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V A R I A B L E S T A R
B U L L E T I N

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Photographic observations of a symbiotic nova 1994 in Sagittarius before discovery

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M.Wakuda discovered the pecular variable on Mar. 14.825 UT,1994 of mag about 10.7 (Hirayama 1994). Its position is R.A.= 18h51m43s, Decl. = -19°45'.9 (equinox 1950.0, uncertainty 10"). Finding chart is shown in Fig.1. It was proved a symbiotic nova in a slightly progressed state.

We have taken photographs of this area to search novae for a decade. Wakuda used a 6x7 camera with 200mm and 400mm lenses (mainly with T-Max 400 films and green filter), Yamamoto used a 6x7 camera with 200mm lens (mainly with T-Max 400 films and green filter), and Sakurai used a 35mm camera with 135mm and 300mm lenses (with Fujicolor films).

This nova could not be found on our patrol photograph between 1984 and 1991. At first we recognized it on May 11, 1992 of mag 12.4, but on Apr. 30 it was fainter than 12.4. Then it brightened very slowly and smoothly from 1992 May to 1993 Aug (Fig 2). In Aug 1993, it's maginitude reached 10.7, after that it has kept constant magnitude at maximum.

Our data are shown in Table.1.

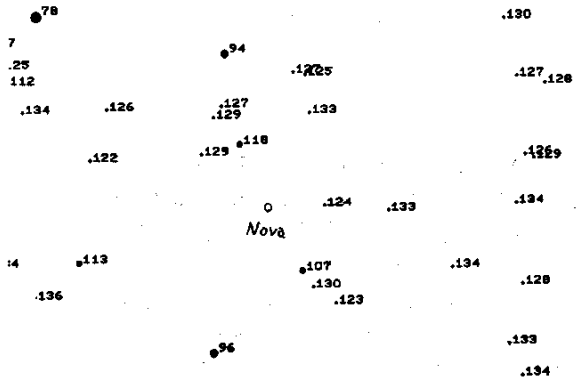

Fig.1 finding chart

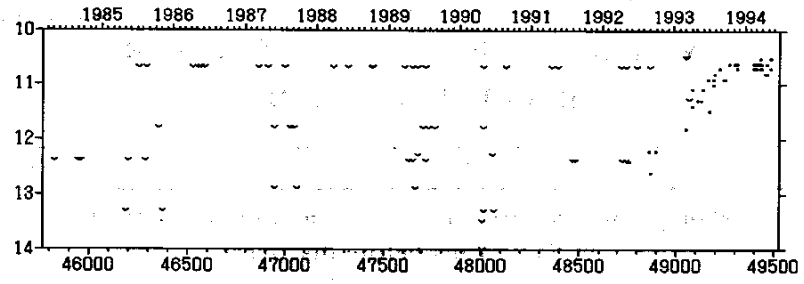

Fig.2 light curve (1984-1994)

