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ON THE VARIABILITY OF G0–G9 STARS

ADELMAN, S.J.¹; DAVIS, J.M.²; LEE, A.S.³

¹ Department of Physics, The Citadel, 171 Moultrie Street, Charleston, SC 29409, USA,
email: adelmans@citadel.edu

² Department of Physics, The Citadel, 171 Moultrie Street, Charleston, SC 29409, USA,
email: davisj@citadel.edu

³ Department of Physics, The Citadel, 171 Moultrie Street, Charleston, SC 29409, USA,
email: 2leea@citadel.edu

This paper examines the Hipparcos photometry (ESA 1997) of the G0–G9 stars in the Bright Star Catalogue, 5th edition (Hoffleit & Warren 1991) and the Supplement of the 4th edition (Hoffleit et al. 1983). The stars investigated include Cepheids, Algol type variables, BY Draconis stars, FK Com variables, irregular and slow irregular variables, R CrB stars, semi-regular variables, microvariables, stars which need additional observations to determine their variability type, and constant stars. 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 previous photometry.

The mean amplitudes of various spectral types with at least 3 class members given in Table 1 are indicative of variability. Stars with spurious variability due to duplicity are excluded. When one allows for known variables and statistics and compares these values with those found for other spectral types, these values indicate that the G stars are not particularly variable. Their means are similar to those found for B6–B9 III stars (Adelman, Gentry, & Sudiana 2000), for A0–A2 III–V stars (Adelman, Flores, & Patel (2000), A3–A7 III and A3–F0 IV stars (Adelman 2000a), and K0–K4 III stars (Adelman 2000b). Even the supergiants are not particularly variable which continues the trend seen among the A and F supergiants (Adelman, Cay, Cay, & Kocer 2000). Our values are slightly smaller than those of Maeder (1980) whose mean V amplitudes are $0^m.030$ for G0–G9 Ib stars and $0^m.025$ for G0–G9 II stars. As Hipparcos obtained data for a period of 3 years, longer period variability such as solar cycles have only been partially sampled and the total variability may be greater.

Table 2 (available electronically from the IBVS site as 4993-t2.txt and 4993-t2.tex) contains the values for individual stars including those which were not used in compiling these means. It shows for each star the HR number (if any), names (Bayer, Flamsteed, and/or variable star designations), the V magnitude from the Bright Star Catalog and its Supplement, the spectral type, the Hipparcos number, the standard error (mag), the amplitude (mag), and comments (type of variable and some NSV numbers if there was not space in the Names column).

Table 3 lists stars with amplitudes of variability of $0^m.04$ and greater which are more variable than the other G stars. Some are well-known variables while others particularly those with amplitudes of order $0^m.04$ require additional observations.

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Table 1: The mean amplitudes of various types of G0 through G9 stars

Spectral class	Number	Mean amplitude (mag)	Comment
G0Ib	5	0.024 ± 0.009	
G0Ib-II	3	0.020 ± 0.000	
G2Ib	5	0.024 ± 0.005	
G2Ib-II	4	0.022 ± 0.010	
G3Ib	5	0.020 ± 0.007	
G5Ib	5	0.172 ± 0.334	0.022 ± 0.005 without S Sge
G8Ib	6	0.030 ± 0.006	
G5II	11	0.023 ± 0.006	
G6II	4	0.015 ± 0.006	
G8II	16	0.023 ± 0.004	
G7II-III	3	0.023 ± 0.006	
G8II-III	16	0.023 ± 0.008	
G9II-III	3	0.020 ± 0.000	
G0III	6	0.023 ± 0.008	
G2III	4	0.022 ± 0.005	
G3III	5	0.028 ± 0.008	
G4III	6	0.020 ± 0.000	
G5III	37	0.025 ± 0.010	
G6III	21	0.024 ± 0.007	
G7III	28	0.023 ± 0.007	
G7+III	3	0.020 ± 0.000	
G7.5III	4	0.020 ± 0.008	
G8III	218	0.024 ± 0.014	
G8+III	5	0.020 ± 0.012	
G8.5III	15	0.018 ± 0.007	
G8-K0III	27	0.024 ± 0.007	
G9-III	3	0.017 ± 0.006	
G9III	76	0.022 ± 0.007	
G9.5III	9	0.020 ± 0.007	
G5III-IV	3	0.020 ± 0.010	
G8III-IV	18	0.034 ± 0.044	0.024 ± 0.005 without λ And
G9III-IV	7	0.021 ± 0.004	
G0IV	6	0.032 ± 0.026	0.022 ± 0.011 without HR 6105
G1IV	3	0.020 ± 0.010	
G2IV	6	0.023 ± 0.019	0.016 ± 0.005 without ϕ Vir
G2.5IV	3	0.020 ± 0.000	
G3IV	5	0.020 ± 0.007	
G5IV	17	0.028 ± 0.010	0.026 ± 0.006 without HR 7639
G6IV	3	0.020 ± 0.000	
G8IV	18	0.030 ± 0.019	0.024 ± 0.006 without HR 878 & HR 1362
G8-K0IV	4	0.030 ± 0.000	
G9IV	4	0.025 ± 0.006	

Table 1 (cont.)

