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NEW TIMES OF LIGHT MAXIMUM OF EH Lib

It is well known that the study for the secular period variation of a pulsating star is an important contribution to the understanding of the nature and state of the stellar evolution. But is it possible to determine reliably the period behavior, only in the condition that the available observational data are regular and numerous enough, especially for establishing the mechanism that produces the changing period.

EH Lib was first reported as a variable star of AI Vel type in 1950. From then on, though more than 100 times of its light maximum had been accumulated up to 1980, many of them were determined in visual and photographic observations, which are not reliable enough. Both Mahdy & Szeidl (1980) and Jiang & Yang (1981) collected all the times of light maximum available in the literature and gave different results about the period variation. Therefore we decided to observe EH Lib once a time for every several years and carried out observations in 1981, 1985, 1992. All these observations were made by the 60 cm reflector at Xinglong station of Beijing Astronomical Observatory in the V-band of standard Johnson UBV system. The 13 new times of light maximum obtained are listed in Table 1. The columns 2–5 in Table 1 represent heliocentric epoch of maximum, cycle number, residuals with linear and parabolic ephemeris respectively. The column 6 is the weight for each data. Some of the light curves of the variable relative to the comparison star BD–0°2909 are shown in Figure 1.

In order to investigate how the period of EH Lib changes after we had obtained 13 new times of maximum for spanning another 12 years, we fitted all the times of maximum of photoelectric photometry [included the data taken from Hamdy (1985) and Joner (1986)] by using a linear formula and obtained

$$T_{max} = HJD\,2433438.6082 + 0^{d}.088413242E.$$

Figure 2 shows how the $(O\text{-}C)_L$ varies with cycle number E. After a further fitting with the least squares method we get

$$T_{max} = T_0 + P_0E + 0.5\beta E^2,$$
$$T_0 = HJD\,2433438.6079 \pm 0.0002,$$
$$P_0 = 0^{d}.088413251 \pm 4 \times 10^{-9},$$
$$\beta = -1.05 \times 10^{-13} \pm 4.4 \times 10^{-14} \text{ (days per cycle)}.$$

Since of rate the period change, β, is negative, it means the pulsation period is decreasing though the period change is small. This result, obtained by adding 29 new times of light maximum for a longer span of time, is consistent with that by Jiang & Yang (1981).

More accurate observations are encouraged in order to increase the time span and hence to get its accurate period variations.

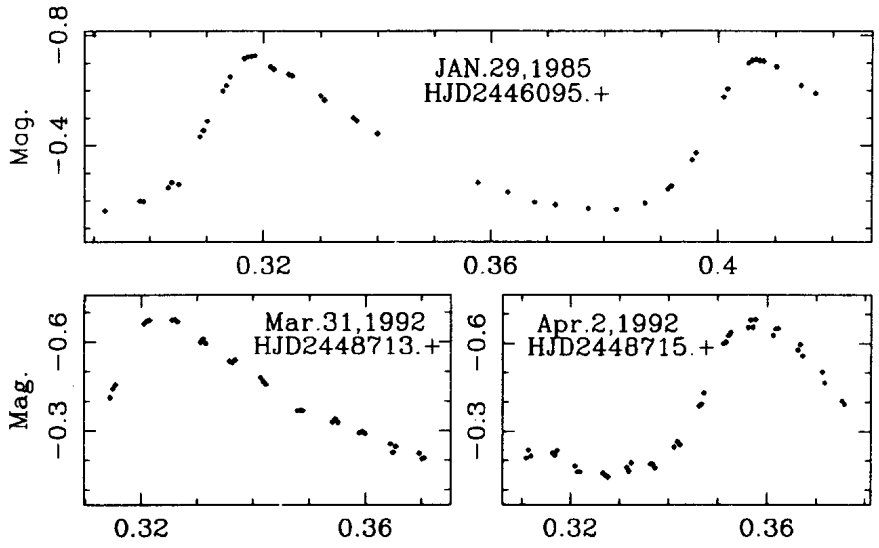

Fig.1 Light curve relative to comparison star

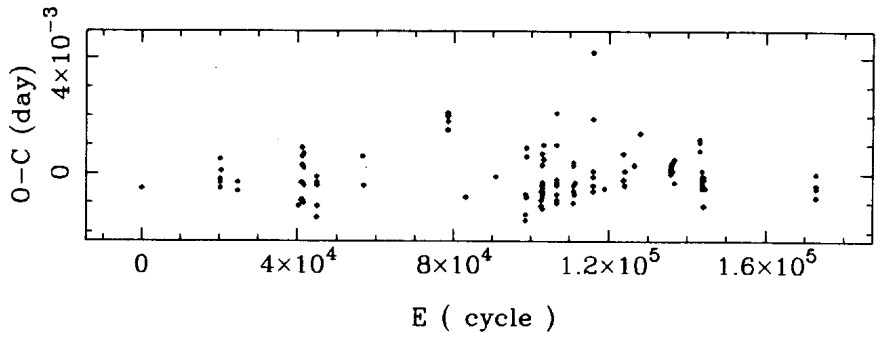

Fig.2 The O-C diagram

Table 1
New times of maximum and O-C residuals
of EH Lib for linear and quadratic fits

No.	T_{max}	E	$(O-C)_L$	$(O-C)_Q$	W
1	44754.0900	127984.0	0.0014	0.0014	0.9
2	46094.3461	143143.0	0.0012	0.0013	1.0
3	46095.3183	143154.0	0.0008	0.0009	1.0
4	46095.4070	143155.0	0.0011	0.0012	1.0
5	46179.0437	144101.0	−0.0011	−0.0010	1.0
6	46179.1331	144102.0	−0.0001	0.0000	1.0
7	46179.2214	144103.0	−0.0002	−0.0001	1.0
8	46211.1383	144464.0	−0.0005	−0.0004	1.0
9	46211.2267	144465.0	−0.0005	−0.0004	1.0
10	48713.3220	172765.0	0.0000	0.00004	1.0
11	48714.2053	172775.0	−0.0008	−0.0004	1.0
12	48714.2941	172776.0	−0.0004	0.0000	1.0
13	48715.3550	172788.0	−0.0005	−0.0001	1.0

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References:

Hamdy, M. A., 1985, IBVS, No. 2810.
Jiang, S. & Yang, Z., 1981, *Acta Astronomica Sinica*, **22**, 279.
Jouner, M. D., 1986, *PASP*, **98**, 651.
Mahdy, H. A. & Szeidl, B., 1980, Commun. Konkoly Obs., No. 74, 17.