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PHOTOMETRY OF STARS IN THE FIELD OF VX TAURI

VX Tauri (= IRAS 04225+1626 = GSC 65-0539) is a Mira variable projected on the main body of the Hyades. It was added to the program of the AAVSO in 1984. However, the comparison stars on the preliminary chart had magnitudes based mostly on eye-estimates. At the request of Charles Scovill of the AAVSO, I made photoelectric observations of several stars in the field.

I observed the stars using the Lowell 53cm photometric telescope on four nights, 5, 7, 8, & 9 December 1993 UT. Strömgren *y* and *b* filters were used through either a 29- or 49-arcsec diaphragm. Each observation consisted of at least three 10s integrations on 'star' and two 10s integrations on 'sky', with greater numbers for stars fainter than about  $9^m0$ .

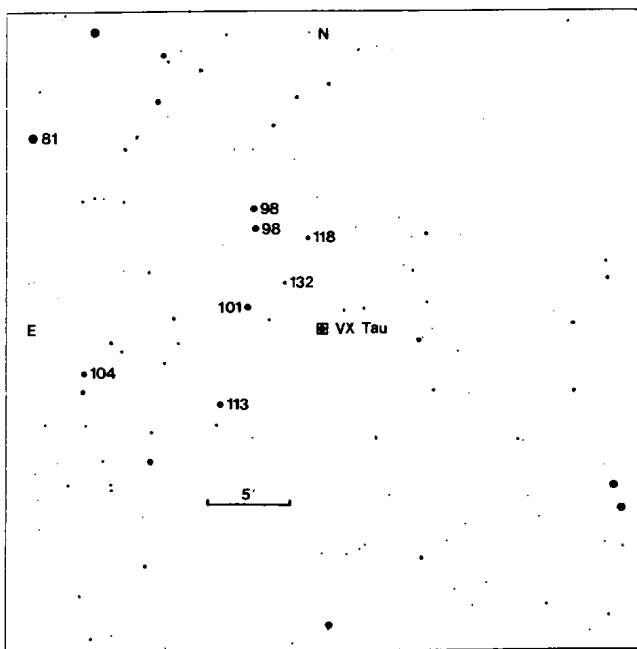


Figure 1. The field of VX Tauri showing stars from the GSC. V magnitudes are indicated to the nearest tenth with the decimal point omitted.

Table 1. Standard Star Observations

Name	V (std)	$b - y$ (std)	V (obs)	$b - y$ (obs)	n	source
HD 11577	7.707	0.112	7.714	(0.089)	1	O83
HD 16901	5.436	0.566	5.441	0.562	1	O83
HD 22211*	6.487	0.408	6.491	0.406	2	POC/O83
HD 22695	6.194	0.597	6.186	0.584	2	O93
HD 24154	6.722	0.715	6.712	0.709	1	O93
HD 24357*	5.970	0.221	5.964	0.230	2	CB70
HD 24482	8.184	1.256	8.190	1.261	5	Lowell
HD 26462*	5.707	0.231	5.715	0.234	3	POC/CB70
HD 29063	6.072	0.855	(6.051)	0.855	1	AT91
HD 31073	9.300	0.125	9.302	0.137	1	L83/Knu
HD 32174	8.419	0.882	8.405	(0.863)	1	Lowell
HD 33021*	6.165	0.397	6.167	0.392	6	POC/O83
HD 35299	5.701	-0.092	5.707	-0.104	1	GO76
HD 37784	6.340	0.757	6.331	0.753	1	Lowell
HD 42049	5.929	1.044	5.930	1.051	1	HO87/Lowell
HD 42824	6.627	0.019	6.629	0.028	4	GO76/C72
HD 43358*	6.363	0.296	6.361	0.298	4	POC/O83
HD 44974	6.524	0.571	6.525	0.567	4	O93
HD 45433	5.540	0.858	5.528	0.861	2	AT91
HD 52533	7.702	0.006	7.701	-0.003	1	L83/HM
HD 57667	7.490	1.018	7.501	(1.037)	1	O83
HD 69994	5.808	0.696	5.808	0.694	1	Lowell
HD 73665	6.391	0.603	6.384	0.599	1	O93/CB69
HD 74721	8.715	0.029	8.711	0.035	2	AT91

The values for the primary and secondary standard stars were taken mostly from the work of E. H. Olsen, supplemented by the sources cited in Table 1. Dr. Olsen provided me with revised values for the primary four-color standards (marked with \* by the star name) derived from the original standard-star list of Crawford & Barnes (1970). The ‘‘Lowell’’ secondary standards were observed on about thirty nights each over several seasons with the 53cm telescope directly against primary standards. Table 1 shows the adopted and observed mean V and  $b - y$ , the number of observations ‘n’, and the source for the standard values. The stars are listed in RA order for equinox 2000. The data in parentheses were omitted from the transformations, mostly involving the slightly variable red stars, none of which are primary standards. The mean residuals of the observed averages from the assumed values in this group of data are:  $V = -0.001 \pm 0.007$ ;  $b - y = +0.001 \pm 0.006$ .

Results for the stars near VX Tauri are shown in Table 2, listed in order of decreasing brightness. The stars are identified by HD, BD, or GSC number; positions come from the PPM or the GSC; SIMBAD is also the source of the spectral types from the literature. The second line of each entry shows the standard deviation of the means for the two nights’ measures on each star (except HD 28099).

Table 2. Photometry of Stars in the Field of VX Tauri

Name	RA (2000)	Dec (2000)	V	$b - y$	n	spec	Remarks
HD 28099	4 <sup>h</sup> 26 <sup>m</sup> 40 <sup>s</sup> .1	+16°44'49"	8.107	0.410	1	G2+Va	(1)
HD 285794	4 25 44.0	+16 39 21	9.823	0.499	2	G0	
BD+16°0595	4 25 44.5	+16 40 33	9.844	0.828	2	G0	
HD 285795	4 25 46.0	+16 34 40	10.107	0.549	2	K0	
HD 285796	4 26 26.9	+16 30 47	10.403	0.513	2	A7	
GSC 1265-0135	4 25 52.8	+16 28 56	11.324	1.483	2		
GSC 1265-0941	4 25 30.9	+16 38 48	11.750	1.294	2		
GSC 1265-0065	4 25 36.6	+16 36 07	13.155	0.664	2		
			.035	.040			

Remarks: (1) = V911 Tau = van Buren 64.  $b - y = 0.414$  (Olsen 1983), 0.414 (Anthony-Twarog et al. 1991).

HD 28099 is the well-known close solar analog, 1988 MK standard (Keenan & Yorke 1988), and chromospherically-active spotted Hyades star V911 Tauri (Lockwood et al. 1984). Because the full amplitude is less than 0.05 mag., it is suitable as a comparison star for visual observers.

Interestingly, none of the fainter stars in the list is a Hyades member, and lie well in the background of the cluster, as does VX Tauri. Their  $b - y$  colors suggest most or all are substantially reddened by the dark clouds in the Taurus region. Indeed, the reddest two are beyond the color range of the standards, and so the results are subject to 'reduction errors' (in this case rather small) from extrapolating beyond the system defined by the standards (cf. Manfroid & Sterken 1992). For the convenience of observers, a chart derived from the GSC is shown in Figure 1. The comparison stars are indicated by their V magnitudes rounded to the nearest tenth (decimal point omitted) in the style of visual variable- star charts.

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