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PS4452-1347* - A NEW RR Lyr VARIABLE STAR

OF BAILEY TYPE C

In a search programme for field population II A and F stars with visual magnitudes between 13^m and 16^m in high galactic latitudes, extending a pilot project reported on by Crawford et al. (1979), simultaneous photoelectric photometry in the Strömberg uvby photometric system (Strömberg, 1966) has now been carried out for 275 candidate stars in two observing periods in 1980 and 1981 with the Danish 1.5-m telescope at ESO, La Silla (Andersen, 1982). One of these stars, PS4452-1347, was, based on three observations in October 1980, suspected for variability and observed systematically on six consecutive nights in August 1981 along with other programme and standard stars. The reduction of these observations shows that the star is an RR Lyr variable with a nearly sinusoidal light-curve indicating a Bailey type c; the period is 0.381 d and the mean visual magnitude is 13.53. The star is not included in the General Catalogue of Variable Stars (Kukarkin et al., 1969) nor in the subsequent name-lists of variable stars (Kukarkin et al., 1970-1977; Kholopov et al., 1978-1981).

The star PS4452-1347 ($\alpha_{1950} = 0^h 24^m 30^s.13$, $\delta_{1950} = +0^\circ 23' 54".9$, epoch 1960.64) was observed 34 times during the six nights, each observation consisting of 3 to 4 60-second integrations. Table I gives the 34 observations reduced to visual magnitudes on the Johnson system and indices on the standard system of Crawford and Barnes (1970). Typical mean

* Star no. 1347 measured on Palomar Schmidt plate no. 4452.

Table I

Helio. JD -2440000	V	b-y	m1	c1	Phase
4839.7790	13.403	.181	.091	1.152	.158
4839.8157	13.521	.212	.080	1.043	.255
4839.9255	13.717:	.307:	.030:	1.092:	.543
4840.7090	13.699	.246	.079	.897	.599
4840.7667	13.477	.193	.095	1.039	.750
4840.8861	13.240	.169	.094	1.190	.064
4841.6664	13.367	.172	.094	1.177	.111
4841.7577	13.641	.237	.080	.988	.351
4841.8105	13.765	.262	.067	.890	.489
4841.8297	13.741	.253	.076	.895	.540
4841.8795	13.650	.230	.081	.960	.670
4842.6577	13.616	.211	.085	.962	.713
4842.6838	13.455	.185	.092	1.066	.781
4842.7450	13.322	.168	.097	1.127	.942
4842.7836	13.299	.170	.086	1.206	.043
4842.8306	13.401	.192	.084	1.155	.166
4842.8517	13.472	.197	.095	1.112	.222
4842.8786	13.564	.218	.087	1.045	.292
4843.6542	13.642	.221	.090	.989	.327
4843.6933	13.741	.241	.090	.906	.430
4843.7381	13.772	.251	.080	.895	.548
4843.7881	13.691	.219	.095	.948	.679
4843.8284	13.456	.170	.100	1.085	.785
4843.8485	13.411	.173	.095	1.083	.837
4843.8762	13.331	.176	.087	1.110	.910
4843.8982	13.328	.157	.105	1.189	.968
4844.7170	13.358	.175	.090	1.193	.116
4844.7304	13.386	.186	.084	1.178	.152
4844.7382	13.405	.191	.081	1.168	.172
4844.7415	13.438	.182	.095	1.155	.181
4844.7535	13.469	.199	.084	1.129	.212
4844.7634	13.518	.201	.088	1.104	.238
4844.7946	13.640	.234	.081	.984	.320
4844.8094	13.703	.227	.095	.957	.359
Mean	13.531	.205	.089	1.050	$\beta = 2.706$
Amplitude	.476	.100	.024	.286	

