ON THE VARIABILITY OF A3–F0 LUMINOSITY CLASS III–V STARS

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Several previous IBVS contributions (see, e.g., Adelman 2000) studied the Hipparcos photometry (ESA 1997) of stars from various parts of the HR Diagram in the Bright Star Catalogue, 5th edition (Hoffleit & Warren 1991) and the 4th edition Supplement (Hoffleit et al. 1983). Here I examine the A3–F0 stars of luminosity classes III–V except for those magnetic and non-magnetic CP stars which were studied by Adelman (1998). These stars also include δ Scuti variables, Algol type and other eclipsing binaries, W Ursae Majoris stars, microvariables, constant stars considered as variable by some observer(s), and stars with spurious variability due to duplicity, as well as nonvariable stars.

Table 1 shows the mean amplitudes of A3–F0 luminosity class III–V stars with at least 3 class members. When one allows for known variables and statistics, the mean amplitudes appear to be smallest for the A3–A7 III and A3–F0 IV stars with almost all averages indicating that these are not very variable stars. These values are similar to those found for B6–B9 III stars by Adelman, Gentry, & Sudiana (2000) and K0–K4 III stars by Adelman (2000). It is unlikely that all the small amplitude δ Scuti stars have been found as those with amplitudes comparable to the mean values were not readily discovered using Hipparcos photometry. The averages for the luminosity class III stars are similar to those of comparable luminosity class II stars given by Adelman, Cay, Cay & Kocer (2000).

Table 2 (available electronically from the IBVS site as 4969-t2.txt) contains the values for the stars whose averages appear in Table 1 as well as those which were not used in compiling these values, especially with spurious variability due to duplicity. Table 3 lists stars whose amplitudes of variability are a factor of order 1.67 or more greater than the means (without known δ Scuti stars), usually $0\overset{m}{.}04$ or greater. No known δ Scuti stars are included in this table. Those stars which have not been classified as belonging to a known type are in need of additional photometry.

Table 2 also contains many stars with amplitudes of 0.01 which should be considered as candidates for standard stars. A few are indicated to have spurious variability due to duplicity, but may still be suitable for certain applications. In addition 37 δ Cas is an eclipsing binary star and 82 NT Peg is a δ Sct star. This indicates that it would be desirable to check the literature of these stars for any high quality photometry before using them as standards.

Table 1: The mean amplitudes of various types of A3 through F0 stars

Spectral class	No.	Mean amplitude (mag)
A3III	15	0.023 ± 0.007 (without EA HR 7422)
A4III	11	0.020 ± 0.004
A5III	18	0.022 ± 0.008
A7III	30	0.029 ± 0.015
	26	0.025 ± 0.009 (without 4 0.05-0.07 mag. variables)
A8III	11	0.019 ± 0.005
A9III	10	0.028 ± 0.008
F0III	42	0.030 ± 0.015
	33	0.025 ± 0.009 (without known δ Scuti stars)
A7III–IV	6	0.022 ± 0.004
A9III–IV	4	0.035 ± 0.010
F0III–IV	3	0.027 ± 0.006
A3IV	29	0.022 ± 0.008
A4IV	12	0.022 ± 0.009
A5IV	15	0.022 ± 0.004
A6IV	5	0.020 ± 0.007
A7IV	18	0.024 ± 0.007
A8IV	7	0.023 ± 0.005
A9IV	10	0.026 ± 0.008 (without δ Sct V376 Per)
F0IV	50	0.023 ± 0.006 (without δ Sct stars and known photometric variable binaries)
A5IV–V	8	0.024 ± 0.007
A6IV–V	3	0.033 ± 0.006
A7IV–V	5	0.026 ± 0.005
A9IV–V	3	0.027 ± 0.006
F0IV–V	10	0.028 ± 0.006
A3V	141	0.026 ± 0.030 (without RZ Cas)
A4V	56	0.027 ± 0.015 (without V1031 Ori)
A5V	61	0.024 ± 0.010 (without V1010 Oph)
A6V	16	0.026 ± 0.011
A7V	54	0.029 ± 0.025
A8V	27	0.028 ± 0.010
A9V	22	0.029 ± 0.007 (without S Ant)
F0V	80	0.028 ± 0.015

