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A LIST OF VARIABLE STARS SIMILAR TO γ Dor

In this note we compile data on stars that appear to constitute a new class of variable stars. These stars typically have spectral types near F0 and luminosity classes of V or IV-V. They are variable up to 0.1 mag in V on a time scale of 0.5 to 3 days – an order of magnitude longer than the fundamental radial pulsation period for stars of this density. Some exhibit two or more frequencies. The evidence is that these stars are variable owing to non-radial g-mode pulsations. Given that γ Dor was the first one found to be variable (Cousins & Warren 1963), it has been suggested that they be known as "γ Doradus stars". Our list is a consequence of the rapidly growing scientific interest in these stars. For instance, multi-longitude campaigns are planned for four of the stars during 1995; these are necessary to avoid aliasing of the frequencies of variation for stars with ≈ 1 day periods.

In Tables 1, 2, and 3, respectively, we give various data on the bona fide members of the group, on other candidates, and on one star formerly regarded as being of the γ Dor type. The coordinates are equinox 2000. The photometric periods are given in days. The projected rotational velocities $v \sin i$ are in km s^{-1}. Table 1 is only for stars with a considerable amount of available data. Table 2 contains all objects we found in the literature which were reported to be related with the γ Dor phenomenon. In the tables we provide Strömgren photometry from Hauck & Mermilliod (1990) supplemented by new observations of Handler (1995). In the references we include only published papers. We do note, however, that Zerbi (private communication) informs us there is a paper in preparation on NGC 2516 which provides evidence for additional four γ Dor candidates in that cluster.

Table 1. Bona Fide Members

Star	HD	$< V >$	$(b-y)$	m_1	c_1	β
RA	DEC	Sp	Period(s)	$v \sin i$	Remarks	References
	224945	6.9	0.192	0.147	0.719	2.743
00:02:02.4	−02:45:59	(F0)	1.072, 1.495	55		11, 12, 14
γ Dor	27290	4.25	0.201	0.173	0.658	2.742
04:16:01.0	−51:29:21	F0 V	0.733, 0.757	62		2, 3, 21
9 Aur	32537	5.00	0.217	0.152	0.642	2.723
05:06:40.7	+51:36:01	F0 V	1.258, 2.895	18	1	4, 13, 16
2 Pup B	62683	6.89	0.201	0.165	0.634	2.727
07:45:28.7	−14:41:09	A8 V	1.92 or 0.48			20
	164615	7.06	0.230	0.178	0.624	2.715
18:01:32.9	+11:17:08	F2 IV–V	0.815	60		9, 10
	224638	7.2	0.198	0.157	0.680	2.726
23:59:34.5	−01:51:02	(F0)	1.233, 1.460	24		11, 12, 14

Table 2. Other Candidates

Star RA	HD DEC	$< V >$ Sp	$(b-y)$ Period(s)	m_1 $v \sin i$	c_1 Remarks	β References
	23375	8.58	0.228	0.172	0.719	2.765
03:45:34.4	+24:27:50	A9 V	> 0.2	75		1
NGC 2516 C52		10.29	0.278	0.176	0.673	2.761
7:55:52	−60:24:37		0.2-0.4		2	5
NGC 2516 C69		11.21	0.282	0.117	0.739	2.761
7:56:19	−60:36:59		0.2-0.4			5
NGC 2516 C93		11.13	0.263	0.144	0.797	2.776
7:54:25	−60:30:40		0.2-0.4			5
NGC 2516 C96		11.23	0.257	0.151	0.720	2.766
7:54:13	−60:35:09		0.2-0.4			5
τ^1 Hya	81997A	4.60	0.296	0.164	0.448	2.661
9:29:08.4	−02:46:07	F6 V	(days)	25		18
	106103	8.12	0.264	0.160	0.449	2.675
12:12:24.9	+27:22:49	F4 V	(0.83)	6	3	19
γ Vir	110379/80	3.48	0.242	0.152	0.522	2.708
12:41:41.4	−01:26:58	F0 V	?	28	4	23
	111829	9.46	0.228	0.100	1.000	2.806
12:53:41.3	−74:53:46	A1 IV-V	1.8 ?		5	8
	117777	9.25				
13:32:03.3	+28:35:05	F2 V	(1)			22
BS 8799	218396	5.99	0.181	0.142	0.678	2.745
23:07:28.3	+21:08:05	A5 V	0.510	45		17

Table 3. Star formerly on the list

Star RA	HD DEC	$< V >$ Sp	$(b-y)$ Period(s)	m_1 $v \sin i$	c_1 Remarks	β References
	96008	6.74	0.209	0.165	0.703	2.727
11:03:43.7	−51:21:11	F0 V	0.309873	85	6	6, 7, 15

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Remarks to Tables 1–3:

1. 9 Aur was designated V398 Aur in the latest name-list of variable stars (Ref. 13 above).
2. Cluster membership doubtful (Ref. 5 above); Strömgren indices suggest high metallicity, thus the absolute magnitude of the star in Figure 1 could be too low
3. Period uncertain due to aliasing
4. The magnitudes and colors given are for the slightly brighter of the two nearly identical components.
5. Note correct HD number
6. Shown to be an ellipsoidal binary (Ref. 15 above)

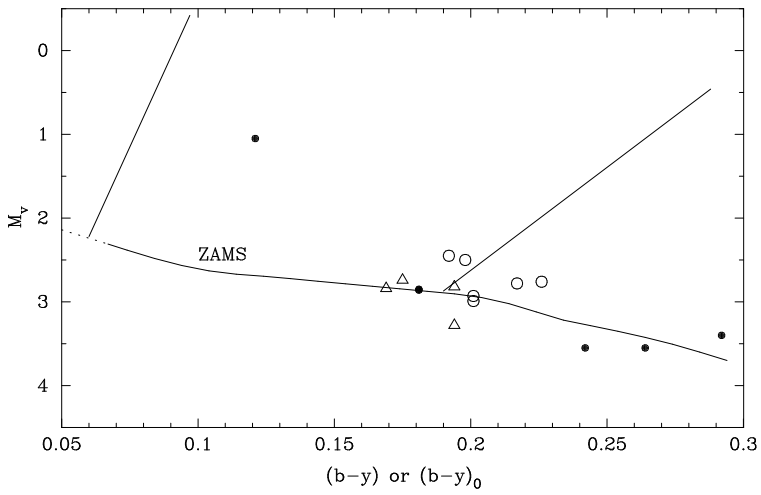

Figure 1. Color-magnitude diagram of the stars similar to γ Dor. Circles: stars from Table 1. Triangles: NGC 2516 stars. Dots: other candidates from Table 2. The Zero Age Main Sequence is adopted from Crawford (1975, 1979), while the borders of the instability strip are taken from Breger (1979).

In Figure 1 we give a color-magnitude diagram of the bona fide members and the other candidates. For field stars and doubtful members of clusters, we calculated the unreddened colors and absolute magnitudes from the Strömgren photometry by applying the calibrations of Crawford (1975, 1979).

The authors would appreciate receiving from other observers further data and news of new candidates, since this list will be continuously updated.

Some information in the table was obtained from the SIMBAD data retrieval system, a data base of the Astronomical Data Centre, Strasbourg, France.

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