Date(UT)	Mag.(*)	Observer	Date(UT)	Mag.(*)	Observer	Date(UT)	Mag.(*)	Observer	Date(UT)	Mag.	Observer	
84 05 03.699	<124	Wdm	88 10 14.448	<107	Wdm	92 04 05	<107	Ymo	93 08 21.888	107	Skr	
84 08 31.490	<124	Wdm	89 03 22.	<107	Ymo	92 04 13.796	<124	Wdm	93 09 09.525	109	Wdm	
84 09 17.456	<124	Wdm	89 04 12.719	<124	Wdm	92 04 30.717	<124	Wdm	93 09 14.494	109	Wdm	
85 04 28.773	<133	Wdm	89 05 01.734	<124	Wdm	92 05 03	<107	Ymo	93 10 10.421	106	Ymo	
85 05 12.741	<124	Wdm	89 05 03	<107	Ymo	92 05 11.648	124	Skr	93 11 03.398	106	Ymo	
85 07 08	<107	Ymo	89 05 14.767	<129	Wdm	92 05 11.679	124	Wdm	93 11 14.373	106	Ymo	
85 08 13.576	<124	Wdm	89 05 30	<107	Ymo	92 06 21	<107	Ymo	93 11 16.378	107	Ymo	
85 08 16	<107	Ymo	89 05 31.758	<123	Wdm	92 08 23.459	122	Skr	94 02 12.353	106	Ymo	
85 10 15.424	<118	Wdm	89 06 28.658	<118	Wdm	92 08 28.535	126	Wdm	94 02 13.725	107	Skr	
85 11 02.392	<133	Wdm	89 07 07.608	<124	Wdm	92 08 30	<107	Ymo	94 02 17.720	107	Skr	
86 04 11	<107	Ymo	89 07 08	<107	Ymo	92 09 23.355	122	Skr	94 02 18.845	106	Ymo	
86 05 08	<107	Ymo	89 07 23.583	<118	Wdm	93 02 24.848	<105	Ymo	94 02 24.840	107	Ymo	
86 05 18	<107	Ymo	89 08 22.569	<118	Wdm	93 02 25.709	118	Skr	94 02 25.845	106	Ymo	
86 06 08	<107	Ymo	90 04 23.677	<135	Wdm	93 03 04.843	<105	Ymo	94 03 10.822	106	Ymo	
87 03 09	<107	Ymo	90 04 24.740	<140	Wdm	93 03 19.817	<113	Ymo	94 03 14.825	107	Wdm	discovery
87 04 29	<107	Ymo	90 04 29	<107	Ymo	93 03 29.679	114	Skr	94 03 15.834	106	Ymo	
87 05 27.765	<129	Wdm	90 04 29.787	<118	Wdm	93 03 29.824	111	Ymo	94 03 15.678	107	Skr	
87 05 31.719	<118	Wdm	90 04 30.736	<133	Wdm	93 04 25.664	113	Skr	94 03 16.826	105	Wdm	
87 07 23	<107	Ymo	90 06 16.599	<123	Wdm	93 05 20.624	113	Skr	94 03 20.808	106	Ymo	
87 08 17.560	<118	Wdm	90 06 22.601	<133	Wdm	93 05 23.619	111	Ymo	94 03 24.801	106	Wdm	
87 09 09.476	<118	Wdm	91 04 16	<107	Ymo	93 07 15.550	110	Ymo	94 04 13.763	108	Wdm	
88 06 10	<107	Ymo	91 08 03.514	<124	Wdm	93 07 15.661	109	Wdm	94 04 16.774	108	Wdm	
88 10 01.446	<107	Wdm	91 08 11.576	<124	Wdm	93 07 23.616	108	Wdm	94 04 17.773	106	Wdm	

Wdm : M.Wakuda Ymo: M.Yamamoto Skr: Y.Sakurai

(*) The mark '<' indicates the upper limit (the nova was not detected).

Table.1 Observations

Reference

Grebel, E. K., 1994, IAU Circ., No.5961

Hirayama, T., 1994, IAU Circ., No.5961

Visual observation of PG 0943+521: A New Dwarf Nova in the Palomar Green Survey

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PG 0943+521 was discovered as an ultraviolet-excess object, and was spectroscopically confirmed to be a cataclysmic variable (Green et al. 1986). In spite of its brightness (B=14.16, Green et al. 1986), the object went little observed. I noticed that the object coincides with a V=13.3 magnitude star (R.A. 09h 47m 11.82s, Decl. +51° 54' 08.9", J2000.0) in the Guide Star

Catalog. The large difference between these materials suggests a variable nature of the object, and I started visual observations to clarify the nature of its variability.

Observations were done using a 25-cm reflector. Magnitudes of the comparison stars were taken from the Guide Star Catalog (Figure 1). The results are given in Table 1. A light curve in 1993 is shown in Figure 2.

These light curve clearly demonstrate that the object is indeed a dwarf nova with a visual range of 12.3 to fainter than 14.2. Outbursts of this object are characterized by initial brightness peaks usually reaching mv=12.5, and protracted fading lasting ten days or more. Such behavior may be analogous to short standstills sometimes observed in some Z Cam-type dwarf novae, but the largest observed decline rate (0.7 mag/day) is slightly atypical for this group of dwarf novae. The outburst cycle length is rather difficult to be decided because of gaps in the light curve, but is definitely shorter than a month.

Further observations are strongly encouraged to get a more detailed outburst charactersitics and physical parameters of the cataclysmic binary.

