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FG Sge: RISE FROM MINIMUM

FG Sge is a post-AGB star which displays strong changes of brightness. It brightened from 13.6 $mag_{pg.}$ in 1894 to 9.6 mag(B) in 1965 (Herbig and Boyarchuk 1968) but only small variations were detected in recent years. Rapid decline of brightness began in August 1992 (Papoušek 1992). The lightcurve of the decrease of brightness was published by Jurcsik (1992).

FG Sge was observed with a CCD camera ST-6 attached to a Maksutov telescope 180/1000 mm in Ondřejov Observatory in 1992–1994. The observations were carried out in an instrumental V-band. FG Sge and the comparison stars were captured in the same image and the expositions lasted 60–120 seconds. The set of 2 or 3 comparison stars (always the same) was used for determining the brightness of FG Sge on each image and an average value was calculated. These data covering the mimimum and the rise of brightness are presented in this paper.

FG Sge has a companion in a distance of 8 arc sec. Only the composed brightness of these two stars could be measured on the CCD images. The exact brightness of this companion has not been published so far but its approximate value is 12.5 mag(V). The brightness of this companion was determined using the spectrophotometric data of Stone et al. (1993). One of their observations was carried out on the same night as the data in this paper (JD = 48 956). Their magnitude of FG Sge alone was 13.06 mag(V) on this night. Brightness of the companion = 12.81 mag(V) was determined using the average of $mag_{tot.}$(V) in the CCD data No. 5, 6 and 7.

The CCD data are listed in Table 1. The column mag_{FG}(V) refers to V-magnitude of FG Sge assuming brightness of the companion is 12.81 mag(V). The column $mag_{tot.}$(V) refers to the total brightness of FG Sge and its companion. The data in this column enable recalculating the magnitude of FG Sge when better data of the companion are known. The standard deviation of $mag_{tot.}$(V) lies in the range of 0.01–0.03 mag.

Table 1: CCD data in 1992-1993. $Mag_{tot.}$(V) refers to the total brightness, mag_{FG}(V) refers to V-magnitude of FG Sge assuming brightness of the companion is 12.81 mag(V).

N	HJD	$mag_{tot.}$(V)	mag_{FG}(V)
1	48954.2863	12.14	12.98
2	48954.2877	12.14	12.98
3	48954.2905	12.10	12.91
4	48956.2508	12.07	12.83
5	48956.2563	12.15	13.01
6	48956.2702	12.19	13.09
7	48956.2716	12.18	13.08
8	48972.2241	12.05	12.79

Table 1:–cont.

N	HJD	$mag_{tot.}(V)$	$mag_{FG}(V)$
9	48972.2262	12.04	12.78
10	49168.4282	11.56	11.97
11	49168.5029	11.46	11.84
12	49207.3622	11.05	11.29
13	49207.4231	11.07	11.31
14	49213.4201	11.02	11.25
15	49213.4237	11.00	11.23
16	49215.4637	10.98	11.21
17	49215.4463	10.95	11.17
18	49216.3632	10.95	11.17
19	49216.3700	10.99	11.21
20	49247.3435	11.00	11.23
21	49247.3473	10.99	11.22
22	49249.3104	11.02	11.26
23	49250.3263	10.98	11.20
24	49258.3338	10.93	11.15
25	49266.3327	10.92	11.13
26	49290.2979	10.74	10.92
27	49291.2690	10.67	10.83
28	49292.2350	10.65	10.81

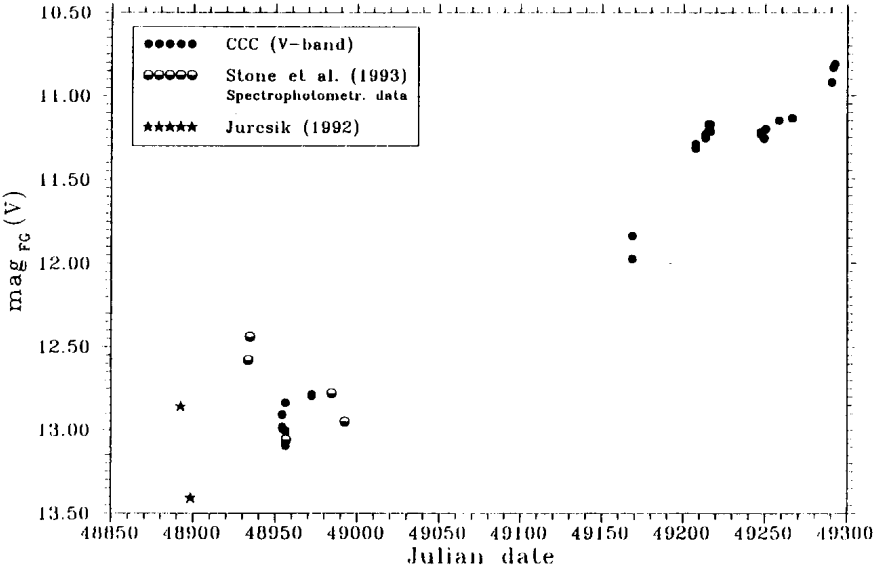

Figure 1: The lightcurve of FG Sge in November 1992–October 1993

The CCD data are plotted in Fig.1 together with the data of Stone et al. (1993) and of Jurcsik (1992). The variations of brightness of the order of several tenths of magnitude can be seen even in the time of the deep minimum. The timescale of these changes was several days long.

The rise from minimum which had begun in 1993 continued in an irregular manner with a possible plateau on JD = 49 212– 49 250.

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