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# V417 AQUILAE: PHOTOELECTRIC OBSERVATIONS AND IMPROVED PERIOD

The eclipsing binary V417 Aql (BD+5° 4202) was discovered by Hoffmeister (1935), but he only commented that it had a short period. Four times of minimum light were determined by Soloviev (1937), who found a period of $0^d.370114$ and classified it as a W Ursae Majoris system. Further work by Soloviev (1949) yielded an improved period of $0^d.3701207$. Kramer (1947) published four times of minimum light, obtained a period of $0^d.3701250$, and suggested the possibility that the secondary minimum was displaced. With one time of minimum light, Koch (1956) concluded that the secondary was not displaced and redetermined the period to be $0^d.3701251$. The only photoelectric observations of this system appear to be one time of minimum light (Braune and Mundry, 1982).

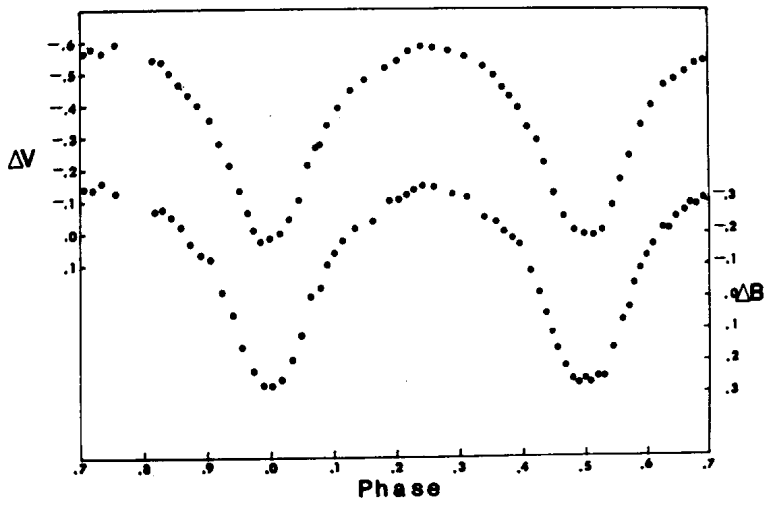


Figure 1

Because this system has not been observed extensively, it was selected for observations on 8 nights between July and October, 1983 with the 41-cm telescope of the Morgan-Monroe Station of the Goethe Link Observatory. A 1P21 photomultiplier tube cooled with dry ice was used in the pulse counting mode with standard B and V filters. Differential measurements were made using BD+5° 4203 as the comparison star and BD+5° 4196 as a check star. Due to the close proximity of the variable and comparison, no corrections for differential extinction were necessary.

Two primary and three secondary eclipses were well defined, from which five times of minimum light were determined with the Hertzsprung method. These are listed in the table below.

| JD Hel. 2445000+ | Min. | (O-C) |
|---|---|---|
| 542.6894 | II | +0.0004 |
| 550.6508 | I | +0.0001 |
| 554.7234 | I | -0.0007 |
| 575.6468 | II | +0.0002 |
| 605.6416 | II | 0.0000 |

The following light elements were determined from a least squares solution to these times of minimum light:

$$\text{HJD Min.I} = 2445554.7241 \pm 3 + 0^{d}.3703072 \pm 23 E.$$

This ephemeris was used to calculate the (O-C)'s in the table above.

This period is about 16 seconds longer than any previously published period. Since this period change seems rather large, other explanations were explored. Soloviev's first period was based on observations made over an interval of only five nights. With a base line this small, such a large error in the period is understandable. Further refinements in the period relied upon the addition of single times of minimum light or, at most, two epochs determined from observations made on consecutive nights. Unfortunately, an error of 16 seconds in the period would amount to almost precisely one half a period in one year. Because the primary and secondary eclipses have equal depth, it is difficult to distinguish between them. Therefore it appears that past observers may have misidentified some of the eclipses that they observed. Only when observations were conducted over many cycles in a single season, as in the present study, would the error in the period become apparent.

Normal points have been formed from the present observations and are plotted in the accompanying figure. As can be seen, good definition is given to most of the light curve. Analysis of the light curve will be published elsewhere.

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