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PHOTOELECTRIC OBSERVATIONS OF V541 Cas AND ITS PERIOD

The eclipsing system V541 Cas was observed photoelectrically from September to December in 1982 with the 60 cm reflector at Beijing Astronomical Observatory. Some minimum times were obtained in December 1983 and September 1984.

The photoelectric equipment is very close to the Johnson's standard system. A total of 470 photoelectric BV observations were corrected for differential extinction and transferred to UBV system.

The coordinates of the comparison and check stars are given in Table I.

Table I

Name	R.A.(1982)	Dec.(1982)
Comp.Star	$2^h33^m05^s$	$63^\circ10'20''$
Check Star	2 32 44	63 10 02

Using Kwee and Van Woerden's method, seven times of primary minimum and five times of secondary minimum were determined. They are given in Table II.

Table II

JD Hel. 2445000+	filter	m.e.	Min.	JD Hel. 2445000+	filter	m.e.	Min.
231.2429	V	0.0006	II	231.2425	B	0.0008	II
232.1523	V	0.0006	II	232.1527	B	0.0001	II
236.2487	V	0.0007	I	236.2472	B	0.0004	I
258.0832	V	0.0009	I	258.0834	B	0.0003	I
266.2743	V	0.0007	I	266.2732	B	0.0006	I
267.1832	V	0.0011	I	267.1809	B	0.0010	I
293.1125	V	0.0006	II	293.1120	B	0.0002	II
298.1162	V	0.0020	I	298.1151	B	0.0008	I
329.0510	V	0.0005	I	329.0517	B	0.0007	I
675.2475	V	0.0001	II	675.2473	B	0.0001	II
962.3050	V	0.0004	I				
967.3099	V	0.0006	II				

V541 Cas is a rather neglected system. In 1974 Busch gave its ephemeris as follows:

JD Hel. Min I = 2439026.542 + $0^d.909026 \cdot E$

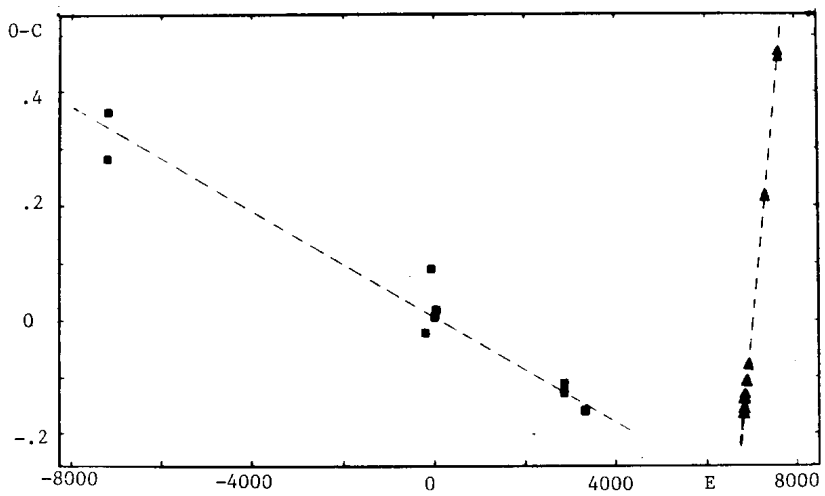

Figure 1 : O-C Diagram of the times of minimum light of V541 Cas. "▲" represents photoelectric observations.

Table III

JD Hel.Min.	E	(O-C)	Min.	Method	Observer
2432477.4000	-7204.5	$0^d.2829$	II	pg.	Weber (see Busch,1974)
503.3900	-7176.0	0.3643	I	pg.	Weber (see Busch,1974)
8843.3300	- 201.5	-0.0219	II	pg.	Romano (see Busch,1974)
950.2600	- 84.0	0.0921	I	pg.	Romano (see Busch,1974)
9026.5370	0.0	0.0070	I	pg.	Busch
27.4510	1.0	0.0119	I	pg.	"
53.3640	29.5	0.0164	II	pg.	"
57.4570	34.0	0.0185	I	pg.	"
58.3540	35.0	0.0065	I	pg.	"
88.3640	68.0	0.0171	I	pg.	"
41595.4580	2826.0	-0.1109	I	pg.	"
96.3540	2827.0	-0.1240	I	pg.	"
602.2740	2833.5	-0.1130	II	pg.	"
42036.3120	3311.0	-0.1571	I	pg.	"
45231.2427	6825.5	-0.1617	II	pe.	this paper
32.1525	6826.5	-0.1610	II	pe.	"
36.2480	6831.0	-0.1563	I	pe.	"
58.0833	6855.0	-0.1387	I	pe.	"
66.2738	6864.0	-0.1299	I	pe.	"
67.1821	6865.0	-0.1307	I	pe.	"
93.1122	6893.5	-0.1091	II	pe.	"
98.1156	6899.0	-0.1056	I	pe.	"
329.0514	6933.0	-0.0783	I	pe.	"
675.2474	7313.5	0.2156	II	pe.	"
962.3050	7629.0	0.4608	I	pe.	"
967.3099	7634.5	0.4658	II	pe.	"

