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UBV PHOTOMETRY OF NOVA Cas 1995 AT PREMAXIMUM PHASE

Nova Cas 1995 was discovered at R.A. = $01^h05^m05\overset{s}{.}4$, Dec. = $+54°00'41''$ (equinox 2000.0) by Yamamoto (1995) on August 24, 1995 UT. *UBV* photoelectric photometry reported here was made from three days after the discovery to mid-January 1996. The equipments used were two same type photon counting photometers attached to Schmidt-Cassegrain telescopes whose apertures are 28-cm and 35-cm at different personal observatories of two of the authors (H.A. and N.O.) respectively. The photometers developed by one of the authors are same type instrument described in Ohshima (1988).

Actual observations were made differentially with respect to SAO 21974 = HD 6250 as a comparison star, and the comparison was also checked with SAO 22031. The integration time was 20-seconds for each band. No variation of the comparison star was detected. Obtained magnitude and colors of the comparison star are $V = 6.81$, $B-V = 0.54$ and $U-B = 0.00$ which were differentially measured with μ Cas ($V = 5.12$, $B-V = 0.69$, $U-B = 0.09$, Johnson and Morgan, 1953). In the data reduction the dead time corrections of the photon counter and the atmospheric extinction correction were carried out. The transformation coefficients to the *UBV* standard system used were obtained from observation of the standard stars.

The magnitudes and colors which are mean values obtained during one night are given in Figure 1a and 1b. The long premaximum halt was seen during about a hundred days. The magnitude and color curves at premaximum phase are very similar to that in HR Del (Duerbeck, 1981). The maximum in U band was earliest. In our data, the maximum is $V = 7.08$ at December 19, 1995 UT (HJD 2450071), $B = 7.60$ and $U = 7.69$ at December 17 UT (JD 2450069).

In color variation, the reddening pulse at the maximum is obviously observed as same as in other novae (Duerbeck 1981, van den Bergh and Younger 1987). The bottom of reddening pulse in $B-V$ is later than that in $U-B$ i.e. $B-V = +0.80$ on December 21 (JD 2450073) and $U-B = +0.52$ on December 19 UT (HJD 2450071).

The color-color diagram is given in Figure 2. The color track of nova light at premaximum halt and at maximum are situated at narrow linear region on the diagram. The set of colors at post-maximum light are situated at separated region.

In the case of this nova at premaximum halt, the behavior of color in *UBV* photometry was attributed to almost continuum light of the nova. Because emission lines in the photometric passbands at the phase of this nova are very weak and narrow. Even though in B band which is the most affected by emission lines, the contribution from emission to the band during premaximum halt is less than a few percent, according to our low dispersion spectra obtained at Bisei Astronomical observatory (Ohshima et al. 1995) and at Okayama Astrophysical Observatory (Norimoto, 1996).

