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PHOTOMETRY OF WZ SAGITTAE DURING ITS 1978 OUTBURST

Photoelectric photometry of the recurrent nova and eclipsing binary WZ Sagittae reveals that a 0.8 minute, or 1% change in its photometric period took place during its recent outburst. Whereas the premaximum period given by Robinson et al. (1978) is 81.63 minutes, outburst observations since December 10,1978 are more consistent with an 82.42 minute period.

Observations were made on seven evenings between December 10 and December 23, 1978, using the 36 cm Schmidt-Cassegrain telescope of Brown University. The photometer employs an RCA 1P21 tube (uncooled) and the standard U,B,V filters. All measurements were made through the V filter. BD+17°4224 [V=8.76 (Krzeminski and Kraft, 1964)] was the comparison star.

The slowly changing features of the light curves are sometimes masked by sudden fluctuations in brightness. These fluctuations are partly intrinsic to WZ Sge and partly related to the poor photometric conditions at Sagitta's low altitude. The most distinct minima observed during this period are listed in column one of Table 1.

Table 1

O Obs.Minima ($JD_\odot$2443800.0+)	E Eclipse Number	C Calc.Minima ($JD_\odot$2443800.0+)	O-C Residuals (Days)	C′ Revised Calc.Min. ($JD_\odot$2443800.0+)	O-C′ Revised Residuals (Days)
57.4621	111307	57.4825	-0.0203	57.46298	-0.0009
58.4382	111324	57.4462	-0.0080	58.4360	0.0022
62.4397	111394	62.4143	0.0254	62.4423	-0.0026
66.4499	111464	66.3825	0.0674	66.4487	0.0012

The predicted times of minima, T (column three), were calculated using the premaximum elements: $T=JD_\odot 2437547.72845 \pm 3 + 0^d.0566878455 \pm 7 \cdot E$ (Robinson et al. 1978).

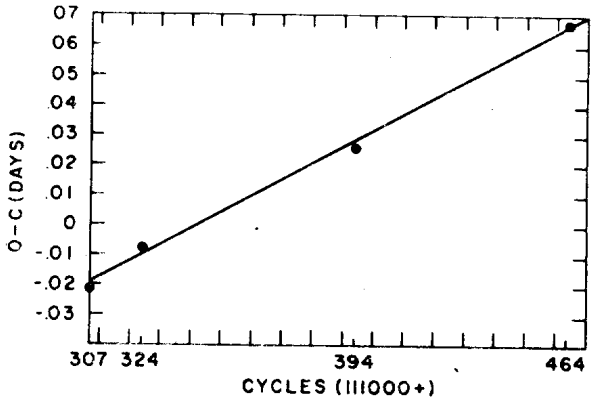

FIGURE 1

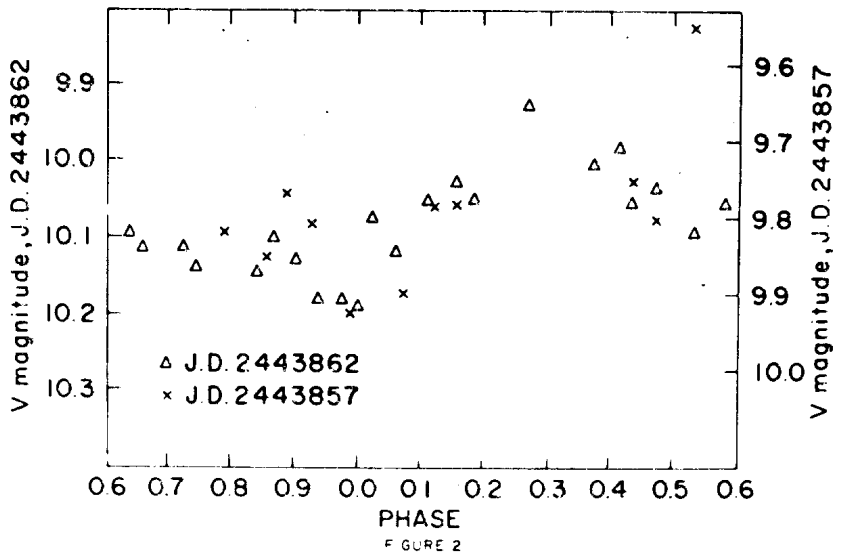

FIGURE 2

The residuals are plotted in Figure 1. The revised elements that give the best fit for our data are $T=JD_{\odot}2443857.46298+0^{d}.057234 \cdot E$.

The values in the fifth column and the residuals in the sixth column of Table 1 are based upon these revised elements.

Observers at the University of Texas McDonald Observatory found it easier to discern the maxima during the outburst, and their observations conform to the elements: $T_{max}= JD_{\odot}2443852.552+0^{d}.057250 \cdot E$ (Patterson 1979).

Table 2 shows that their elements do predict this author's observations of maxima within observational error. The maxima were obtained by selecting what appeared to be well defined primary maxima, and neglecting occasional isolated high readings as well as a secondary hump separated from the primary by half the orbital period, which was occasionally observed.

Table 2

O	C	O-C
Observed Maxima ($JD_{\odot}2443800.0+$)	Calculated Maxima ($JD_{\odot}2443800,0+$)	(Days)
57.4767	57.4755	0.0012
58.4496	58.4488	0.0008
62.4575	62.4563	0.0012

A magnitude versus phase diagram combining the observations of JD 2443857 and JD 2443862 shows the general form of the $0^{m}.3$ amplitude variation in V, while providing further evidence that the assumed new period is correct. (See Figure 2). The phase was computed by using the revised ephemeris. Allowance was made for gradual variation in brightness as the nova faded.

It should be noted that observations by E. Bogusz and A.Udalski of the Warsaw University Observatory indicate that WZ retained its normal periodicity through December 8-9 (Kruszewski and Krzeminski, 1979). Apparently the period change occurred somewhere between December 8-9 and December 10, when the new period was first observed.

In conclusion, observations from December 10, 1978 indicate that the photometric period of WZ Sagittae has increased by 0.8 minutes. Observations of WZ Sge upon its reappearance from behind the sun would be of importance in understanding the nature of such changes in period.

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