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ON THE VARIABILITY OF A0–A2 LUMINOSITY CLASS III–V STARS

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This paper investigates the Hipparcos photometry (ESA 1997) of luminosity class III–V A0–A2 stars from the Bright Star Catalogue, 5th edition (Hoffleit & Warren 1991) and the Supplement of the 4th edition (Hoffleit et al. 1983). These stars include δ Scuti variables, eclipsing binaries, SX Phe stars, ellipsoidal variables, and a few CP stars (although most studied by Adelman (1998) were excluded) along with microvariables and many stars which need additional observations to determine their variability type.

Table 1 lists the mean amplitudes of various spectral types which have at least 3 class members. These values indicate the mean variability. We excluded stars with spurious variability due to duplicity. A few values were calculated again when they included stars whose amplitudes were much larger than those typical of their spectral type. The mean amplitudes are smaller than those of the corresponding supergiants (Adelman & Albayrak 1997 and Adelman, Cay, Cay, & Kocer 2000) and are generally comparable with the smallest such values previously seen in similar papers among the late B III–V stars (Adelman, Gentry, & Sudiana 2000), the A3–F0 III–V stars (Adelman 2000a), and the K0–K4 III stars (Adelman 2000b).

Table 2 (available electronically from the IBVS site as 4984-t2.txt and 4984-t2.tex) contains the values for the individual A0–A2 III–V stars including those which were not used in compiling these means. It lists for each star the HR number (if any), names (Bayer, Flamsteed, or variable star designations), the V magnitude from the Bright Star Catalogue and its Supplement, the spectral type, the Hipparcos number, the standard error (mag), the amplitude (mag), and comments (type of variable using the GCVS and NSV designations). The NSV number is included in the comments field if another name is given in the names column. Hipparcos photometry does not confirm the reported variability of some stars which might indicate a change in the stellar behavior or reflect the quality of the previous photometry. Table 2 also contains stars with amplitudes of $0\overset{\mathrm{m}}{.}01$ which are candidates for use as standards.

Table 3 lists selected stars with amplitudes of variability significantly greater than those of stars with the same spectral types, usually a factor of 1.67 greater than the type mean, typically $0\overset{\mathrm{m}}{.}04$. Some are well-known variables. Many of those with amplitudes of $0\overset{\mathrm{m}}{.}04$ require further study. We doubt that α CMa (Sirius) is really variable.

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Table 1: The mean amplitudes of various types of A0–A2 stars

Spectral class	Number	Mean amplitude (mag)	Comment
A0III	23	0.025 ± 0.006	
A1III	4	0.025 ± 0.006	
A2III	12	0.022 ± 0.006	
A0III–IV	3	0.027 ± 0.012	
A2III–IV	4	0.028 ± 0.005	
A0IV	22	0.030 ± 0.051	
	21	0.020 ± 0.004	without χ^2 Hya
A1IV	10	0.022 ± 0.006	
A2IV	34	0.029 ± 0.032	
	32	0.022 ± 0.006	without YZ Cas & β Aur
A2IV–V	3	0.023 ± 0.012	
A0V	238	0.025 ± 0.024	
	231	0.022 ± 0.007	without 7 stars
A0–1V	6	0.028 ± 0.008	
A1V	200	0.024 ± 0.017	
	197	0.022 ± 0.007	without TU Hor, α CMa, & 75 KS Peg
A1–2V	4	0.030 ± 0.000	
A2V	199	0.027 ± 0.043	
	196	0.023 ± 0.009	without 31 Cam, V2368 Oph, & SX Phe
A2–A3V	6	0.082 ± 0.146	
	5	0.022 ± 0.004	without ES Lib

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

Name	HD No.	Spectral Type	HIP No.	SE (mag)	Amp. (mag)	Comments
HR 444	9484	A0III	7222	0.0010	0.04	
HR 3962	87318	A0III–IV	49294	0.0010	0.04	
χ^2 Hya	96314	A0IV	54255	0.0041	0.26	EB
21 YZ Cas	4161	A2IV	3572	0.0008	0.20	EA/DM
34 β Aur	40183	A2IV	28360	0.0006	0.07	EA
	23642	A0Vp*	17704	0.0013	0.04	
	24966	A0V	18437	0.0009	0.04	
HR 1524	30397	A0V	22136	0.0009	0.04	
IW CMa	45382	A0V	30583	0.0011	0.09	U
HR 2328	45380	A0Vn	30675	0.0141	0.04	U
	50126	A0V	32715	0.0011	0.04	
PS Pup	60168	A0V	36608	0.0022	0.10	EA
HR 3019	63112	A0V	37951	0.0008	0.04	
BU CMi	65241	A0V	38945	0.0020	0.10	NSV 3829, EA
37 OW Hya	83650	A0Vn	47427	0.0015	0.33	EA
HR 4428	99922	A0V	56078	0.0020	0.12	U
	113457	A0V	63839	0.0008	0.04	
	203112	A0V	105237	0.0009	0.04	
δ Scl	223352	A0V	117452	0.0014	0.09	
	152521	A0/1V	82792	0.0017	0.04	
BD Phe	11413	A1Vp	8593	0.0017	0.04	DSCT
HR 597	12467	A1V	10054	0.0009	0.04	
HR 875	18331	A1Vn	13717	0.0016	0.06	
TU Hor	21981	A1V	16339	0.0053	0.14	ELL
NSV 1359	24071	A1V	17797	0.0006	0.05	U
9 α CMa	48915	A1Vm	32349	0.0024	0.19	
34 Hya	83373	A1V	47249	0.0009	0.04	
HR 4805	109860	A1V	61637	0.0010	0.04	
	131637	A1V	73102	0.0008	0.04	
	133330	A1V	73635	0.0009	0.04	
75 KS Peg	222133	A1Vn	116611	0.0045	0.10	EB
V357 And	5066	A2V	4129	0.0025	0.06	P
	14172	A2V	10856	0.0009	0.04	
32 Eri	24554	A2V	18255	0.0011	0.06	U
HR 1324	26961	A2V	20070	0.0031	0.06	ELL
	35859	A2V	25298	0.0010	0.04	
31 Cam	39220	A2V	27971	0.0029	0.16	EB
HR 3335	71581	A2V	41475	0.0011	0.04	EA/DM
	102481	A2V	57556	0.0009	0.04	
HR 6169	149632	A2V	81231	0.0009	0.04	
V2368 Oph	156208	A2V	84479	0.0008	0.13	NSV 8438, EA
HR 7857	195922	A2Vnn	101473	0.0015	0.04	U
SX Phe	223065	A2V	117254	0.0216	0.59	SXPHE
VZ Psc	214484	A2Vp	111809	0.0005	0.04	EA
ES Lib	135681	A2/3V	74765	0.0188	0.38	EB/KE

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