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A NEW BLUE VARIABLE STAR

While working on a photoelectric sequence around Seyfert 1 galaxy Arakelian 120, one of us (M.H.) found a very blue star. The object is shown in Figure 1. M. Wischnjewsky kindly measured for us a plate we had, taken with the Maksutov astrographic camera at the Cerro El Roble Astronomical Station of the University

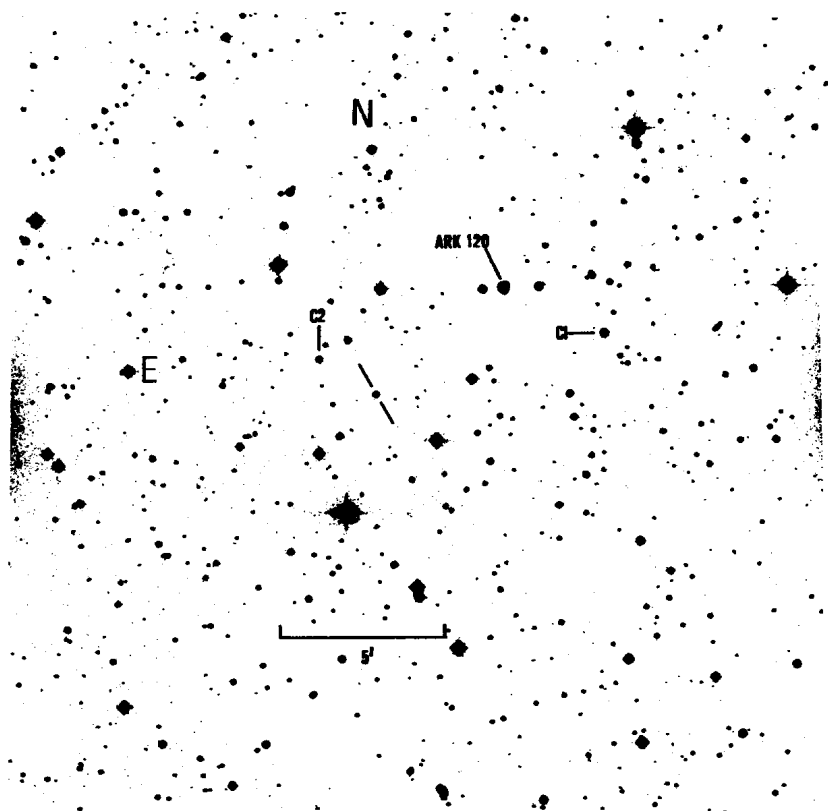


Figure 1

Table I. UBVR photometry of the variable star

U-B	B-V	V	V-R	R-I	Date	U.T.
-0.70	0.06	14.24	0.09	0.12	85.Feb.23	2.043
-0.74	0.02	14.11	0.12	0.06	85.Feb.24	2.326
-0.74	0.02	14.28	0.09	0.14	85.Feb.25	1.902
-0.83	0.06	14.03	0.13	0.14	86.Jan.09	4.254
-0.87	0.04	14.05	0.07	0.09	86.Jan.10	4.728
-0.83	0.06	14.13	0.08	0.11	86.Jan.10	4.888
-0.93	0.04	13.95	0.04	0.05	86.Jan.11	4.687
-0.79	0.05	14.07	0.06	0.13	86.Jan.11	4.906
-0.83	0.06	14.03	0.11	0.16	86.Jan.12	4.306
-0.82	0.06	14.10	0.05	0.11	86.Jan.12	4.622
-0.89	0.01	14.01	0.07	0.06	86.Jan.12	4.861
-0.82	0.10	14.10	0.11	0.12	86.Jan.13	2.671
-0.85	0.07	13.96	0.03	0.09	86.Jan.13	4.230
-0.82	0.02	14.10	0.09	0.11	86.Jan.13	4.836
-0.89	0.05	14.09			86.Jan.14	2.840
-0.88	0.07	14.07			86.Jan.14	2.974
-0.89	0.01	14.06			86.Jan.14	3.133
-0.84	0.06	14.16			86.Jan.14	3.244
-0.97	0.03	14.07			86.Jan.14	3.399
-0.84	0.04	14.07			86.Jan.14	3.513
-0.85	0.05	14.12			86.Jan.14	3.657
-0.89	0.05	14.08			86.Jan.14	3.766
-0.88	0.05	14.08			86.Jan.14	3.910
-0.78	0.05	14.08			86.Jan.14	4.021
-0.85	0.01	14.06			86.Jan.14	4.162
-0.79	0.07	14.20			86.Jan.14	4.266
-0.95	0.02	14.08			86.Jan.14	4.414
-0.90	0.03	14.05			86.Jan.14	4.518
-0.94	0.05	14.02			86.Jan.14	4.651
-0.80	0.08	14.11			86.Jan.14	4.744
-0.85	0.07	14.12			86.Jan.14	4.883
-0.84	0.03	14.05			86.Jan.14	4.980
-0.89	0.05	14.09			86.Jan.14	5.074