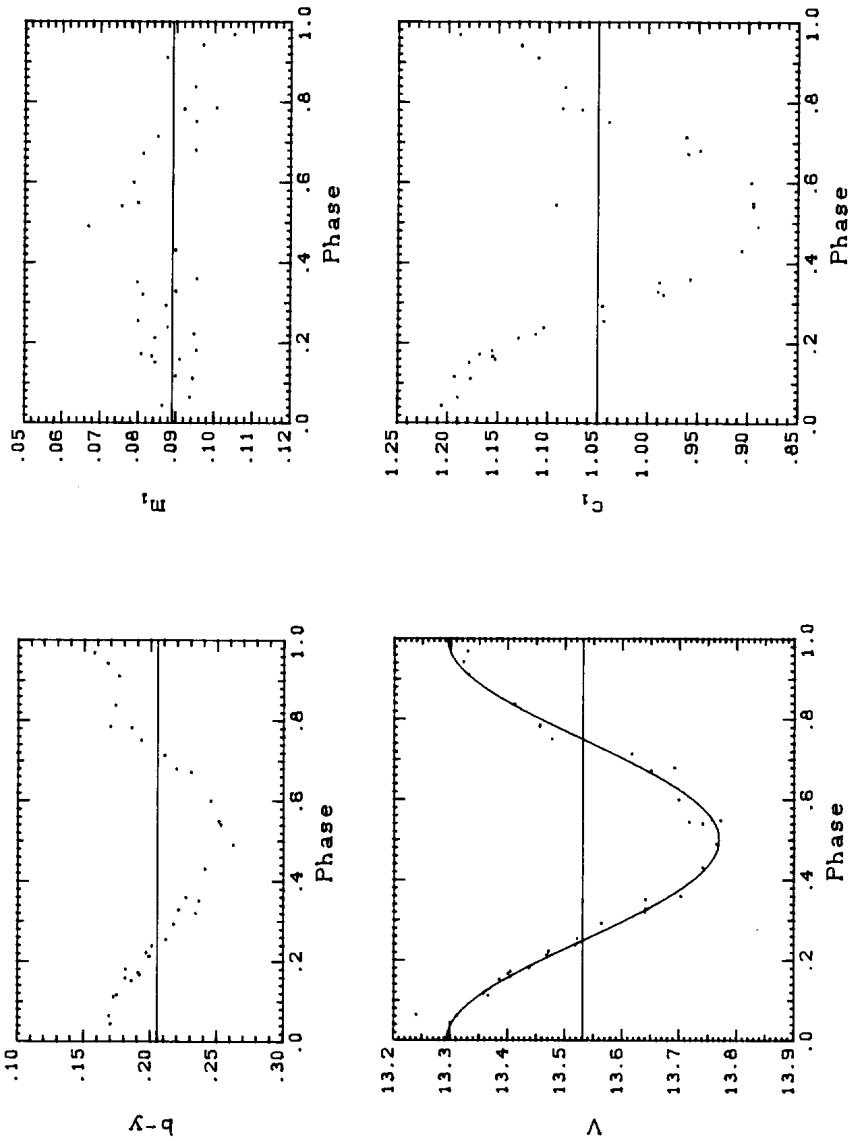


Figure 1

errors of one observation in V , $b-y$, m_1 and c_1 are 0.008, 0.006, 0.009 and 0.010, respectively. It was found that the instrumental magnitudes u , v , b , y , could each be accurately fitted with a pure sine curve with no significant difference in period, and in this way a period

$$P = 0^d.38108 \pm 0^d.00020 \text{ (m.e.)}$$

has been determined. The epoch of maximum is given by the expression

$$\text{Max} = 2\ 444\ 839.7186 + 0.38108 E \quad .$$

In Figure 1 we give the observed V -light curve along with the observed $(b-y)$ -, m_1 -, and c_1 -colour curves. Also shown is the sine curve best fitting the V observations. In Table I we have also given the mean magnitude and colours and the respective full amplitudes as determined from the optimum sine curves. The mean value of a few $H\beta$ -observations is also given. The observations indicate a mean spectral type around $F0$.

Assuming a mean absolute visual magnitude of $+0^m.5$, the star is located at a distance of 4.0 kpc, i.e., 3.6 kpc from the galactic plane.

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