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OBSERVATIONS OF A SYMBIOTIC NOVA IN SAGITTARIUS

This object was discovered by Minoru Wakuda on March 14, 1994, as a star of 10^m7 and announced as a peculiar variable (Hirayama 1994). The position is $\alpha = 18^h51^m43^s$, $\delta = -19^\circ45'9$ (1950.0). The star has already been bright since 1993 March 29, but was fainter than 12^m5 throughout 1992.

Spectroscopic observations were carried out on 1994 March 30.4 (UT) with the ESO/MPI 2.2m-telescope and EFOSC-II. A low resolution spectrum (Fig. 1, resolution 0.84 nm) shows emission lines of H α , H β and the infrared Ca II triplet, superimposed on a somewhat veiled late-K-giant continuum. A high-resolution spectrum (Fig. 2, resolution 0.19 nm) shows the Ca II H and K lines in absorption, as well as narrow emission lines of H β and Fe II.

The absence of blueshifted absorption lines, the narrowness of the emission lines (FWHM $< 250 \text{ km s}^{-1}$), as well as the long standstill at maximum magnitude excludes the classification as a classical nova. The blue emission line spectrum resembles that of the symbiotic nova PU Vul in 1987–1988, eight years after brightness rise (Iijima 1989).

On 21 plates of the Sonneberg astrograph 400/1600 mm, taken between 1984 and 1988, as well as on the last available sky patrol plate of this area, taken in 1990, the object is invisible. The data are as follows:

JD 244...	m_{pg}	JD 244...	m_{pg}	JD 244...	m_{pg}	JD 244...	m_{pg}
5912.43	[16.5	7039.32	[15.5	7088.24	[16.5	7387.39	[17
6232.52	[16.5	7039.33	[15.5	7088.25	[16.5	7404.32	[17
6264.46	[15	7063.30	[16.5	7353.43	[16.5	7404.33	[17
6287.38	[17	7063.31	[16.5	7353.44	[17	8069.49	[12
6287.39	[16.5	7087.24	[16.5	7355.34	[17		
6298.39	[16.5	7087.25	[16.5	7387.38	[17		

On 667 additional plates of the Sonneberg sky patrol with plate limits of about $12^\circ \dots 14^\circ$, taken in 1926... 1948 and 1950... 1983, the object is also always invisible. Similar results, based on 272 Harvard plates for the interval 1888... 1989, are reported by Hazen (1994).

A direct CCD frame taken at outburst (Fig. 3) was compared with the ESO/SERC Atlas J and R film copies. The outburst image lies in an empty field, $\approx 3''$ north of the connecting line of two stars of about 20^m , whose separation is $\approx 5''$. Thus the preoutburst magnitude was below the limit of both plates, i.e. below $m_V \approx 21.5$, indicating an outburst amplitude of more than 11^m . This is unusually large for a symbiotic nova; until now the poorly known object V2110 Oph = AS 239 held the record with 8^m , while RR Tel has an amplitude of about 7^m5 (Allen 1978, 1984; Duerbeck 1987).

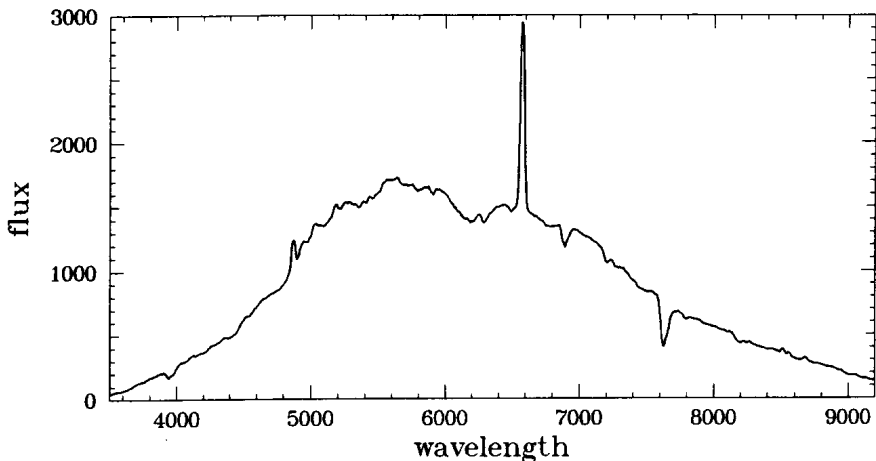


Figure 1. Low-resolution spectrum of the symbiotic nova, taken 1994 March 30.4 with EFOSC-II and grism 1 at the ESO/MPI 2.2m-telescope. Besides $H\alpha$ and $H\beta$, the infrared Ca II triplet at 8498, 8542 and 8662 Å is present as weak emission, while the Ca II H+K lines appear in absorption. The features in the continuum mimic a late K giant spectrum, but show low contrast, possibly being veiled by a featureless continuum.

