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THE LAST MAXIMA OF HR 8752 = V509 Cas

Much interest in the light and spectrum variability of the hypergiant HR 8752 = V509 Cas has recently been shown, particularly since there is speculation that the cause of the changes is non-radial pulsation. Sheffer and Lambert (1987) have determined that this pulsation may be bimodal with a dominant mode of approximately 421 days and a secondary of 315, both of which may be overtones of a primary fundamental mode of 1070 days. Concerted efforts by photometrists (e.g., Mantegazza et al., 1988; Zsoldos, 1986; Halbedel, 1985, 1986) have provided relatively complete coverage of the recent light variations of this star. It has been interesting to note that while the average magnitude of HR 8752 has remained essentially constant over the past decade, the B-V colors have consistently become more blue with time, implying that there has been an effective temperature increase of about 800°K over that time period.

This paper reports on the most recent behaviour of this interesting hypergiant. Observations at the Corralitos Observatory have now followed HR 8752 through four maxima. The observations in BV colors have been carried out with the single channel photon-counting photometer and uncooled EMI 9924A photomultiplier tube. The comparison star HR 8761 ($V=6.20$; $B-V=+1.50$) and its check HR 8778 ($V=6.43$; $B-V=+0.90$) have remained constant throughout this time period to within 0.01 in V magnitudes and 0.02 in B-V.

The thusfar unpublished Corralitos magnitudes are shown in Table I, and graphically depicted for the entire four year span in Figure 1. It is interesting to note that the last maximum of HR 8752 was somewhat depressed in V magnitude and that the trend towards bluer colors has most definitely continued.

Two spectra centered on $H\alpha$ were also obtained by the author with the Kitt Peak Observatory coudé feed telescope and CCD camera on JD 2447119.6715 and 7120.6819. These showed the same profile at $H\alpha$ as has been previously observed by others for this star: a double peaked emission line with deep central absorption superimposed on a wider absorption. Mean radial velocity measures of these features and a superposition of the line profiles revealed no detectable change from night to night. The radial velocities appear in Table II and the line profile in Figure 2.

Table I

JD-2440000	V	B-V	JD-2440000	V	B-V
6710.6868	4.92	+1.24	7028.7777	5.01	+1.27
6713.7958	4.88	1.25	7045.8340	5.03	1.29
6714.7826	4.88	1.23	7046.7993	5.01	1.29
6717.7277	4.88	1.23	7047.8201	5.03	1.26
6730.7805	4.91	1.21	7049.7507	4.97	1.27
6732.7395	4.88	1.25	7050.8438	4.98	1.25
6735.6847	4.87	1.22	7051.7021	4.99	1.25
6754.6062	4.90	1.29	7062.7750	4.96	1.24
6755.6548	4.91	1.25	7066.7826	4.98	1.23
6756.7381	4.95	1.25	7067.6875	4.97	1.22
6759.6111	4.84	1.24	7087.7194	4.95	1.21
6773.6326	4.91	1.21	7088.7528	4.96	1.20
6774.6145	4.94	1.19	7089.6271	4.94	1.21
6776.6125	4.95	1.23	7102.7451	4.92	1.21
6777.5784	4.93	1.23	7106.6965	4.90	1.21
6794.6263	5.01	1.19	7124.6819	4.91	1.17
6795.5951	5.02	1.26	7125.6806	4.90	1.17
6797.5770	4.99	1.24	7126.6271	4.90	1.17
6800.5909	4.99	1.25	7127.6340	4.91	1.17
6814.5784	5.00	1.30	7128.6229	4.90	1.18
6817.5826	5.00	1.30	7169.5771	4.88	1.16
6945.9424	4.99	1.13	7170.5868	4.86	1.17
6948.9479	4.97	1.20	7173.5785	4.91	1.12
6949.9417	4.98	1.20	7174.5785	4.91	1.10
6951.9076	4.99	1.20	7175.5861	4.96	1.15
6994.8465	4.97	1.22			

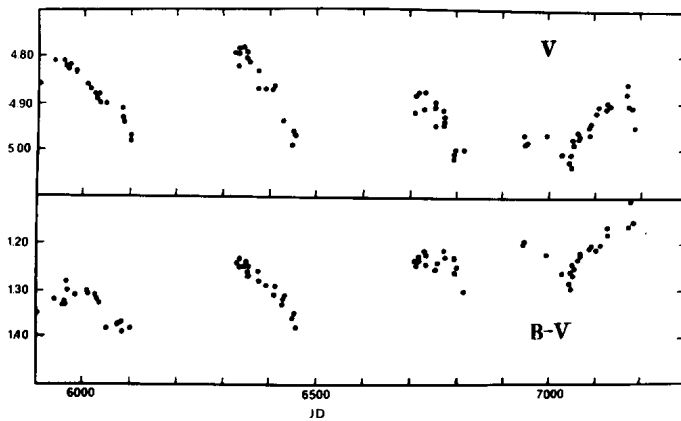


Figure 1. V and B-V observations for HR 8752 for the past four observing seasons.

Table II

H α feature mean radial velocities:

Violet Emission Peak	-134.7 km s ⁻¹
Line Profile center	- 98.2
Deepest Absorption	- 94.0
Red Emission Peak	- 49.0

Mean stellar radial velocity:

-43.7 \pm 5.9 km s⁻¹ (from 7 lines)



Figure 2. Mean H α line profile for HR 8752.

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