of Chile. Using 22 reference stars from the Perth-70 catalogue, the following 1950.0 coordinates were obtained for the object: R.A. =  $5^{\text{h}}13^{\text{m}}53^{\text{s}}.16$  and Dec. =  $-0^{\circ}15'28''.5$ .

We carried out UBVR photometric photometry during February 1985 and January 1986 using the 1 m, 0.91 m and 0.61 m telescopes of Cerro Tololo Inter-American Observatory, equipped with a dry-ice cooled Hamamatsu Ga-As photomultiplier and the standard Tololo set of UBVR filters as described by Graham (1982). We determined the standard magnitudes and colors from observations of at least 20 standard stars from the list published by Graham (1982) during several moonless photometric nights. The observations are listed in Table I. Typical errors are smaller than 0.02 mag., except in (R-I) whose error is smaller than 0.03 mag. Appreciable variability is seen in V magni-

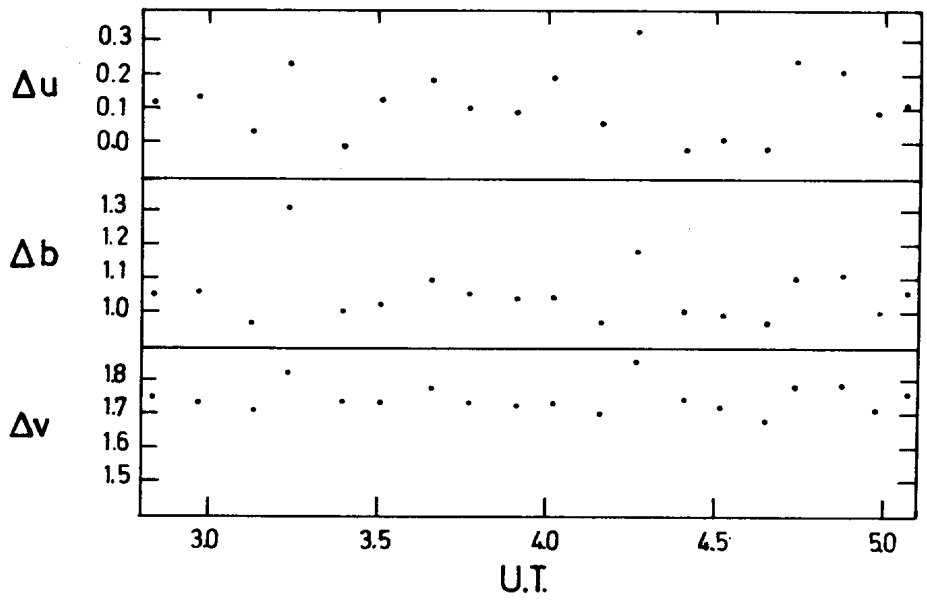


Figure 2

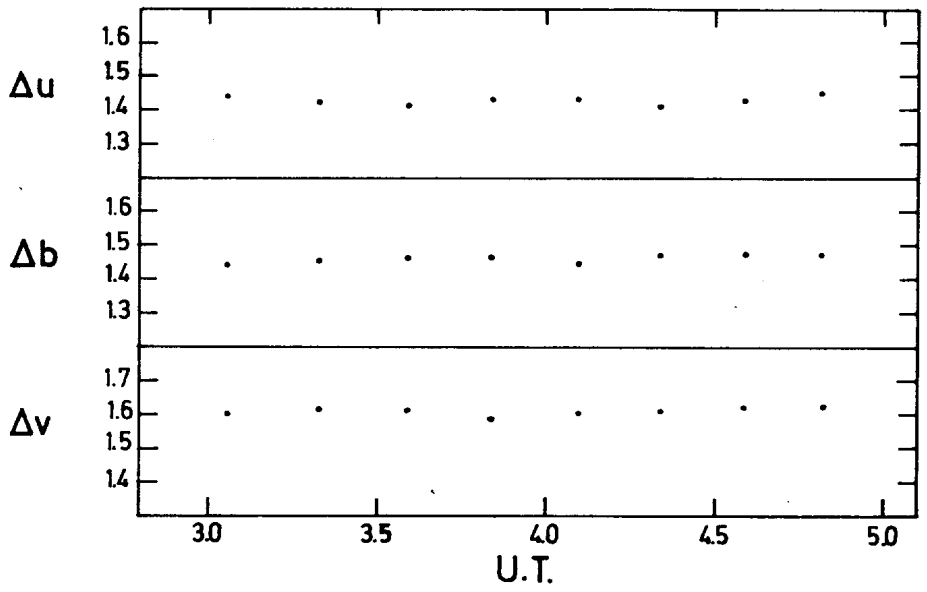
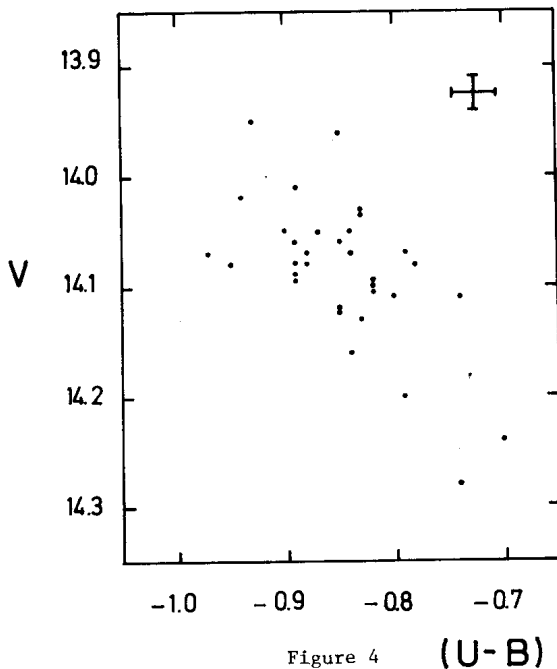


Figure 3

tude as well as in colors. The formal average of all observations leads to a mean visual magnitude of 14.09 and the following mean colors:  $U-B = -0.85$ ,  $B-V = 0.05$ ,  $V-R = 0.08$  and  $R-I = 0.11$ .

On January 14th, 1986 we observed the object and two comparisons (shown in Figure 1) for two hours, following the sequence  $C_1$ , var,  $C_2$ , var, ... etc. These observations were made with a statistical accuracy of 1% in U, B and V. Figure 2 shows the instrumental magnitude differences, corrected for atmospheric extinction, between the variable star and the brightest comparison ( $C_1$ ), versus Universal Time. Figure 3 shows the difference  $C_2 - C_1$ . It is clear that, within the accuracy of the data,  $C_2$  remains constant while the variable star changes