

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 2327

Konkoly Observatory
Budapest
4 May 1983

HU ISSN 0374-0676

ON THE PERIOD OF EG CEPHEI

The first photoelectrical measurements of this β Lyr star were done in 1959/60. They showed some interesting lightcurve instabilities (Geyer, 1961). Therefore, we reobserved this eclipsing binary in the nights of Sept. 1/2, 2/3, 3/4, 1980 with a double beam photometer attached at the Nasmyth focus of the 106 cm Cassegrain telescope of Hoher List Observatory. This photometer which is equipped with usual UBV filters, 1P28B photomultipliers and charge integrators was described by Geyer and Hoffmann (1974, 1975). This instrument allows simultaneous observations of the variable- and the comparison stars with fairly high time resolution. The integration times for the U-measurements were 20 seconds, for the B and V were 10 seconds. A total of 307 U, 614 B and 614 V-observations were obtained on the three nights. We used the same comparison star as Geyer (1961). The reduction of the measurements was done in the usual manner, channel calibrations were done during the second and third night.

From our observations, we derived one time instant for the primary and two time instants for the secondary minima by the Pogson method which are listed in Table I. The O-C values were calculated with the light ephemeris given by Strohmeier (1958) (confirmed by Geyer, 1961).

From the literature, we collected all photoelectric determinations of minimum time instants and the extensive visual and photographic minimum time instant estimations by AAVSO-, BAV-, BBSAG- and Sonneberg-Observers (Mallama, 1980; Ahnert, 1975; Locher, 1975-1980). The visual and photographic deter-

Table I : Determinations of heliocentric
Times of Minima for EG Cep

Minimum time	m.e.	C	E	O-C
244 4484. ^d 4962 ₋	0. ^d 0025	V	32233.5	+ 0. ^d 0252
4484.4951	0.0014	B	32233.5	+ 0.0241
4484.4972	0.0016	U	32233.5	+ 0.0262
4485.5820	0.0016	V	32235.5	+ 0.0217
4485.584	0.004	B	32235.5	+ 0.024
4486.4032	0.0008	V	32237	+ 0.0260
4486.4026	0.0006	B	32237	+ 0.0254
4486.4022	0.0010	U	32237	+ 0.0250

m.e.: mean error; E: Epoch; O-C calculated with
the ephemerides of Strohmeier

minations were binned to normal epochs, all photoelectric
results were taken into account individually.
These values are listed in Table II.

Using Strohmeier's light ephemeris, we calculated the O-C
values given in Table II and shown in Figure 1. We investigated
the (O-C)'s for the influence of cumulative and observational

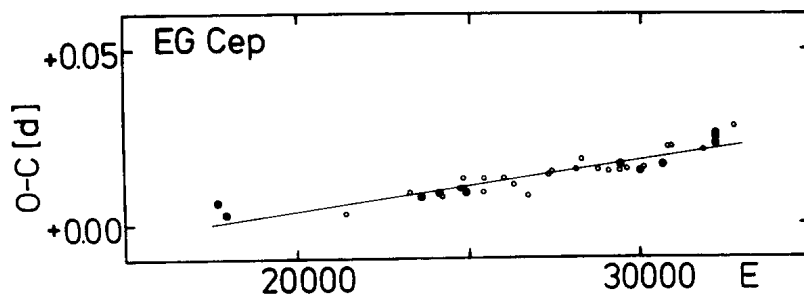


Fig. 1: The O-C diagram according to the light ephemeris of Strohmeier

Table II: Photoelectric minimum time determinations and normal epochs from visual and photographic observations of EG Cephei

Epoch	O-C	W	Reference
17 781	+ 0. ^d 0065	10	Geyer, ZfA <u>51.79</u> (1961)
17 941	+ 0.0032	10	
21 373	+ 0.0029	5	Normalepoch (NE)
23 244	+ 0.0091	5	
23 585	+ 0.0083	10	Ahnert, MVS <u>7.65</u> (1975)
24 092	+ 0.0087	10	
24 210	+ 0.0080	5	NE
24 739	+ 0.0099	5	
24 795	+ 0.0103	10	Ahnert, MVS <u>7.65</u> (1975)
24 794	+ 0.0130	5	NE
24 887	+ 0.0091	10	Ahnert, MVS <u>7.65</u> (1975)
25 410	+ 0.0093	5	NE
25 388	+ 0.0127	5	
26 081	+ 0.0132	5	
26 272	+ 0.0108	5	
26 751	+ 0.0079	5	
27 336	+ 0.0133	5	
27 422	+ 0.0153	5	
28 092	+ 0.0154	5	
28 257	+ 0.0186	5	
28 763	+ 0.0156	5	
29 051	+ 0.0147	5	
29 434	+ 0.0152	5	
29 437	+ 0.0169	10	Pohl, IBVS 1358 (1977)
29 612	+ 0.0155	5	NE
30 037.5	+ 0.0149	10	Ebersberger, IBVS 1449 (1978)
30 104	+ 0.0162	5	NE
30 641.5	+ 0.0171	10	Pohl, IBVS 1924 (1981)
30 775	+ 0.0219	5	NE
30 924	+ 0.0222	5	
31 869	+ 0.0213	5	
32 233.5	+ 0.0252	10	this paper
32 235.5	+ 0.0227	10	
32 237	+ 0.0255	10	
32 755	+ 0.0278	5	NE

errors according to the method described by Sterne (1934) with the result that a cumulative period error of $8.8 \cdot 10^{-5}$ day is present. Therefore the slight curvature in the (O-C)-diagram is fully explained by this "random walk" effect. Removing the linear trend in the (O-C)-diagram (figures) one yields the improved light elements:

$$t_{\text{Min. (J.D.)}} = 2426\ 929^{\text{d}}.4325 + 0^{\text{d}}.54462159 \cdot E.$$

Within the errors this new period agrees well with that found by Mallama (1980) based on the 112 visual determinations of AAVSO observers between 1969 and 1978. It represents all mentioned minima instants very well, indicating that the period was constant during 1959-1980 within $9 \cdot 10^{-5}$ day.

Our new UBV lightcurves which resemble those given by Geyer (1961), show some interesting, wavelength dependent instabilities. They will be discussed in detail elsewhere. The found cumulative period errors may be the result of such light curve variabilities.

U. HOPP
 Institut für Astronomie
 und Astrophysik
 Technische Universität
 D-1000 Berlin 10

E.H. GEYER
 F.-Th. LENTES
 Observatorium Hoher List
 D-5568 Daun/Eifel

References:

- Ahnert, P.: 1975, *Mitt.f.Veränderliche Sterne* 7, 65
 Geyer, E.H.: 1961, *Zeitschrift f. Astrophys.* 51, 79
 Geyer, E.H., Hoffmann, M.: 1974, *Mitt. Astron. Ges. No.* 35, 209
 Geyer, E.H., Hoffmann, M.: 1975, *Astron. & Astrophys.* 38, 359
 Locher, K.: 1975-1980, *BBSAG-Bull. No.* 22 - 62
 Mallama, A.D.: 1980, *Astrophys. J. Suppl. S.* 44, 241
 Sterne, T.E.: 1934, *Harvard Circ.* 386, 1
 Strohmeier, W.: 1958, *Kleine Veröff. Bamberg No.* 22, 3