Table 3: Some stars with amplitudes greater than stars of similar spectral type

Name	HD number	Spectral type	HIP number	SE (mag)	Amp. (mag)	Comments
28 Peg	210516	A3III	109458	0.0008	0.04	
	16769	A5III	12821	0.0009	0.04	P
	104664	A7III	58765	0.0008	0.04	
41 Vir	112097	A7III	62933	0.0016	0.04	
	141296	A9III	77574	0.0009	0.04	
	118295	A7–F0III	66294	0.0008	0.04	
	107054	A9.5III	60018	0.0008	0.04	
υ^1 Cnc	72041	F0IIIn	41816	0.0017	0.05	U
	111102	F0III	62428	0.0009	0.05	
36 Her	150379	A3IV	81634	0.0010	0.04	
	88987	A9IV	50305	0.0013	0.04	
	69682	F0IV	40878	0.0010	0.04	
	222226	F0IV	116699	0.0014	0.04	
	55595	A5IV–V	34814	0.0010	0.04	
NSV 8183	155154	F0IV–Vn	83317	0.0010	0.04	U
LR And	1826	A3V	1799	0.0025	0.04	ELL
V773 Cas	10543	A3V	8115	0.0011	0.05	EA
	23055	A3V	17223	0.0010	0.04	
42 V467 Per	23848	A3V	17886	0.0017	0.05	EB
	24805	A3V	18286	0.0009	0.04	
RR Lyn	44691	A3Vm	30651	0.0009	0.36	EA/DM
32 τ^2 Hya	82446	A3V	46776	0.0008	0.06	U
65 DN UMa	103483	A3Vn	58112	0.0012	0.08	EB
NSV 5983	111604	A3V	62641	0.0018	0.04	U
	168740	A3V	90304	0.0013	0.04	MV
	195481AB	A3V	101223	0.0010	0.04	
	14213	A4V	10814	0.0016	0.04	MV
26 Cam	38091	A4Vn	27249	0.0014	0.04	NSV 2615, U
	82380	A4V	46873	0.0011	0.04	
22 Com	109307	A4V	61295	0.0010	0.04	
	130917	A4V	72552	0.0006	0.04	
	215631	A4V	112725	0.0009	0.04	
V343 Peg	218395	A4Vn	114187	0.0015	0.12	NSV 14430, U
	51335	A5V	33385	0.0014	0.04	
π Vir	104321	A5V	58590	0.0008	0.04	MV
V342 Peg	218396	A5V	114189	0.0049	0.08	P
	73819	A6Vn	42600	0.0012	0.04	
	126859	A6V	70904	0.0014	0.05	
	199986	A5/7V	103557	0.0014	0.04	
DD Cam	24733	A7V	18585	0.0062	0.19	EB
	68457	A7Vm	40474	0.0015	0.04	U
	76512	A7V:n	43853	0.0007	0.04	
α Aql	187642	A7V	97649	0.0011	0.05	EA

Table 3: (cont.)

Name	HD number	Spectral type	HIP number	SE (mag)	Amp. (mag)	Comments
48 LMi	94480	A8V	53355	0.0026	0.07	U
92 Vir	121607	A8V	68092	0.0013	0.04	U
	103928	A9V	58369	0.0010	0.04	MV
	149989	A8/F0V	81650	0.0012	0.04	P
	154660	A9V	83738	0.0018	0.04	MV
	11100	F0V	8417	0.0015	0.06	MV
9 V398 Aur	32537	F0V	23783	0.0027	0.06	SR
V368 Pup	58634	F0V:	35960	0.0020	0.05	P
	82582	F0V	46963	0.0010	0.04	MV
30 LMi	90277	F0V	51056	0.0007	0.04	
LL Vel	96008	F0V	54060	0.0016	0.05	ELL
BW Boo	128661	F0V	71487	0.0009	0.05	EA/DM
V533 Lyr	172187	F0V	91250	0.0022	0.12	EB
	204153	F0V	105769	0.0007	0.04	MV

Notes:

EA = Algol type eclipsing binary	P = periodic variable
EB = eclipsing binary	SR = semi-regular variable
EW = W Ursae Majoris type variable	U = unresolved variable
MV = microvariable	

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