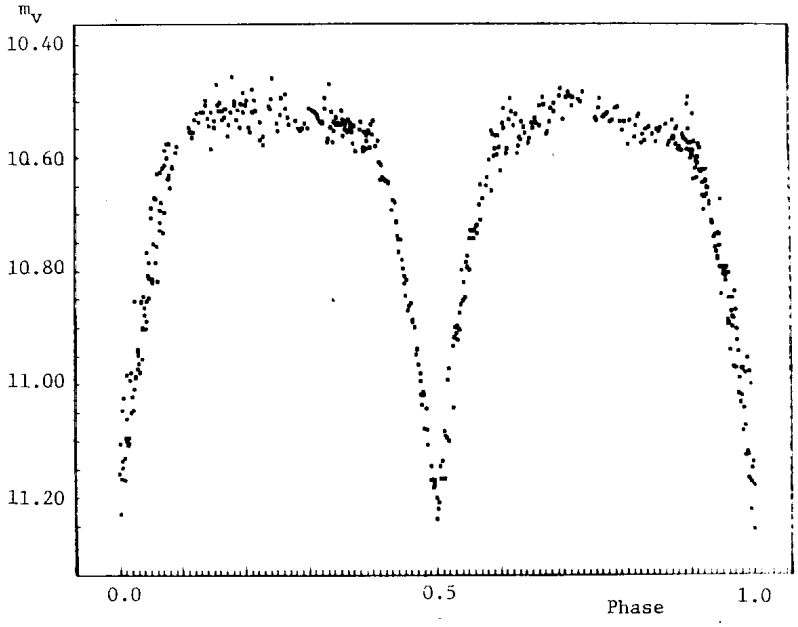

Figure 2 a

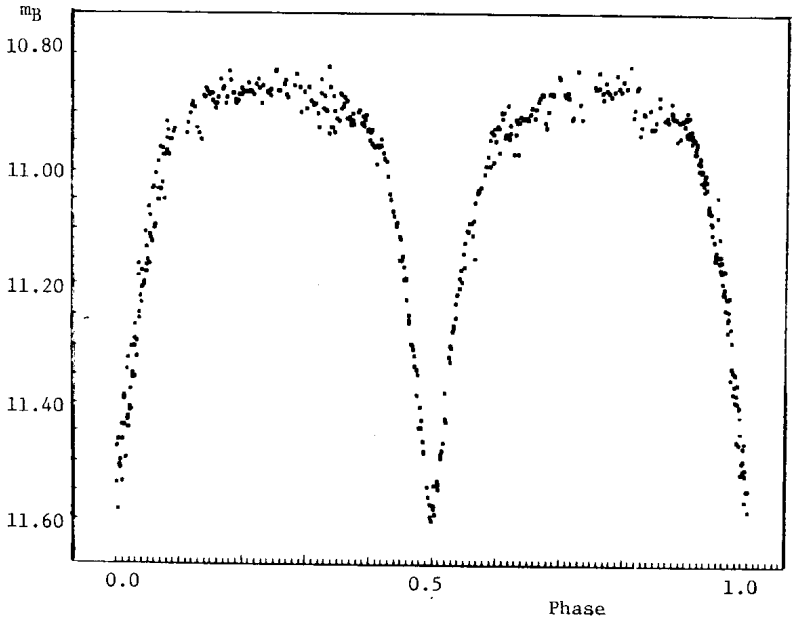

Figure 2 b
Figure 2 BV light curves of V541 Cas in 1982.

This ephemeris, however, cannot be extended till the recent times of minima (in Table II), and the period 0.909026 days also cannot be used to combine our BV observations into smooth light curves.

Table III listed all the historic minima and their O-C based on ephemeris (1). The O-C diagram (see Fig. 1) reveals that an abrupt change in the period of V541 Cas happened between 1973-1982.

If we simply use our much more accurate photoelectric minima, the following new light elements could be proposed for current use after 1982

$$\text{JD Hel. Min I} = 2445962.3049 + 0^{d}.90984695 \cdot E$$
$$\pm .0003 \pm .00000044 \cdot E$$

The B, V light curves of V541 Cas are shown in Figure 2.

It shows that: (1), there are obvious brightness variations outside the eclipse; (2), the primary and secondary minima have almost the same depth; (3), its light curve is very similar to those of detached system AT and AZ Cam (Zhai et al, 1983 and Zhang et al., 1984).

The light curve of the star and the change of its period should be analyzed in more detail in a subsequent paper.

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