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NEW MINIMA TIMES AND LIGHT ELEMENTS FOR SIGMA AQUILAE

In 1986, I chose the small-amplitude eclipsing binary Sigma Aquilae (HR 7474) to test the capabilities of a new photometer. It was soon apparent that minima were occurring almost 2.5 hours later than predicted by the light elements in the General Catalogue of Variable Stars (Kholopov et al., 1985, citing Wylie, 1922). Observations were therefore continued to determine accurate times of primary and secondar eclipses.

During the 1986 and 1987 seasons, 162 mean differential magnitudes in V of the Johnson system were obtained with an Optec SSP-3 solid-state photometer and 20-cm reflector, using Upsilon Aquilae (HR 7519) as the comparison star. The following normal times of minima were determined by the tracing paper method from each season's light curve:

TABLE I

HJD 244+	Min. I/II	O-C (a)	O-C (b)
6728.6292 ±10	I	$+0^d.100$	$-0^d.0009$
6729.6086 ±15	II	+0.105	+0.0034
7027.0196 ±12	I	+0.101	-0.0015
7027.9978 ±16	II	+0.104	+0.0016

(a) GCVS elements, Min. I = HJD 242 2486.797 + $1^d.95026$ E

(b) New light elements, below.

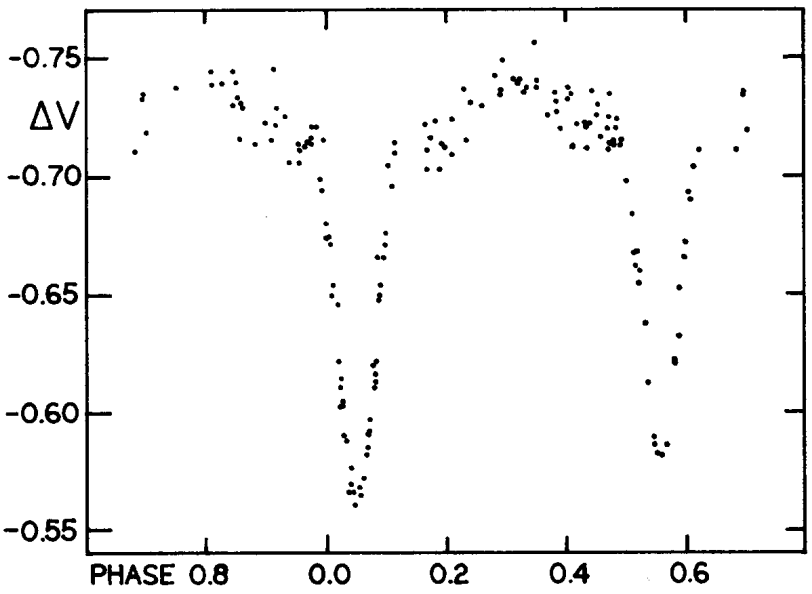

FIGURE 1. The light curve of Sigma Aquilae. The phases are calculated according to the light elements of Wylie (1922). Each point represents the mean of three or four differential measures.

A literature search failed to find any photoelectric times of minima published since Wylie (1922). However, one unpublished timing of primary eclipse by D. Engelkemeir (17 pe measures in 1961) is recorded on card 4 of the Sigma Aquilae file, Eclipsing Binary Card Catalogue, University of Florida (Wood, 1987): Min. I = HJD 243 7589.669.

Engelkemeir's timing differs by only $0^d.004$ from a constant period between Wylie's epoch and the new times of minima reported here. Assuming, on this evidence, that the period has indeed been constant, the six available times of eclipse were used to derive improved light elements by least-squares linear regression:

$$\text{Min. I} = \text{HJD } 242\ 2486.7955 + 1^d.95026827\ E$$

The standard deviation of a single timing from these elements is $\pm 0^d.0027$. Monet (1980) reports a spectroscopic period of $1^d.950271$, much closer to the improved photometric value than Wylie's period.

The observations are plotted in the accompanying figure. Based on Upsilon Aquilae's magnitude, 5.91 **V**, in The Bright Star Catalogue (Hoffleit and Jaschek, 1982), Sigma's magnitude at maximum is 5.17 **V**. The **V** amplitude is 0.18 (Min. I) and 0.16 (Min. II).

Surprisingly, no modern photoelectric light curve of Sigma Aquilae has been published. Hill et al. (1976) report 57 three-color measures, but almost no observations were made in the deep phases of eclipse. I am therefore continuing observation of Sigma Aquilae to provide light curves with complete phase coverage in **B** and **V**.

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