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THE SPECTRUM OF NOVA SERPENTIS 1970

A series of spectra of the bright Nova Serpentis 1970 was obtained with the one-prism spectrograph attached to the 99.5 cm reflector  $f/15$  of the Hamburg Observatory between March 10th and 21th, 1970 with a dispersion of 70 Å/mm at  $H\gamma$ . The spectral range between 3900 Å and 5250 Å was studied.

The emission lines of hydrogen, H and K lines of Ca II and those of ionised iron are the most conspicuous features of the spectrum of Nova Ser 1970. The most intense emissions of Fe II belong to the multiplets 27, 28, 37, 38 and 42. Furthermore, emission lines of He I  $\lambda\lambda 471.477$  Å (multiplet 14), those of Ti II multiplets 19 and 41, and those of Cr II multiplet 44 are present. The investigation of the fine structure of the emission lines has shown that the line profiles are formed by superimposing of emissions of different radial velocities. The velocities of these emissions derived from red wings (violet being distorted by the absorption) are given in Table 1.

Table 1.

Date	Radial velocities in km/s			
	I	II	III	IV
1970 March 10.186	614	939	1272	1959
12.179	690	886	1432	
14.154	782	933	1268	
21.134	675		1364	1872

The values in columns I-III correspond to data communicated by J.Grygar and J.B.Hutchings in Circ.Bur.Cent.Int.Telegr. Astr. No.2220 for the dates Feb.20th and 22th. A further emission system was derived from Fe II multiplet 42 lines and from hydrogen lines, their values are listed in column IV of Table 1. Both profiles with higher velocities were not observed for H and K lines of Ca II. The emission profile III seems to be multiple. The width of  $H\delta$  is affected by the absorption line due to  $\lambda 4122.638$  Å Fe II (28). The shape of the bright emission is regular; only that of  $H\gamma$  is distorted by superimposed emission and absorption of the line  $\lambda 4351.764$  Å Fe II (27).

The strongest absorption lines belong to H I, Ca II, Fe II multiplets 27, 28, 37, 38 and 42, Ti II multiplets 19, 31 and 41, Cr II multiplet 44, and the line  $\lambda 4481$  A of Mg II multiplet 4. The principal as well as the diffuse enhanced spectrum were developed when Hamburg's observation began. Both systems were observed for H I, Fe II and Ca II lines; for Ti II only principal and for Mg II line  $\lambda 4481$  A diffuse enhanced spectrum were observed. The last line is blended by the  $\lambda 4488.319$  A Ti II line. The absorption due to the diffuse enhanced spectrum during the whole observational period was stronger than the principal absorption except for Ca II and H $\gamma$  lines; the principal absorption of the latter is affected by the diffuse enhanced absorption  $\lambda 4351.764$  Fe II (27). The interstellar absorption of Ca II was also present. The velocities of the principal and the diffuse enhanced spectrum corrected for the orbital velocity of the Earth are given in the Table 2.

Table 2.  
Radial velocities derived from absorption lines

Date	H I	FeII+ TiII	CaII (U)	HI+ FeII	MgII	CaII (K)
1970 March 10.186	884	786		1662	1674	
12.179	827	746		1548	1503	
14.154	832	775	785	1613	1619	1466
21.134	792	728	616	1616	1589	

As can be seen from Table 2, the velocities of the principal spectrum derived from H I lines are higher than those derived from the Fe II and Ti II lines.

Two additional spectra were obtained on 1970 April 4.123. An investigation showed the following differences to the previous spectra; the emissions of Fe II became stronger compared to the H $\beta$  emission and new emission lines appeared around  $\lambda 4660$  A. The Mg II absorption line  $\lambda 4481$  A weakened substantially and also Fe II absorption lines became fainter. The principal absorption of H I is strengthened relative to the diffuse enhanced one. Emission and absorption lines of Ti II did not change.

For the definitive study of the correlation between brightness of the nova and radial velocity changes it is most desirable to give radial velocity data corrected for the orbital velocity of the Earth, and to give the time of the observation with an accuracy of one hundredth of a day at least.

U.K.GEHLICH      J.TREMKO  
R.WEHMEYER  
Hamburger Sternwarte  
205 Hamburg 80  
Federal Republic Germany