XZ CYGNI UP-DATE

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Abstract

New elements describing primary maxima after the decrease in period that occurred circa 1975 are presented.

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The RR Lyrae variable star XZ Cygni is notable largely because of its well-known Blazhko effect (Blazhko, 1922) and because of its large change in primary period during 1965-69. These phenomena were analyzed by Baldwin (1973), Smith (1975), and Taylor (1975), among others.

Extensive observations from many observers indicate that the primary period of XZ Cygni remained constant, or nearly so, between 1969 and 1975. My own determination of the period for this interval, utilizing 33 visual maxima (reduced by the author) and 38 photoelectric (V) maxima (Pop, 1975) yields the following equation:

$$\text{JD(hel.)primary max.} = 2441979.573 + 0\overset{d}{.}466474E. \qquad (1)$$

It is interesting to note that this result is identical to that of Taylor (1975) whose calculations involved only visual maxima that attained magnitude 8.9 or brighter.

My present investigation is based on 21 new, visual times of maximum (heliocentric) reduced through Pogson analysis (Table I).

TABLE I

RECENT VISUAL TIMES OF PRIMARY MAXIMUM, CYCLES (E) AND O-C RESIDUALS COMPUTED FROM EQUATION (1)

JD hel.max. 2440000+	E	O-C	JD hel.max. 2440000+	E	O-C
2567.798(:)	1261	$0\overset{d}{.}001$	3098.602	2399	$-0\overset{d}{.}042$
2611.653	1355	.008	3390.587	3025	-.070
2624.708	1383	.001	3395.721	3036	-.067
2631.712	1398	.008	3438.638	3128	-.066
2632.639	1400	.002	3444.697(:)	3141	-.071
2751.574	1655	-.013	3446.563	3145	-.071
2978.740	2142	-.020	3715.704	3722	-.085
2984.792	2155	-.032	3721.779	3735	-.074
2986.660	2159	-.030	3728.769	3750	-.082
3028.642	2249	-.031	3786.609	3874	-0.084
3034.698	2262	-0.039			

It is apparent from inspection of the O-C residuals, that during the summer of 1975 a further decrease in period took place. The following ephemeris, calculated with the final 19 equally-weighted primary maxima listed in the Table and a linear regression analysis, now holds:

$$\text{JD(hel.)primary max.} = 2443028.641 + 0\overset{d}{.}466438E. \qquad (2)$$

The coefficient of determination, a statistic measuring the validity of the linear relationship, exceeds .96 in this case; quite good when one considers the often large O-C fluctuations inherent in stars that display the Blazhko effect.

Column 1 of Table II continues the list of secondary cycle "Magnitude Maxima" presented by Smith (1975). All maxima are com-

TABLE II

MAGNITUDE MAXIMA

JD max 2440000+	Δ	EII	O-CII
1919		52	$1^{d}.2$
1980	$61^{d}.00$	53	3.8
2272	58.40	58	3.9
2332	60.00	59	5.5
2567	58.75	63	6.9
2972	57.86	70	3.2
3032	60.00	71	4.8
3443	58.71	78	7.1
3615	57.33	81	4.0
3728	56.50	83	0.2
3785	57.00	84	-1.2

prised of AAVSO visual observations. They were determined graphically, by hand-fitting a mean secondary curve to well-defined apparent maxima of magnitude. Maxima at Julian dates 2441919 and 2441980 from Smith (1975) were slightly redefined. The Smith equation describing secondary cycle maxima proved slightly superior to those of Baldwin or Taylor. Therefore, secondary cycles (EII) and O-CII residuals were calculated with that relation, namely,

$$\text{JD mag. secondary max.} = \underset{\pm 2.7}{2438881.7} + \underset{\pm .076}{58^{d}.387}\text{EII}. \quad (3)$$

While all fall within the range of (3), a best-fit is obtained when the value for initial epoch is taken as JD 2438884.1. In addition, it should be noted that the mean differences (Δ) between the last four listed maxima appear consistently shorter than any since late 1972. The present data is too limited in duration for valid conclusions to be drawn in this regard but it will be interesting to see if this "trend" is real, and if so, whether it continues during the next observing season.

No attempt was made with respect to analysis of the O-C Blazhko effect. The available visual observations are not sufficient to support such an investigation.

Figure 1 depicts the star's activity after January, 1975, in primary periodicity, plotted according to equation (1).

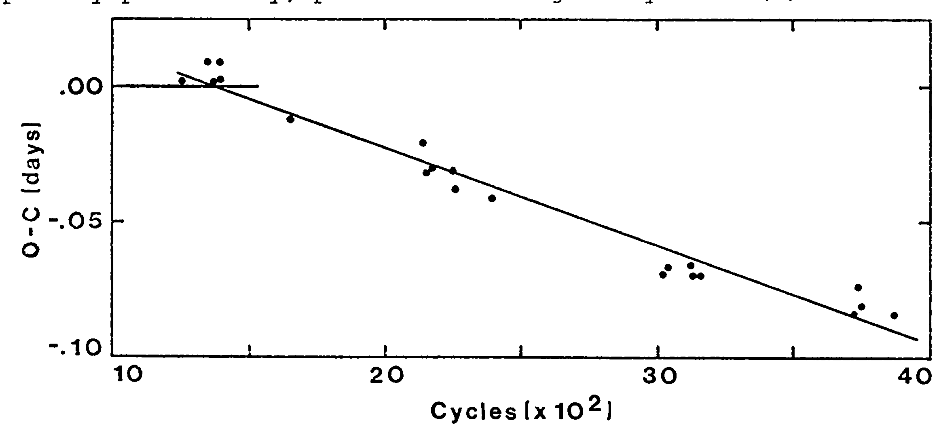

Figure 1. O-C diagram for XZ Cygni (1975-1978) plotted according to equation (1). The rightmost line represents the author's least-squares analysis (equation 2).

The assistance of Marvin E. Baldwin in supplying the AAVSO visual estimates of XZ Cygni is gratefully acknowledged.

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THREE UNUSUAL VARIABLES IN CYGNUS

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Abstract

Three suspected variables in Cygnus were examined on the plates of the Maria Mitchell Observatory. All three prove to be of unusual type:

S4802 is apparently semiregular with cycles on the order of 80 days;
S4831 is probably RV Tauri type with half cycle lengths ranging from 120 to 160 days;
S4846 is an unusual star with long-period semiregular cycles interrupted by intervals of relative quiescence. A beat phenomenon may be present.

Details on these stars are published in the Information Bulletin on Variable Stars of the International Astronomical Union.

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THE LIGHT VARIATIONS OF V SAGITTAE

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Abstract

The light curve of this nova-like star displays three types of variations: (1) Brightening of up to three magnitudes associated with the ejection of hot gas from either or both components of the close binary, (2) eclipses whose shapes vary from cycle to cycle, (3) irregular and very rapid fluctuations, called "flickering."

This flickering was observed visually on several nights in October, 1978, when the star appeared to change brightness by up to 0.6 mag. in several seconds.

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