

PHOTOMETRY OF THE 1995-96 ECLIPSE OF ZETA AURIGAE*

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ABSTRACT

UBV observations have been made jointly at three observatories for the recent eclipse of the long period atmospheric eclipsing binary star Zeta Aur in 1995-6. Observations covered successfully the phases before, during, and after the eclipse enable us to determine the accurate time of mid-eclipse and the duration of the totality. The hypothesis of the expansion of the K supergiant has been tested and the positive conclusion may be derived.

UBV observations of Zeta Aur for the 1995-6 eclipse have been jointly made at three observatories; Yonsei University Observatory(YUO), I.-S. Nha Observatory(NO), and Chungbuk University Observatory(CUO). The number of observations made for 65 nights from JD 249988.17 to JD 250107.00 are 45, 63, and 62 nightly means for U, B, and V, respectively. The nightly mean instrumental magnitudes in the sense of $m(Zeta\ Aur - \lambda\ Aur)$ were converted to the standard Johnson system. The instrumentations, observational techniques and reduction procedures are given elsewhere (Nha *et al.* 1986; Nha 1996). The depths in magnitude at the mid-eclipse are 2.18, 0.58, and 0.14 for U, B, and V, respectively. The contact times during the eclipse are deduced by using the light curves. They are :

- HJD2450031.9 ... 1st contact
- HJD2450033.5 ... 2nd contact
- HJD2450071.4 ... 3rd contact
- HJD2450073.0 ... 4th contact

The time of mid-eclipse thus becomes HJD 2450052.45 and the duration of total eclipse is 37.90 days. According to the ephemeris by Nha (1991), the O-C value is -0.02 day.

The collection of durations of totality has been made and these with respect to different eclipses are plotted in Figure in a chronological order. As is obvious in the Figure, the duration of the total eclipse seems to continue its increase; the rate of increase is +0.044 day/p. This value confirms the hypothesis of increase of the size of K-component of Zeta Aur system (Kiyokawa 1967; Saijo *et al.* 1978).

REFERENCES

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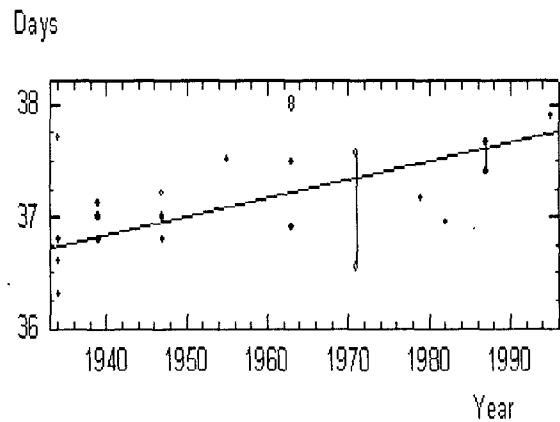


Fig. 1.— The variation of the durations of totality of Zeta Aur. Small closed circles are for those from the literatures and open circles the estimates from the Figure 2 of Nha (1992). The solid line represents the increase rate (see the text).

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