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FLARE ACTIVITY OF EPSILON AURIGAE?*

Epsilon Aurigae has been regularly observed at the Yonsei University Observatory with the 40-cm and the 60-cm reflectors in the UBV system. The number of observations in each color, since the observation began in 1982 April, exceeds one hundred. Normally the observation of Eps Aur each night lasted for about an hour or so and the rest of the night was shared with other program stars. Atmospheric extinction for each color was determined by the observation of an extinction star, i. e., a star chosen to observe throughout the night for the determination of the given night's extinction coefficients, and thus the differential extinction was corrected promptly for each night.

Soon after the termination of the ingress of Eps Aur we preempted several photometrically excellent nights to monitor Eps Aur for the entire night, with no other program stars included, using Lamda Aur as a comparison and as the extinction star for the night. Nine such good nights were available in two months, January and February, during which Eps Aur went well into its total eclipse. Eta Aur served as the check star. It is our customary procedure to make a net deflection vs. time diagram for each color of each star in order to correct any misread or misrecorded net deflection(star-sky), which could easily be made by the reader of the chart paper, at the earliest stage of the reduction work preceding computer processing. Through this reduction an unusually large net deflection in B was noticed on the diagram made for the Eps Aur observations of Jan. 21. Among over fifty nights' observations made so far, this Jan. 21 data

*Yonsei University Observatory Contribution No.8.

has been reduced in the instrumental magnitude system and the results are shown in Figure 1. In this figure the open circles represent the blue light curve of

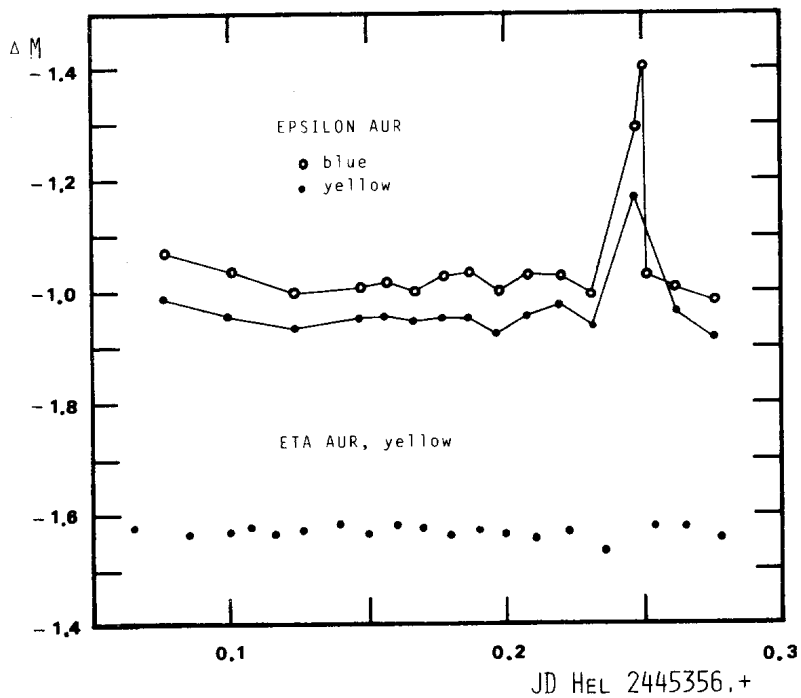


Figure 1.

Blue and yellow light curves of Eps Aur and the yellow light curve of Eta Aur.

Eps Aur and the dots represent the yellow light curves of Eps Aur and Eta Aur. As shown in the figure, Eps Aur exhibits a sudden brightening by about 0.4^m in B and 0.2^m in V above their mean magnitudes. This light variation appears to be real because the V light curve of Eta Aur shown in the same figure remains constant throughout the night.

Since the previous eclipse 27 years ago the eclipse light curve of Eps Aur is known to be trapezoidal with a depth of 0.8^m in the range and neighborhood of

visual light wavelengths. There are small, about $0^{\text{m}}.1$, irregular variation, on a time scale of about 100 days in V and B-V in all orbital phases, but the light variation increases to about $0^{\text{m}}.2$ - $0^{\text{m}}.3$ during eclipse. There seems, however, no report that Eps Aur has ever been intensively observed to search for light variation shorter than 100 days, say night-to-night or even during a night.

It may be too early to say that there are flare activities in Eps Aur during total eclipse. The light change of $0^{\text{m}}.4$ in B is, however, much larger than the long range variations in V reported by Gyldenkerne(1970). In addition the brightening lasted for only about 20 minutes, which is comparable to the longer flare durations of known flare stars. The light variation in V is insignificant, but we will have to account for the fact that the V measurement was 2 minutes ahead of the peak brightening time estimated on the B light curve. This report requires confirmation by other Eps Aur campaign participants.

I.-S. NHA and S. J. LEE

Yonsei University Observatory, Seoul, Korea

Reference:

Gyldenkerne, k. 1970, Vistas in Astronomy 12, 190.