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PHOTOGRAPHIC OBSERVATIONS OF V651 Mon, THE CENTRAL STAR OF
THE PLANETARY NEBULA NGC2346

The central star of planetary nebula NGC2346 (AGK3-0965) is known to be a spectroscopic binary with a period of about 16 days (Mendez 1980). From at least 1899 to 1981 Nov. it did not vary in brightness (Schaefer 1983). But in 1981 Dec. unexpected large amplitude eclipse variations in brightness were observed (Kohoutek 1982). Since then a lot of observations have been reported by many authors as Kohoutek (1983), Feibelman and Aller (1983), Marino and Williams (1983, 1984), Schaefer (1985), Jasniewicz and Acker (1986) and others. They have revealed that the central star of NGC2346 showed fast and complex light variations due to eclipse and the amplitudes of the eclipse varied rapidly.

We have observed the the planetary nebula NGC2346 since 1981 and found that its eclipse amplitude rapidly decreased in 1986 and pointed out that the amplitudes would be decreasing (Hao 1987).

In this paper we present new photographic observations made in March and April 1987 using the 32/385 cm refractive telescope at the QingDao observatory. The plates and filter combination used for the photographic and photovisual magnitudes were Eastman Kodak-103_a0 (or II_a0) and Kodak-103_D + GG14 respectively. The method of the magnitude determination is described by Hao (1987). From these we obtained the m_{pg} and m_{pv} , the results are given in Table I and Table II respectively. The photographic light curves we obtained in 1985, 1986 and 1987 are plotted in Figure 1. In Figure 2 the photovisual light curve is plotted.

The magnitudes in Table I and II contain contributions from both the central star and the nebular radiations.

From these observations we can state that the brightness variations of the central star of planetary nebula NGC2346 have an obvious difference from 1985 to 1987. The eclipse amplitude is decreasing rapidly from 4^m.0 (1985), 1^m.1 (1986) to about 0.4 (1987). The fluctuation in the light curve

Table I

No	Plates No. QA-	J.D.hel. 2446000+	M pg	Phase
1.	1003	870.978	11.13	0.982
2	1004	871.983	11.49	0.045
3	1005	872.972	11.41	0.170
4	1008	879.990	11.26	0.540
5	1010	880.985	11.35	0.609
6	1011	887.971	11.34	0.047
7	1014	901.003	11.22	0.864
8	1015	901.985	11.30	0.925
9.	1017	902.986	11.27	0.957
10	1018	906.983	11.20:	0.238
11	1021	907.996	11.33	0.302
12	1022	908.985	11.38	0.364
13	1025	911.984	11.39	0.552
14	1026	913.997	11.40:	0.678

Table II

No	Plates No. QA-	J.D.hel. 2446000+	M pg	Phase	C
1	1006	837.991	11.43	0.171	-0.02
2	1009	880.927	11.38	0.608	-0.03
3	1012	887.984	11.52	0.048	-0.18
4	1013	900.988	11.33	0.863	-0.11
5	1016	901.998	11.37	0.926	-0.07
6	1019	906.996	11.27	0.239	-0.07
7	1020	907.983	11.25:	0.301	0.08
8	1023	909.010	11.17	0.365	0.21
9	1024	912.015	11.30	0.554	0.08

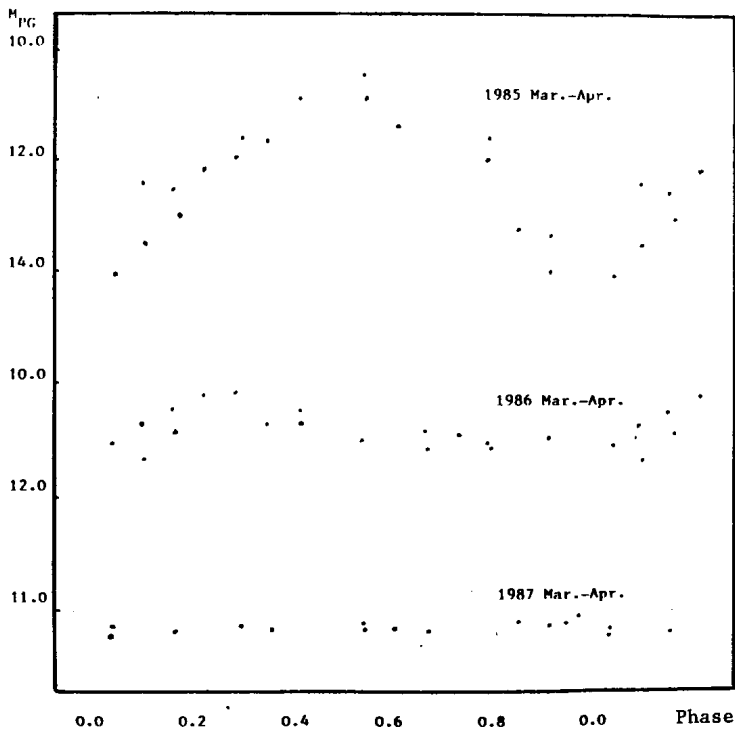


Figure 1. The light curves of AGK3-0965. Phases were computed using the elements given by Hao (1987).

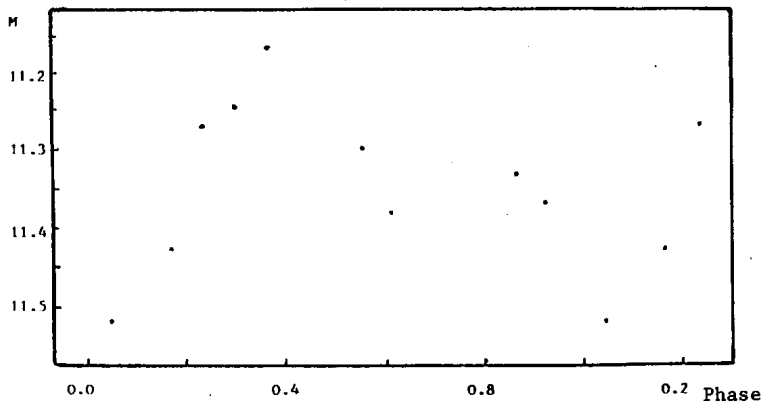


Figure 2. The light curve of AGK3-0965 (photovisual magnitudes).

is increasing in 1987 even we could not see the eclipse variations in photographic region.

The maximum brightness (m_{pg}) of this object showed no obvious change between 1985 and 1986 but in 1987 increased by about one magnitude ($11^m.2$). The variation of minimum brightness is larger than that of the maximum brightness (m_{pg} nearly $14^m.0$ in 1985 to about $11^m.5$ in 1987).

From Figure 2 it seems that the eclipse variation still exists and its amplitude is only about 0.35 mag. which is smaller than in 1986.

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