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LIGHT VARIATIONS OF KU Hya

KU Hya (HD 81009, HR 3724) is classified as an A3Vp (Sr-Cr-Eu) visual and spectroscopic binary with a photometric variation of 0.06 mag (Kholopov et al., 1985). It was also discovered to be one of those stars which have resolved Zeeman split lines (Preston, 1971; Mathys, 1990). This means that the star has strong magnetic field but the structure of this field has never been studied yet. In spite of the fact that this bright star ($m_v=6.52$) has been studied over 60 years, an accurate orbital period has not been obtained (too long!).

For rotation period, Wolff (1975) concluded that it has to be either 69 or 34.5 days from the 1973 January-May photometric observations. Hensberge et al. (1976) suggested it to be about $34^d1 \pm 0^d2$. Adding new observations, Hensberge et al. (1981) revised that the period should be $33^d97 \pm 0^d02$ with the ephemeris

$$\text{Min (in } v) = \text{HJD } 2441782.80 + 33.97 \times E$$

Waelkens (1985) got a most similar period of $33^d96 \pm 0^d01$ with an epoch of maximum brightness of JD 2444480.7 \pm 0.5.

In February 1993 we observed this star using Kurtz's (1982) rapid photometry method. Photometric measurements were made in Strömgren v band with 1 m RCC telescope of Yunnan observatory in Kunming. We adopted an integration time of 10 second, so that, a total of 694 data points, covering about 3 hours, could be collected in a good observation night.

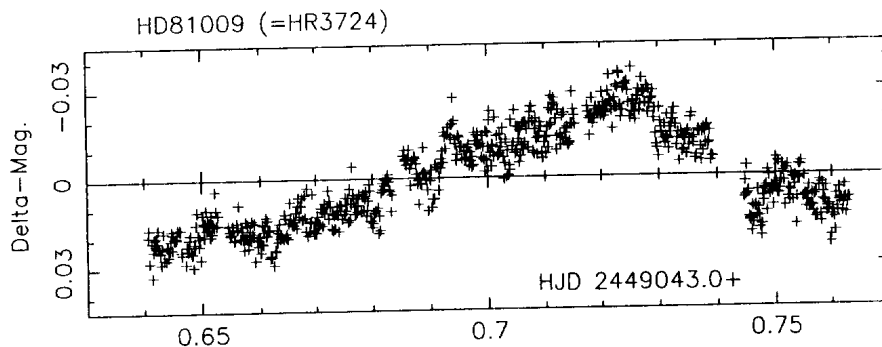


Figure 1

The light curve in Figure 1 clearly shows a large variation ($\approx 0^m04$). The data was only corrected for sky light and atmospheric extinction, using statistically determined mean absorption coefficients. Frequency analysis of short periods did not give us any significant result. But, we paid attention to the fact that an obvious light maximum occasionally appears in our observations at HJD 2449043.724. We can do some calculations as follows:

$$\begin{aligned}(2449043.724 - 2444480.7) \div 134 &= 34.05 \\ (2449043.724 - 2444480.7) \div 135 &= 33.80 \\ (2449043.724 - 2441782.80) \div 213.5 &= 34.01 \\ (2449043.724 - 2441782.80) \div 214.5 &= 33.85\end{aligned}$$

Which value should we choose? If we take the period of 33^d80 or 33^d85 , it seems that the rotation period became shorter and shorter gradually (from 34^d5 to 34^d1 , to 33^d96 , to 33^d8). Does this star spin up?

Since there was so large variation (about 0.04 mag) in our about 3 hour observations, in addition, we could not verify that whether this light maximum is the maximum in whole rotation period or not, an alternative explanation is that possibly there are some short period variations in this star. Anyway, future photometric, especially differential photometric observations, are necessary to confirm those hypotheses.

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