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A CONTINUATION OF QUASI-PERIODIC BEHAVIOR FOR
HD 45677 = FS CMa

HD 45677 = FS CMa is not an "ordinary" member of the class of Be stars. It has been suggested to be an object intermediate between these and the planetary nebulae or else a symbiotic object since it possesses an extended shell of gas and dust of considerable density. Its spectral type has been classified in the range B0p (Rufener 1981) to B3 V (Low et al. 1970), but it possesses strong emission lines both permitted (hydrogen) and forbidden (Fe II, Ni II, Cr II, S II, O I). Partly due to its strong infrared excess, it has been suggested that it is binary with a very late-type giant/supergiant or perhaps an infrared object still in the process of formation (Ciatti et al. 1974). Alternately, Allen (1971) suggested that the excess is caused by H⁻ free-free emission. Recently Sorrell (1989) modelled the far UV to far IR energy distribution as a spherical dust shell (a fossil from the star's formation surrounding a single hot young [$< 10^8$ years] object).

Halbedel (1989) has published four years of photometry for HD 45677 which showed two types of variation: a quasi-periodic 296.5 day V mag variation superimposed on a >3 year change. This paper reports on a further two years of observations for the star. All recent differential photometry was obtained with the 0.6-m. telescope of the Corralitos Observatory and its ambient temperature EMI 9924A-based pulse-counting photometer. Comparison stars used were HD 45495 (V=8.375; B-V=-.027) and HD 45629 (V=7.091; B-V=-.032). They

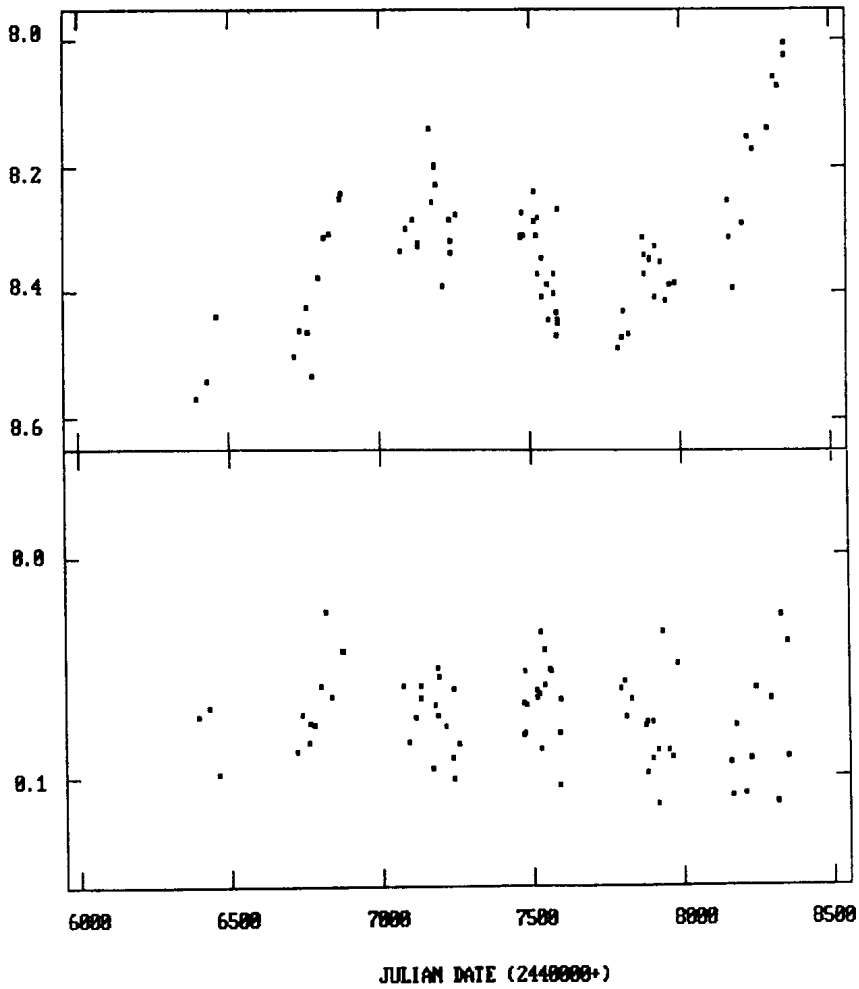


FIGURE 1: MAGNITUDES FOR HD 45677. THE TOP DIAGRAM SHOWS V MAGNITUDE, THE BOTTOM B-V.

TABLE 1: MAGNITUDES FOR HD 45677

JD (2440000+)	V	B-V	JD (2440000+)	V	B-V
7793.96806	8.490	+ .060	7965.67361	8.389	+ .091
7806.93750	8.471	.057	7983.62222	8.386	.049
7809.93958	8.430	.073	8159.97916	8.255	.094
7827.96111	8.466	.065	8161.95138	8.314	.109
7878.88680	8.313	.077	8176.92986	8.394	.077
7880.85694	8.371	.075	8205.86805	8.291	.108
7881.77222	8.340	.098	8225.86042	8.154	.092
7896.76736	8.349	.075	8243.72569	8.174	.060
7897.76874	8.346	.092	8292.78542	8.138	.065
7915.71805	8.328	.113	8313.68748	8.059	.112
7917.75347	8.408	.088	8328.65694	8.071	.072
7933.61736	8.352	.034	8347.64653	8.023	.091
7952.66250	8.413	.088	8350.62500	8.005	----

were found to be stable to 0.016 in V and 0.017 in B-V over the time period of observation.

The thusfar unpublished magnitudes for HD 45677 are set forth in Table 1, and appear graphically along with the previous data in Figure 1. It may be seen that the star still undergoes both short and long cycle time behavior. At present it is brighter than it has been for some time, but there has been no concomitant color change. A period search utilizing the Minimum Phase Dispersion Technique of Stellingwerf (1978) and all 6 years of data finds that the best quasi-period is still similar, 296.7 days, though the scatter in the phase diagram is greater than when this analysis was previously done for only 4 observing seasons. It seems unlikely that this is anything but a temporary phenomenon since FS CMa has undergone long "stand stills" in the past. Therefore, it is not likely connected with binary motion unless it proceeds from semi-regular light variations of a companion late-type star. Still, it is of interest that quasi-periodicity has persisted for six years thusfar.

HD 45677 will continue to be observed at the Corralitos Observatory indefinitely.

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