Spectral class	Number	Mean amplitude (mag)	Comment
G0IV–V	3	0.037 ± 0.006	
G0V	40	0.029 ± 0.024	0.025 ± 0.008 without σ CrB
G1V	16	0.024 ± 0.006	
G1.5Vb	3	0.023 ± 0.015	
G2V	14	0.026 ± 0.008	
G2.5V	3	0.027 ± 0.006	
G3V	14	0.024 ± 0.006	
G4V	13	0.028 ± 0.009	
G5V	18	0.029 ± 0.012	
G6V	6	0.030 ± 0.021	0.022 ± 0.008 without HR 2162
G7V	3	0.030 ± 0.010	
G8V	12	0.034 ± 0.034	0.025 ± 0.005 without HR 4550
G9V	6	0.040 ± 0.025	0.030 ± 0.007 without V711 Tau

Table 3: Stars with amplitudes greater than 0^m03

Name	HD No.	Spectral Type	HIP No.	SE (mag)	Amp. (mag)	Comments
U Sgr	170764	G1.5Ib	90836	0.0683	0.72	DCEP
10 S Sge	188727	G5Ib	98085	0.0616	0.77	DCEP
56 Peg	218356	G8Ib	114155	0.0011	0.04	U
R CrB	141527	G0Iep	77442	0.0075	0.56	RCB
RY Sgr	180093	G0Ipe(C1,0)	94730	0.1050	1.74	RCB
HR 2641	52703	G8II–III	33774	0.0012	0.04	MV
HR 3043	63660	G0III	38146	0.0006	0.04	U
HR 4006	88639	G3IIIFe-1	50109	0.0006	0.04	U
ι Tuc	6793	G5III	5268	0.0028	0.06	U
HR 3922	85945	G5III	48802	0.0014	0.04	U
ϵ UMi	153751	G5III	82080	0.0012	0.05	EA
HR 3636	78668	G6III	44936	0.0007	0.04	MV
χ Eri	11937	G8IIIbCNIV	9007	0.0025	0.04	U
GZ Eri	27362	G8III	20075	0.0043	0.16	L
V403 Aur	39743	G8III	28162	0.0057	0.13	I
NSV 3072	47973	G8III	31765	0.0047	0.08	U
72 τ Cnc	78235	G8III	44818	0.0013	0.04	MV
HR 5896	141853	G8III	77689	0.0009	0.04	
NSV 7785	148897	G8IIICN-2CH-1	80843	0.0010	0.04	P
HR 7010	172424	G8III	91523	0.0009	0.04	
ξ Her	163993	G8+III	87933	0.0012	0.04	SR
HR 3907	85505	G9III	48413	0.0015	0.04	
47 o Dra	175306	G9IIIFe-0.5	92512	0.0009	0.04	RS
HR 7325	181122	G9III	94916	0.0009	0.04	
24 DK UMa	82210	G4III–IV	46977	0.0013	0.05	RS
16 λ And	222107	G8III–IV	116584	0.0142	0.21	RS
HR 780	16589	G0IV	12300	0.0010	0.04	U
HR 6105	147722	G0IV	80399	0.0008	0.08	U

Table 3 (cont.)

Name	HD No.	Spectral Type	HIP No.	SE (mag)	Amp. (mag)	Comments
105 ϕ Vir	126868	G2IV	70755	0.0028	0.06	U
HR 1936	37501	G5IV	26190	0.0013	0.04	
HR 7683	190771	G5IV	98921	0.0017	0.06	U
HR 978	20277	G8IV	15241	0.0030	0.08	U
HR 1362	27536	G8IV:	20263	0.0045	0.08	U
HR 913	18894	G0IV–V	14124	0.0009	0.04	
HR 5740	137510	G0IV–V	75535	0.0008	0.04	
18 Cet	4307	G0V	3559	0.0008	0.04	
HR 4980	114630	G0V	64478	0.0008	0.04	U
39 Ser	142267	G0VFe-0.5	77801	0.0014	0.04	
17 σ CrB	146361	G0VCaIIe	79607	0.0028	0.17	RS
HR 8635	214953	G0V	112117	0.0007	0.04	
π^1 UMa	72905	G1.5Vb	42438	0.0010	0.04	MV
9 BE Cet	1835	G2V	1803	0.0016	0.04	BY
HR 2290	44594	G3V	30104	0.0008	0.04	
HR 2882	59967	G4V	36515	0.0020	0.05	U
96 κ^1 Cet	20630	G5V	15457	0.0022	0.04	P
39 Tau	25680	G5V	19076	0.0013	0.06	U
HR 6748	165185	G5V	88694	0.0013	0.04	U
HR 7330	181321	G5V	95149	0.0019	0.04	
HR 8148	202940	G5V	105312	0.0011	0.04	
HR 2162	41824	G6V	28796	0.0022	0.07	U
HR 4864	111395	G7V	62523	0.0011	0.04	
HR 4550	103095	G8Vp	57939	0.0009	0.14	U
V711 Tau	22468	G9V	16846	0.0035	0.09	RS

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