 through February 1967. The experiment, mounted on a compact solar pointer, consisted of a pulse-height analyzed, thin window proportional counter which yielded low-resolution spectra (~ 2 Å) with excellent time resolution (one complete spectrum every second).

A slowly varying component of the daily averaged solar x-ray flux has been measured and is compared with the slowly varying component of 2800 Mc/sec solar radio emission. In addition to the slowly varying component, several significant increases in solar x-ray flux have occurred in time periods the order of minutes. The fastest significant increase thus far seen occurred in 30 sec. The increase in flux is generally accompanied by a considerable "hardening" of the x-ray spectrum. In some cases ground-based observers have reported enhanced solar activity at approximately the same time as the x-ray increases. A detailed description of such events is presented.

A Formal Third Integral of Motion in a Nearly Spherical Stellar System. ALLAN F. SAAF (introduced by Peter O. Vandervoort), *University of Chicago*.—A formal integral, independent of the energy and the conserved component of the angular momentum, is constructed for the motion of a star in an axisymmetric, nearly spherical stellar system. The integral is formal in the sense that it is a series in powers of a small parameter which characterizes the magnitude of the departure of the potential from spherical symmetry. In general, the leading term of the series is the square of the total angular momentum. The next term corresponds to the