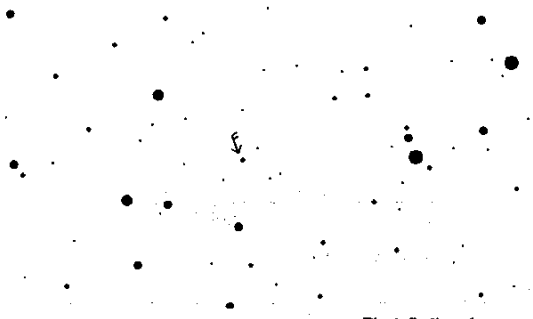

Fig.1 finding chart

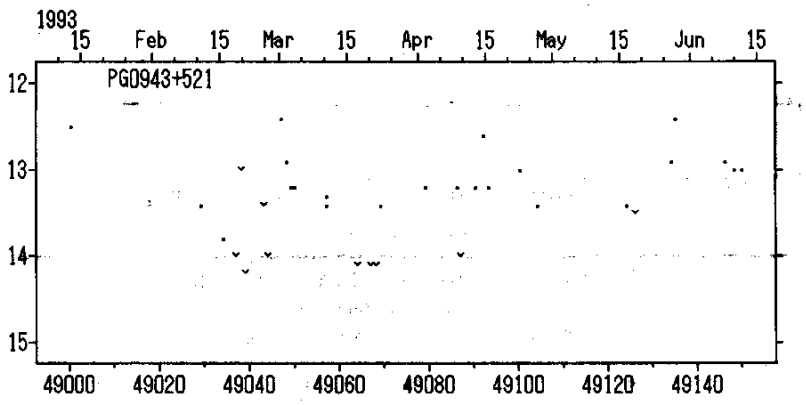

Fig.2 light curve

Date(UT)	Mag.(*)	Date(UT)	Mag.(*)	Date(UT)	Mag.(*)	Date(UT)	Mag.(*)	Date(UT)	Mag.(*)
92 04 20.53	<13.5	92 05 21.51	<12.5	93 02 25.51	<14.0	93 03 21.53	<14.1	93 04 26.48	13.4
92 04 21.51	<13.3	93 01 12.51	12.5	93 02 28.50	12.4	93 03 22.52	13.4	93 05 16.49	13.4
92 04 22.52	<13.3	93 01 12.51	12.5	93 03 01.51	12.9	93 04 01.52	13.2	93 05 18.51	<13.5
92 04 26.52	12.5	93 02 10.53	13.4	93 03 02.52	13.2	93 04 08.47	13.2	93 05 26.49	12.9
92 04 27.46	12.3	93 02 15.52	13.8	93 03 03.51	13.2	93 04 09.52	<14.0	93 05 27.50	12.4
92 05 01.50	12.5	93 02 18.51	<14.0	93 03 10.45	13.4	93 04 12.52	13.2	93 06 07.51	12.9:
92 05 04.51	12.5	93 02 19.53	<13.0	93 03 10.52	13.3	93 04 14.49	12.6	93 06 09.50	13.0
92 05 05.51	13.2	93 02 20.54	<14.2	93 03 17.52	<14.1	93 04 15.50	13.2	93 06 11.51	13.0
92 05 06.51	13.1	93 02 24.56	<13.4	93 03 20.53	<14.1	93 04 22.53	13.0		

(*) The mark '<' indicates the upper limit (the variable was not detected).

Table 1 Visual magnitude estimates of PG 0943+521

References:
Green, R. F., Schmidt, M., and Liebert, J., 1986, Ap.J. Suppl., 61, 305.

Light Curves of the Recent Supernova

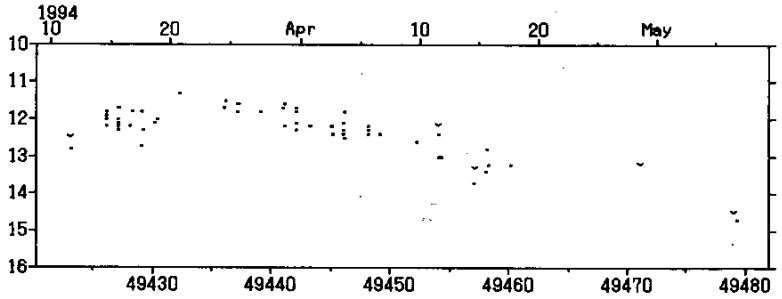

Fig.1 light curve of SN1994D

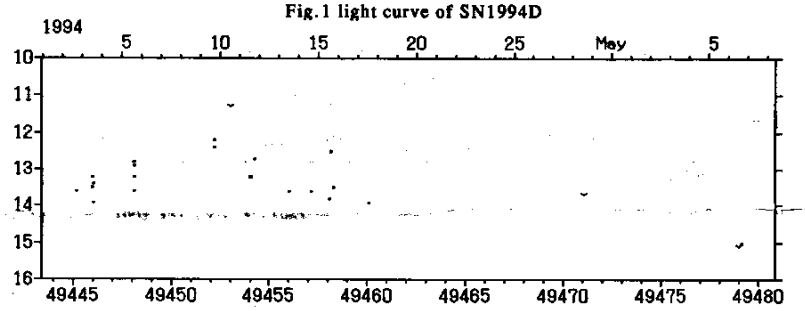

Fig.2 light curve of SN1994I

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