COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS
Number 4118

Konkoly Observatory
Budapest
29 November 1994
HU ISSN 0374 – 0676

35 NEW BRIGHT MEDIUM- AND HIGH- AMPLITUDE VARIABLES DISCOVERED BY THE TYCHO INSTRUMENT OF THE HIPPARCOS SATELLITE[1]

The HIPPARCOS project will discover a large number of hitherto unknown variable stars, as a side result of a primarily astrometric satellite (for a description see Perryman, 1989, and references therein). The HIPPARCOS main instrument is expected to detect low-amplitude variability in several 10 000 stars, while the TYCHO instrument will scan 1 million stars down to about B=12 for medium- to high-amplitude variations. The four-year lifetime of the satellite ended in August 1993. The reduced data, including the individual photometric measurements of all observed stars, will become available to the general astronomical community in 1997.

Here we present a small list of new bright medium- to high-amplitude variables that became obvious during routine astrometric processing of the TYCHO data. All were checked for known counterparts in the General Catalogue of Variable Stars (GCVS), in the New Catalogue of Suspected Variables (NSV), and in the five name lists of newly designated variable stars issued since 1985 (IBVS 2681, 3058, 3323, 3530, 3840). Ground-based follow-up observations are encouraged to clarify the nature of the stars and to assess the quality of these preliminary TYCHO results. The amplitudes (as observed by TYCHO) are mostly above 0.5 magnitude, with 6 of them exceeding 1 magnitude.

The 35 new variables are listed in Table 1. The columns of the table contain, in turn: the designation of the star in the Space Telescope Guide Star Catalogue, the J2000 position, the observed range of variability in the T magnitude (defined below) and remarks. For each of the stars there are of the order of 100 TYCHO observations in two wavelength bands (close to B and V, respectively). Nevertheless light curve classification from these data is very difficult because the observations are extremely unevenly distributed in time. Table 1 therefore gives only rough indications on the character of the variability.

Among the 35 stars in Table 1 there are six NSV stars (indicated in the remarks column). The TYCHO measurements thus confirm the suspected variability of these objects.

Figures 1 and 2 show the observed light curves for two of the NSV objects as an illustration of the TYCHO data. The T magnitude is a broad-band optical magnitude derived from the sum of the photon counts in the TYCHO B and TYCHO V photometric channels, under the condition that T=B=V if B-V=0. See Halbwachs et al., 1992, for more details.

Acknowledgements: This work was supported by Bundesministerium für Forschung und Technologie, Deutsche Agentur für Raumfahrtangelegenheiten (DARA), Projects 500092020 and 500091060, and by the Danish Space Board. The results presented here are based on the collaborative effort of the HIPPARCOS and TYCHO scientists and engineers, scattered all over Europe.

[1] Based on observations made with the ESA Hipparcos satellite

Table 1. Results on the 35 new variables

GSC/TIC Id	R.A. 2000	Dec. 2000	T(max)	T(min)	Remarks
8468 104	$0^h20^m20^s.2$	−57°9'48"	9.37	10.66	
2345 1896	3 19 01.5	32 41 16	7.90	8.33	
8503 158	3 37 44.6	−55 23 47	8.67	10.13	NSV 1214
7572 1544	3 44 18.7	−41 53 52	8.22	8.99	350 days period?
3347 1499	4 48 15.4	47 16 29	9.24	9.77	
3738 234	5 06 31.7	55 21 13	7.73	8.51	periodic, 90 days
2910 447	5 31 26.8	38 19 11	7.54	8.23	
709 46	5 32 54.5	13 03 07	9.04	9.69	NSV 2106
3378 458	6 10 21.3	47 44 22	8.16	8.67	
6513 1712	6 16 01.9	−27 30 34	8.29	9.44	
7102 1296	7 05 13.9	−35 56 23	7.42	8.31	NSV 3379
8143 1629	7 56 20.9	−49 58 55	8.38	9.69	
7132 590	8 01 32.9	−37 11 50	8.06	8.60	400 days period?
8155 343	8 38 01.0	−46 54 16	7.89	9.35	NSV 4166
8585 1054	9 36 14.7	−52 32 41	8.13	8.98	360 days period?
7729 173	11 02 13.9	−41 06 51	7.14	7.55	
8212 1230	11 04 31.4	−51 13 19	8.43	10.00	SRb type?
5511 693	11 15 23.6	−11 35 17	7.62	7.96	periodic?
8653 1082	13 14 08.3	−54 41 35	8.59	9.15	
1466 869	13 43 59.2	21 49 05	8.81	9.73	
2549 677	14 15 58.3	34 26 15	8.91	9.53	
6199 618	15 56 40.1	−22 01 40	8.85	9.83	NSV 7344, R CrB type?
7850 1060	15 57 59.7	−43 57 49	8.94	10.07	NSV 7357
353 301	15 59 05.8	0 35 45	7.51	8.2	eclipsing?
8710 1370	16 01 36.3	−54 08 36	8.67	9.28	slowly variable
7362 894	17 15 15.5	−30 32 14	8.77	9.38	
8353 620	17 21 04.6	−51 07 14	9.47	10.73	
6306 417	19 30 09.6	−19 23 08	8.74	9.28	
5153 387	19 41 07.6	−03 55 10	8.38	9.05	
8782 316	19 43 13.7	−56 15 36	8.25	8.65	
1089 751	20 46 49.3	7 33 11	8.64	9.12	eclipsing?
7987 835	21 25 28.4	−41 42 07	8.26	8.98	periodic?
7990 374	21 54 22.3	−41 15 58	8.59	9.36	
8827 195	22 57 05.8	−57 24 04	7.68	8.71	
8833 1050	23 44 19.2	−54 26 10	8.12	8.74	