its luminosity very fast, even from one observation to the next, typically 5 minutes. The range of variability during the two hours is as large as 0.3 mag. in the U and B bands and 0.15 mag. in the visual. It is also clear that the light curves have approximately the same shape for all three filters, although the amplitude looks much larger in the U band. In order to illustrate this, Figure 4 shows the visual magnitudes versus the U-B color (error bars show typical errors of 0.02 mag. in (U-B) and 0.015 mag. in V). On the average the star gets bluer when it gets brighter.



A spectrogram obtained at CTIO using the 1.5-m telescope and the SIT-Vidicon in April 26, 1985 by M.T. Ruiz and one of us (J.M.), shows a featureless blue continuum. Neither emission nor absorption lines can be inferred from this rather noisy spectrogram covering from 4000 Å to 7000 Å.

This object bears some resemblance to CD -42°14462, a dwarf nova in permanent outburst discovered by Bond and Landolt (1971). Their colors are very similar and CD -42°14462 also shows rapid variations over 0.2 mag. in V within a few days. The broad and shallow Balmer lines in absorption, the weak absorption of HeI line at 4471 Å, as well as the faint Balmer emission lines shown by CD -42°14462 (Bond, 1978; Cowley et al., 1977) cannot be confirmed or ruled out for our variable from the spectrogram we have. New spectroscopic observations are needed to understand the unusual nature of this object.

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References:

- Bond, H.E., and Landolt, A.U., 1971, Publ. A.S.P., 83, 485.  
Bond, H.E., 1978, Publ. A.S.P., 90, 216.  
Cowley, A.P., Crampton, D., and Hesser, J.E., 1977, Ap.J., 214, 471.  
Graham, J.A., 1982, Publ. A.S.P., 94, 244.

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