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PERIOD REFINEMENT OF THE NEWLY DISCOVERED W UMa SYSTEM EF Dra

The W UMa system EF Dra was detected serendipitously by the Einstein Observatory Imaging Proportional Counter (Gioia et al., 1987) as x-ray source 1E1806.1+6944. Fleming et al. (1989) suspected the object to be an eclipsing binary on base of x-ray observations. Photometric data obtained from June to August 1989 by Robb and Scarfe (1989) confirmed the supposition and yielded the preliminary elements:

$$JD \text{ hel. Min.} = 2447700.7602 + 0.42400 \cdot E \quad (\text{I})$$

To refine the period of the system in order to enable a long-time running ephemeris we observed the binary in V and B colour. The data were obtained with the 0.34 m Cassegrain telescope at Nürnberg Observatory, using a 1P21 phototube, and the 0.35 m Schmidt-Cassegrain telescope at F. Agerer's private observatory, using an EMI 9781A tube.

As a result we present the following elements, calculated by the method of least squares from all available times of minima:

$$JD \text{ hel. Min.} = 2447700.75868 + 0.42402394 \cdot E \quad (\text{II})$$

$\pm 70 \qquad \qquad \qquad \pm 22$

Since the light curve shows indeed a significant night to night variation regarding the depth of the minima, as noted by Robb and Scarfe (1989), in combination with some asymmetry, we determined the times of the minima using the tracing paper method. Table 1 lists all known minima and the corresponding O-C residuals against the elements (II).

Table 1: Photoelectric minima of EF Draconis.

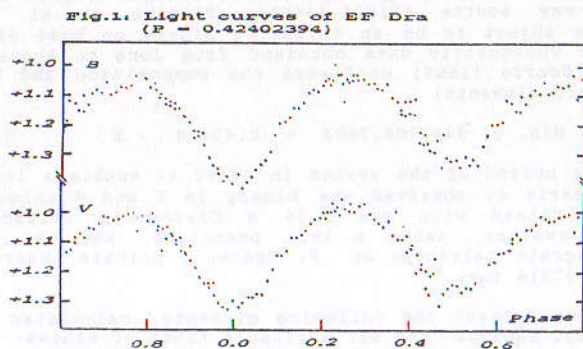
JD hel.	Epoch	O-C(II)	Filt.	Observer	Instr.	Reference
2447701.8201	2.5	+0.0014				Robb & Scarfe
7715.8125	35.5	+0.0010				Robb & Scarfe
7716.8710	38.0	-0.0006				Robb & Scarfe
7727.8971	64.0	+0.0009				Robb & Scarfe
7730.8650	71.0	+0.0006				Robb & Scarfe
7734.8902	80.5	-0.0024				Robb & Scarfe
8467.3956	1808.0	+0.0016	V	Ls/Sg/Wk/Wu	34	this paper

Table 1 (cont.): Photoelectric minima of EF Draconis.

JD hel.	Epoch	O-C(II)	Filt.	Observer	Instr.	Reference
2448475.4498	1827.0	-0.0006	V,B	Ag	35	Hübscher et al.
8488.3835	1857.5	+0.0004	V,B	Ag	35	Hübscher et al.
8491.5634	1865.0	+0.0001	V,B	Ag	35	Hübscher et al.
8502.3729	1890.5	-0.0030	V	Rz/Sg/Wk/Wu	34	this paper
8624.2819	2178.0	-0.0009	V	Wk/Wu	34	this paper
8775.446	2534.5	-0.0014	V,B	Ag	35	this paper
8909.4420	2850.5	+0.0031	V,B	Ag	35	this paper

Abbreviations of the observer's names:

Ag = F. Agerer Rz = R. Rosenzweig Wk = M. Wieck
 Ls = G. Lichtschlag Sg = S. Schurig Wu = E. Wunder



B and V light curves of EF Dra are shown in Figure 1. SAO 017740 was chosen as the comparison star.

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