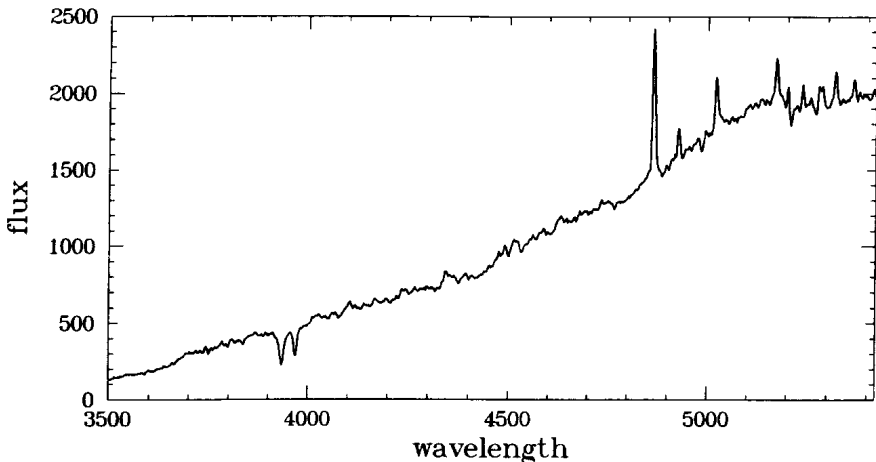


Figure 2. Medium-resolution blue spectrum of the symbiotic nova, taken 1994 March 30.4 with EFOSC-II and grism 3 at the ESO/MPI 2.2m-telescope. The Ca II H+K lines appear in absorption. $H\beta$ is seen in emission. The lines at 4925, 5021, 5171, 5199, 5235, 5282, 5315 and 5365 Å belong to the Fe II multiplets 41, 42, 48 and 49.

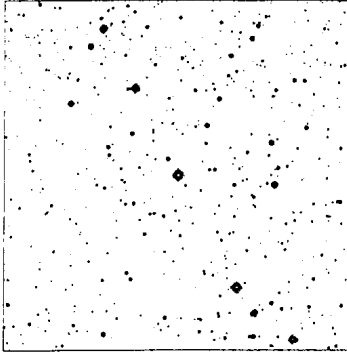


Figure 3. The field of Wakuda's symbiotic nova, observed 1994 March 30.4 with EFOSC-II at the ESO/MPI 2.2m-telescope. The field is 4.3×4.3 , and the object is the bright star at the center. North is on the top, east to the left.

With galactic coordinates $l = 15^{\circ}56$, $b = -9^{\circ}53$, the variable lies in field No. 158 of Neckel's (1967) survey of galactic absorption, where A_V at large distances is typically 1^m . Assuming Eddington luminosity for a medium mass white dwarf at outburst, $M_V \approx 6$ (Kenyon and Truran 1983), its distance is about 10 kpc, and with a z -distance of 1700 pc, it appears to be a bulge object. There is one caveat, however: The absolute magnitude of its progenitor, M_V , is fainter than 5^m , and excludes any late type giant companion. Assuming an M-type giant companion would lead to unusually large distances and outburst luminosities.

A ROSAT pointed observation carried out on 1992 Oct. 13/14 includes the field of the variable. No X-ray source was found, giving an upper limit of 0.004 cts/s. Assuming a 10^7 K blackbody emission (resp., bremsstrahlung spectrum) with $A_V = 1$, this corresponds to $4 \cdot 10^{-13}$ erg $\text{cm}^{-2} \text{s}^{-1}$ and $8 \cdot 10^{-14}$ erg $\text{cm}^{-2} \text{s}^{-1}$, respectively.

Monitoring of the ongoing outburst is encouraged.

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