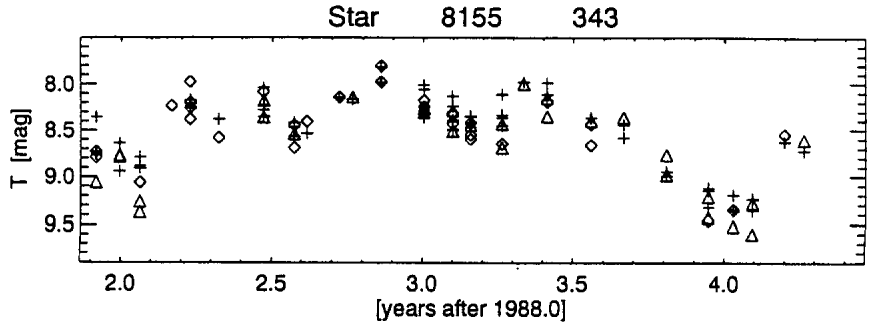

Figure 1: TYCHO light curve of GSC 8155 343 = NSV 4166. All raw observations of the star by TYCHO are shown. The different symbols denote different apertures of the instrument. The T magnitude is defined in the text. The strong clumping of the points is an unavoidable consequence of the (primarily astrometric) measuring schedule of the HIPPARCOS satellite. The scatter of the points within each clump is due to the random measurement errors. They will be somewhat smaller after the final photometric reduction of the TYCHO data. The variability of this suspected variable is confirmed by the data shown here.

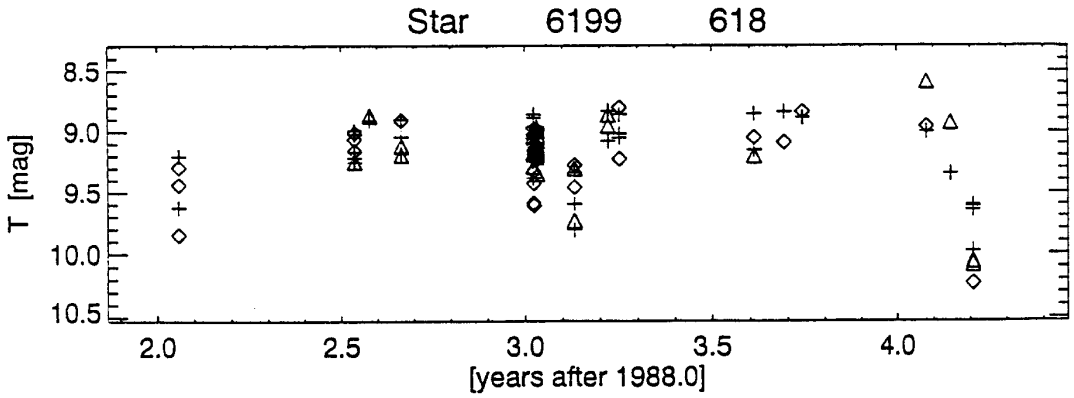

Figure 2: TYCHO light curve of GSC 6199 618 = NSV 7344. Same remarks as for Figure 1

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