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PHOTOELECTRIC OBSERVATIONS OF SYMBIOTIC STARS

The brightness variability is one of the criteria for the symbiotic stars. Their brightness can vary with an amplitude up to 3 magnitudes and a period of several years. The light variations are irregular and the features of the lightcurves can vary from time to time. A definite period can be found for many stars, but for some of these objects it is possible to assume an approximate mean period only; superimposed on this periodicity there is a complex of small simultaneous flares, which give rise to the irregular shape of the lightcurves.

From the list of Boyarchuk (1969) some symbiotic objects were chosen to fill the gaps in time among the stars of the main programs, being of interest to make a photoelectric monitoring of their variability.

All the observations were made by an analogical B-V photometer employing an EMI 9502 photomultiplier, the filters Schott GG14 + GG13 (2mm) for the V light, and Schott BG12 + GG13 (2mm) for the B one, with the Teramo Observatory's 40 cm refractor at Collurania. In Table I are reported the comparison and check stars used for every symbiotic object, the coordinates and the magnitudes V and B-V, as determined by comparison with several standard stars in more nights of good quality. In Table II the observations are listed: each value is the mean of several points and the mean nightly errors are also reported.

It should be noted that the reported values of the magnitudes are relative to the response curve of the used photometer, as in all cases of broad-band observations of stars having emission lines in their spectra.

The following stars have been observed:

Table I

Comparison and check stars

Symbiotic stars	Comparison and check stars	R.A. (1975)	Decl. (1975)	V	m.e.	B-V	m.e.
RW Hya	1-CPD $-24^{\circ}5104$ =CoD 10984	$13^{h}33^{m}42^{s}$	$-25^{\circ}10'.6$	9.00	0.01	0.54	0.02
AG Dra	1-BD $+67^{\circ}925$	16 05 14	+66 51.2	9.86	0.01	0.55	0.01
FR Sct	1-BD $-12^{\circ}5023$	18 21 48	-12 39.3	10.07	0.01	1.48	0.02
	2-BD $-12^{\circ}5028$	18 22 11	-12 40.4	9.997	0.002	0.98	0.04
BF Cyg	1-Anon.	19 21 22	+29 44.0	11.31	0.02	0.51	0.02
	2-Anon.	19 23 26	+29 37.2	11.10	0.02	0.32	0.01
MHα80-5	1-Anon.	19 45 22	+18 30.4	10.83	0.01	0.41	0.02
AG Peg	1-BD $+11^{\circ}4677$	21 50 29	+11 55.1	7.609	0.004	0.167	0.004
	2-BD $+11^{\circ}4681$	21 51 12	+12 25.7	8.178	0.001	1.011	0.004

Table II

Photometry of symbiotic stars

Star	Jul.Day 2440000.+	V	m.e.	B-V	m.e.
RW Hya	702.486	8.80	0.01	1.56	0.01
	704.453	8.80	0.01	1.51	0.01
	720.404	8.83	0.01		
	731.356	8.82	0.01		
AG Dra	686.441	9.85	0.01	1.38	0.02
	689.340	9.84	0.01	1.39	0.02
	701.311	9.87	0.01		
	702.434	9.857	0.004	1.45	0.01
	704.391	9.84	0.01	1.47	0.01
	710.483	9.848	0.003	1.37	0.02
	715.461	9.86	0.01	1.43	0.02
	720.431	9.85	0.01		
	731.378	9.85	0.01		
	741.374	9.849	0.002	1.41	0.01
	748.376	9.82	0.01		
	764.364	9.82	0.02	1.43	0.02
	767.393	9.83	0.02	1.45	0.05
	773.375	9.810	0.005	1.37	0.01
	800.377	9.78	0.01		
	824.328	9.74	0.01	1.32	0.02
	837.421	9.76	0.01		
FR Sct	741.541	10.21	0.01	2.14	0.02
	748.520	10.16	0.02		
	765.489	10.20	0.01		
	772.448	10.26	0.01		
	798.366	10.34	0.01	2.57	0.04
	802.363	10.20	0.01		
	824.354	10.09	0.01		
BF Cyg	769.389	11.12	0.01	0.80	0.01
	775.382	11.22	0.02	0.73	0.01
	798.396	11.42	0.02	0.81	0.03
	809.361	11.44	0.02		
	833.373	11.34	0.03		
	865.311	11.40	0.02		
MHα80-5	770.380	10.619	0.005	0.43	0.01

Table II (cont.)

Star	Jul.Day 2440000.+	V	m.e.	B-V	m.e.
AG Peg	834.410	8.30	0.01		
	865.345	8.241	0.005		
	866.477	8.252	0.004	0.76	0.01

RW Hya = HD 117970. Extended photometric observations are not reported for this star, which has a spectroscopic period of about 376 days.

AG Dra = BD $+67^{o}922$. In 1970 its behaviour is the same as in the years 1962-67 with an amplitude of $0^{m}.12$ and $0^{m}.15$ for U and B light, respectively.

FR Sct. In 1970 its mean magnitude is greater ($10^{m}.21 \pm 0^{m}.03$) than previously reported ($11^{m}.7$ to $12^{m}.5$). It is much more likely to be a VV Cep star than a symbiotic one.

BF Cyg. It is a typical symbiotic star (Z And type) in which the quasi-periodic variations are smaller and the non-periodic part is very important.

$MH_{\alpha}80$-5. The star may be symbiotic. The V magnitude in 1970 is greater than that previously known at the maximum.

AG Peg = HD 207757 = BD $+11^{o}4673$. The star may be regarded as a binary system involving an M giant, a hot emission object, gaseous streams and an enveloping nebulosity. The period is about 820 days.

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