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SPECTROPHOTOMETRIC OBSERVATIONS OF NOVA SAGITTARII 1982 NEAR MAXIMUM LIGHT

Spectrophotometric observations of Nova Sgr 1982, when it was near maximum light, have been obtained with the McGraw-Hill Observatory 1.3 meter telescope. These data were taken on both 1982 October 13 (1<sup>h</sup>48<sup>m</sup> and 2<sup>h</sup>02<sup>m</sup> UT) and 1982 October 14 (1<sup>h</sup>35<sup>m</sup> UT) using the intensified reticon scanner. The night sky was subtracted and the fluxes were calibrated using observations of the white dwarf EG 139 taken on the same night. Spectral features have been measured and identified using the single observation from the second night. This spectral scan is shown in Figure 1.

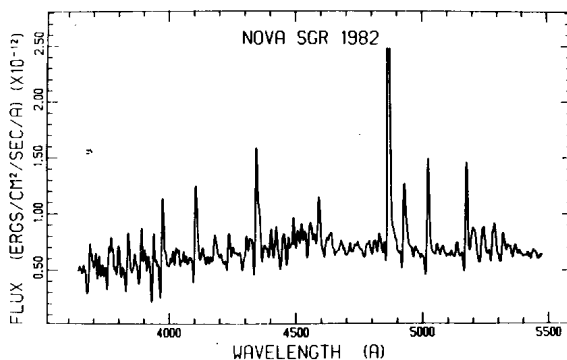


Figure 1

The spectrum of Nova Sgr 1982 taken on October 14, 1982. The peak of the H $\beta$  line is at approximately  $3.6 \times 10^{-12}$  ergs cm<sup>-2</sup> s<sup>-1</sup> Å<sup>-1</sup>, but has been truncated on this plot. The original resolution was  $\sim 3$  Å, and the plot has been smoothed to  $\sim 5$  Å. Prominent features can be identified from Table I.

A plot of the magnitudes given in the IAU Circulars by Kosai and Honda (1982), Mack and Cousins (1982), Churms and Hers (1982), and Elias and Verdenet (1982) shows Nova Sgr 1982 exhibited a double maximum similar to those seen in DM Gem (Campbell 1915) and NQ Vul (Cottrell and Smith 1978). We estimate from looking at the light curve that our observations were made within  $\pm 1$  day of the first and brighter maximum when the star was near eighth magnitude. Judging from the strength of the emission lines it seems likely that our observations are taken just after maximum light, which probably occurred on  $\sim 12$  October 1982. Thus the first observations at approximately ninth magnitude by Kosai and Honda may have caught the nova during a pre-maximum halt.

The spectrum was observed from  $\sim 3700 \text{ \AA}$  to  $\sim 5400 \text{ \AA}$ , although the wavelengths are only properly calibrated between  $\sim 3900 \text{ \AA}$  and  $\sim 5100 \text{ \AA}$ . The Balmer series of H are seen in emission with weak, violet displaced absorption. Other prominent emissions include Fe II, Ti II, and Ca II. No satisfactory identification was found for several lines and blends. Table I lists the measured lines together with their velocities, corrected to the sun.

The mean H emission velocity is found to be  $+69 \pm 25 \text{ km s}^{-1}$  (H $\beta$  - H $\epsilon$ ). The mean from the emissions of the ionized metals is  $+26 \pm 29 \text{ km s}^{-1}$ , but blending of these lines causes some uncertainty in this value. The mean absorption velocity from seven lines is  $-619 \pm 27 \text{ km s}^{-1}$ , thus indicating a net outward flow of  $\sim 700 \text{ km s}^{-1}$ . All of the absorption lines are weak, shallow, and single. The weakness of the absorptions and the presence of only low excitation emission lines reinforces the suggestion that the nova was observed at a very early post-maximum phase (McLaughlin 1960).

Small differences in the spectra between the two nights are present. The Balmer lines show a small central absorption in the peak of the emission on the first night which is not present on the second night, and in general

Table I

Measured Features in Nova Sgr 1982

Ion (multiplet)	$\lambda_0$ (Å)	Radial Velocities		Comments
		Emission	Absorption	
H 10	3797.90	*	*	
H 9	3835.39	*	*	
Fe II (127) ?	~3864	*		
H 8	3889.05	*	*	
Ti II (34)	3900.55	-29		
Ti II (34)	3913.46	+50		
Ca II-K	3933.66	+216	-491	
Hε	3970.07	+124	-609	Blend with Ca II-H
Fe II (127) ?	~4024			
Fe II (126) ?	~4032			
Unidentified	~4035			
Ti II (87)	4053.81	-40		
Hδ	4101.74	+72	+730	
Fe II (22)	4124.79	+86		
Fe II (27)	4128.74	(-66)		Blend with Si II 4128(3)
Fe II (27)	4173.45	+163		
Fe II (28)	4178.86	-37		
Fe II (27)	4233.17	+3		
Ti II (41)	4300.05	(+46)		Blend with TiII 4301(41)?
Unidentified	~4318			
Hγ	4340.47	+3	-617	
Fe II (27)	4351.76	-120		
Ti II (51)	4399.77	-148		
Fe II (27)	4416.82	+163		Blend with Fe II 4414(32)?
Unidentified	~4448			
Ti II (31)	4468.49	-80		
Fe II (37)	~4490			Blend
Fe II (37), (38)	~4520			Blend
Ti II (50), Fe II (37)	~4534			Blend
Fe II (37), Cr II (44)	~4556			Blend
Fe II (37), (38)	~4588			Blend
Hβ	4861.33	+79	-653	
Fe II (42)	4923.92	+85	-589	
Fe II (42)	5018.43	+57	-645	
Fe II (42)	5169.03	*	*	
Fe II (49)	5197.57	*		
Si II ?	~5202	*		
Fe II (49)	5234.62	*		
Fe II (49)	5275.99	*		
Fe II (49), (48)	5316.61	*		Blend

\* Outside the region of well-established wavelengths

( ) Velocity uncertain due to line blending

the emission lines appear to be about 30% stronger on the second night, further supporting the suggestion that the first observation was obtained very near maximum light.

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