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

Number 2266

Konkoly Observatory
Budapest
1983 January 12

HU ISSN 0374-0676

PHOTOGRAPHIC OBSERVATIONS OF THE CENTRAL STAR IN THE PLANETARY NEBULA NGC 2346

In IBVS No. 2113 Kohoutek (1982) has reported drastic changes in the light curve of the central star of the bipolar planetary nebula NGC 2346. These were interpreted as a partial or near total eclipse of the main component of a close-binary system. An orbital period of 17.2 ± 0.4 days was estimated from the light curve.

Earlier radial velocity measurements by Mendez and Niemela (1978) and Mendez (1980) indicated a shorter period of 16 days for the system.

One of us (Marino) observed this system visually in 1982 April using the sequence magnitudes published by Kohoutek. In the five cycles which had elapsed since Kohoutek's data the O-C residual of the minimum using his ephemeris was -6.0 ± 2.0 days. These observations, together with estimates made visually from four photographs taken by Williams, have been presented at the 1982 Annual Conference of the RASNZ (Marino and Williams, 1982). A period of 16.0 ± 0.1 days, consistent with the radial velocity results, was found to be a better fit.

In this circular we present refined estimates of the four photographic observations, plus estimates made from a further 20 photographs exposed by Williams during 1982 May-June. These include exposures during two further minima.

The instrument used for the photography was a 53 cm Cassegrain telescope, owned by Williams, with an f/3 primary mirror stopped down to f/4 to reduce coma at the edges of the photograph. Exposures were for 5 minutes made at the prime focus on Kodak Tri-X film with a yellow filter to approximate visual magnitudes. Prints were made at a scale of 10 arc seconds per 1 mm. Magnitudes were estimated by Marino by visual comparison of the photographic image of the variable with those of the adjacent sequence stars. The reduced magnitudes are listed in Table I.

Table I

Photographic observations of the central star of NGC 2346 in 1982 May-June.

JD 2445000+	m_v	JD 2445000+	m_v
090.8	fainter than 14.2	113.8	11.5
091.8	14.0	114.8	11.6
092.8	12.5	115.8	11.4
093.8	11.8	116.8	11.4
094.8	11.6	117.8	11.9
095.8	11.4	118.8	12.7
099.8	11.5	119.8	14.0
100.8	11.7	120.8	fainter than 14.2
101.8	11.9	127.8	11.4
105.8	fainter than 14.2	128.8	11.4
106.8	fainter than 14.2	129.8	11.3
111.8	11.5	130.8	11.6

Determination of the magnitude at minimum was made difficult by the surrounding nebulosity. In the cases marked 'fainter than 14.2' no positive stellar image could be separated from the nebulosity.

The period of approximately 16 days is confirmed by the additional two minima.

The magnitudes derived by this method are unlikely to be completely consistent with the earlier published photoelectric observations. They should however be sufficiently close to allow some valid comparison to be made. The light curves when plotted suggest the depth and width of minimum may now be greater than previously, and the duration of maximum light shorter by some one to two days.

Photography a few days each side of predicted minima will be continued and supplemented by visual observations by local variable star observers during the coming observing season.

BRIAN F. MARINO and H.O. WILLIAMS

Auckland Astronomical Society
P.O. Box 2858, Auckland 1,
New Zealand

References:

Kohoutek, L., 1982, IBVS No. 2113
Marino, B.F. Williams, H.L., 1982, Journal of the RASNZ (Southern Stars), in press
Mendez, R.H., 1980, IAU Symp. No. 88, 567
Mendez, R.H., Niemela, V.S., 1978, Mon. Not. Roy. Astr. Soc. 184, 351