

MULTICOLOR PHOTOMETRY OF METALLIC-LINE STARS. II ADDITIONAL OBSERVATIONS OF ν DRACONIS

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Received 1974 July 30

RESUMEN

Hemos obtenido datos adicionales y de mejor calidad, en el sistema fotoeléctrico UBVRI, de las estrellas BS 6554 y BS 6555.

El programa de observación consistió de 171 observaciones de estrellas patrón, 370 de comparación y 218 de cada una de las componentes de ν Draconis.

Los resultados indican que la fotometría obtenida es de gran precisión y que durante el período de observación ninguna de las dos estrellas BS 6554 y BS 6555 sufrió variaciones de luz mayores que 0.005 magnitudes.

ABSTRACT

We have obtained additional and improved UBVRI photometric data for BS 6554 and BS 6555. The program has consisted of 171 observations of standard stars, 370 of comparison stars and 218 of each component of ν Draconis.

The results indicate a high quality set of photometric measurements which show that during the observations neither BS 6554 nor BS 6555 suffered light variations larger than 0.005 mag.

Key words: METALLIC-LINE STARS — VARIABLE STARS — PHOTOMETRY.

I. INTRODUCTION

We presented evidence for the light variability of ν^1 Draconis (BS 6554) and ν^2 Draconis (BS 6555) of two sorts in paper I (Mendoza and Gonzalez 1974). The first one consisted of our own UBVRI observations obtained at San Pedro Mártir Observatory in June 1971; the second was derived from UBVR photometry made elsewhere which show enough scatter for us to suspect variability.

The 1971 measurements cast a slight doubt on our results because of a possible instability of the photo-electric equipment. We therefore, re-observed ν Draconis stars in May 1974. These new observations are described below.

II. THE OBSERVATIONS

We have obtained high quality photometric data in the UBVRI system of BS 6554 and BS 6555 with

the 33-inch telescope of the University of Mexico at San Pedro Mártir Observatory in May 1974.

In addition to ν Draconis, six standard and six comparison stars were observed during the first ten photometric nights. On the following three nights the six standard stars were measured in UBVRI. The BS 6369, BS 6554 and BS 6555, however, were only measured in the V-filter.

The observed atmospheric extinction coefficients are slightly better than those obtained in June 1971. The observational errors are lower than those reported in paper I. The new set is given in Table 1.

TABLE 1
PROBABLE ERROR OF A SINGLE OBSERVATION
AT 1.0 AIR MASS

V	B - V	U - B	V - R	R - I
± 0.013	± 0.008	± 0.013	± 0.013	± 0.008

The standard deviations for magnitudes and colors are also smaller than before, actually better than 0.015 on the average. This of course is reflected on the "good" probable errors given in Table 1.

III. RESULTS

The new results are listed in Table 2. The columns of this Table contain: first, the Bright

Star (BS) Catalogue number; second through sixth, the mean V magnitude and the mean U - V, B - V, V - R and V - I colors, respectively; seventh, the number of observations made in UBVRI; eighth, the number of measurements obtained in V, which are in addition to the V-observations indicated in column seven; and lastly, notes indicating the category of the star: St, standard; Cm, comparison; and v:, BS 6554 and BS 6555.

TABLE 2
MEAN MAGNITUDE AND COLORS

BS	V	U - V	B - V	V - R	V - I	n	R
4456	5.95	-0.81	-0.16	-0.06	-0.23	34,9	St
4550	6.46	0.91	0.75	0.66	1.11	35,9	St
6369	4.91	0.52	0.47	0.38	0.62	34,185	Cm
6514	6.51	0.23	0.14	0.12	0.17	34	Cm
6536	2.78	1.60	0.97	0.69	1.16	31	Cm
6554	4.89	0.31	0.25	0.21	0.34	40,178	v:
6555	4.86	0.39	0.29	0.23	0.36	40,178	v:
6560	6.18	0.99	0.59	0.52	0.90	29	Cm
6603	2.76	2.41	1.17	0.82	1.38	22,9	St
6618	5.75	0.06	0.01	0.04	0.04	28	Cm
6629	3.75	0.07	0.04	0.03	0.03	22,9	St
6688	3.74	2.39	1.17	0.84	1.43	29	Cm
8622	4.89	-1.23	-0.19	-0.09	-0.31	8,3	St
8832	5.59	1.88	1.01	0.82	1.34	8,3	St

The present photometry does not indicate any light variations for either ν^1 or ν^2 Draconis. The standard deviations for this pair are approximately the same as those for the comparison and standard stars. For the sake of illustration these are given in Table 3.

TABLE 3
STANDARD DEVIATIONS OF ν DRACONIS

$\sigma(V)$	$\sigma(B-V)$	$\sigma(U-B)$	$\sigma(V-R)$	$\sigma(R-I)$
0.012	0.006	0.012	0.012	0.007

If now we take the difference between the V magnitudes of a comparison star and one ν Draconis, or the difference between the V magnitudes of BS 6554 and BS 6555 or the difference between the V magnitudes of two comparison stars the standard deviations are nearly all the same, around 0.005, provided the difference is measured on couples of V's observed less than 15 min. apart in time.

If the difference is made using the B - V or R - I colors, then the standard deviations are even smaller.

The 1971 (paper I) and the 1974 (this paper) observations employ entirely the same standard stars. Thus we can compare the two sets of measurements. For instance, in the V magnitude four standard stars are exactly equal. The other two only differ by 0.01 mag. with the same sign. However, also in the V magnitude, BS 6554 and BS 6555 differ by 0.02 with the same sign again, but in the opposite direction from the standard stars. That is to say, apparently ν Draconis stars are brighter in 1974 than they were in 1971 by 0.02 mag.

It should be pointed out that the differences between ν^1 and ν^2 Draconis remain constant. Per example for the V magnitude this amount was found to be 0.027 mag. in both 1971 and 1974.

REFERENCES

- Mendoza, E. E. and González, S. F. 1974, *Rev. Mex. Astron. Astrof.*, **1**, 67.