

COMMISSION 27 OF THE I. A. U.
 INFORMATION BULLETIN ON VARIABLE STARS

Number 2281

Konkoly Observatory
 Budapest
 1983 February 21
 HU ISSN 0374-0676

NGC 2346 DOES NOT SHOW ECLIPSES BEFORE 1981

Kohoutek (1982) and Mendez, Gathier, and Niemela (1982) discuss the recently discovered eclipsing behavior of the central star of the planetary nebula NGC 2346. They conclude that no eclipses were visible in the recent past (i.e. the 1970's). This conclusion is primarily based on the exposure of 52 spectrograms recorded between December 1976 and February 1981. If large amplitude eclipses had occurred during this span of time, then the spectrograms taken during the phase of the eclipse would be substantially under exposed. This rapid onset of eclipses is a unique phenomenon and should be confirmed by more direct methods.

The collection of archival photographic plates at Harvard College Observatory can be used to search for old eclipses. Briefly, I find that NGC 2346 did not exhibit large amplitude eclipses before 1981. In the table, I have tabulated 21 magnitudes, based on plates taken since January

Table I
 Magnitudes for NGC 2346

DATE	JD minus 2440000	COLOR	PHASE	m
Apr 15 '82	5074.544	B	0.85	13.2
Mar 20 '82	5048.876	R	0.25	bright
Mar 18 '82	5046.560	B	0.10	11.5
Feb 15 '82	5015.586	V	0.17	11.3
Jan 22 '82	4991.590	B	0.66	12.4
Dec 26 '81	4965.092	R	0.01	bright
Dec 26 '81	4965.056	B	0.01	11.5
Dec 20 '81	4958.793	B	0.61	12.3
Nov 3 '81	4911.887	B	0.68	11.3
Apr 2 '81	4696.874	B	0.23	11.1
Mar 28 '81	4691.540	B	0.90	11.2
Mar 9 '81	4672.943	B	0.74	11.1
Feb 28 '81	4663.581	B	0.15	11.4
Jan 31 '81	4635.657	B	0.41	11.3
Jan 6 '81	4610.679	B	0.84	11.2
Dec 15 '80	4588.759	R	0.47	bright
Nov 6 '80	4549.899	B	0.04	11.1
Mar 11 '80	4309.523	B	0.01	11.2
Feb 6 '80	4275.617	B	0.89	11.4
Jan 10 '80	4248.710	B	0.21	11.2
Jan 10 '80	4248.690	R	0.21	bright

1980. The magnitudes have a one sigma error of 0.2^m and the phase is based on a period of $15^d.991$ and an epoch of 2443126.0. Note that the December 1981 observation shows an eclipse, however the November 1981 observation (at a similar phase) shows the star at its normal brightness. This could indicate that either the period is incorrect or that the deep eclipses started with a time scale similar to an orbital period. Spectroscopic and photometric observations published elsewhere provide ample evidence that the period is well known.

I have also examined 37 plates taken between 1968 and 1979 and 155 plates taken between 1899 and 1953. On no plate exposed before December 1981 was the central star fainter than its normal magnitude. If eclipses had occurred during any substantial fraction of the epoch when observations are available, then it would be highly unlikely for them to have been missed.

My conclusion is that NGC 2346 probably experienced a sudden turn on of deep eclipses in November 1981. Neither the nebular eclipse hypothesis (Mendez, Gathier, and Niemela 1982) nor the nodal motion hypothesis (cf. Schaefer 1981) can allow for such a short eclipse turn on time scale.

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References:

- Kohoutek, L. 1982, I.B.V.S. no. 2113.
Mendez, R., Gathier, R., and Niemela, V. 1982, *Astron. Astrophys.* 116, L1.
Schaefer, B.E. 1981, *Pub. Astron. Soc. Pacific* 93, 225.