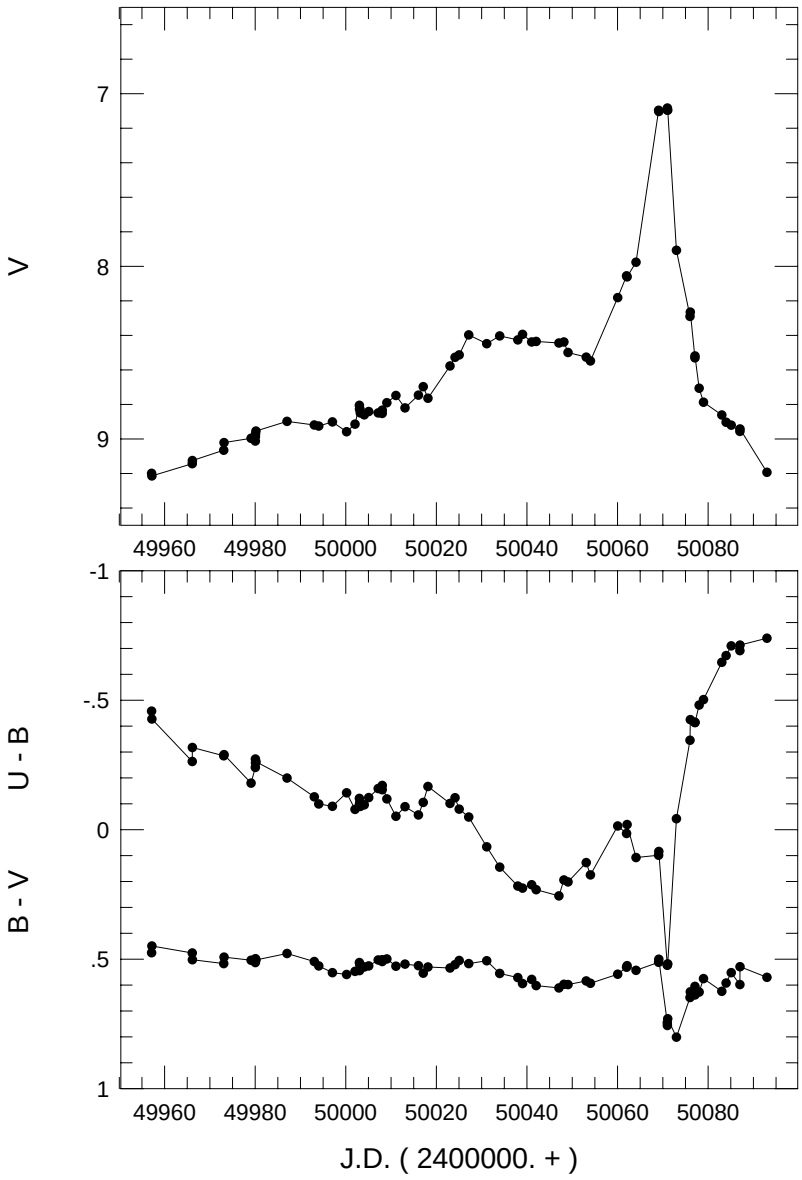

Figure 1. Magnitude and color curve of Nova Cas 1995

According to Gonzalez-Riestra et al. (1996), the color excess $E(B-V) = 0.6$ is obtained from UV observation with IUE. Using this value, the reddening corrected track on the color-color diagram is very similar to those of early type supergiants. These colors are consistent with observed premaximum spectra of classical novae (Seitter 1989).

The UBV photometric data reported here are available on request from the authors via E-mail (address given at the affiliation).

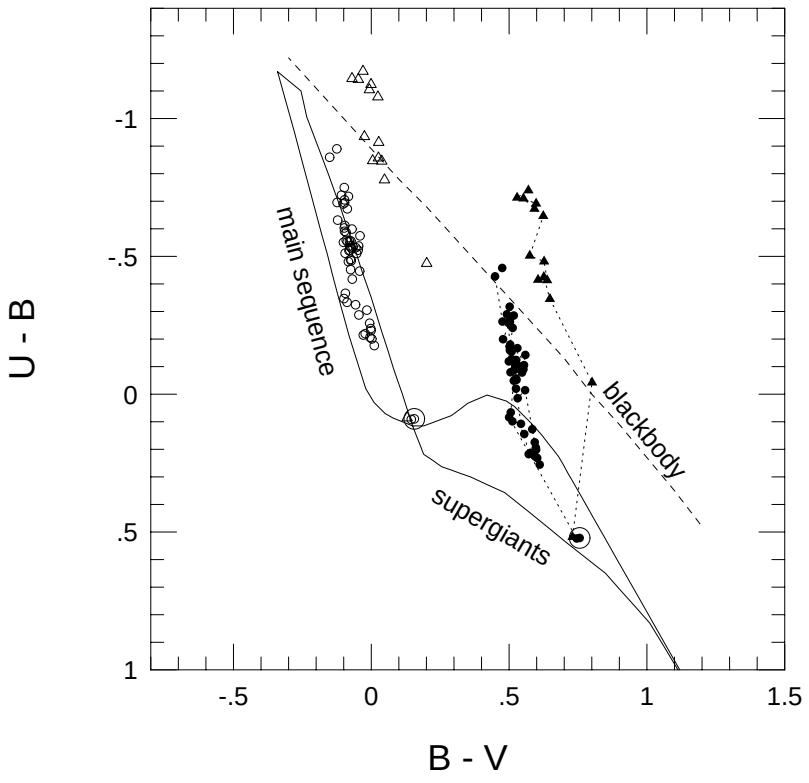

Figure 2. Color-color diagram of Nova Cas 1995. Filled circles are indicated premaximum halt light, filled triangles are post maximum light and large open circle is at V maximum light. Dotted line indicates progress of time. Open symbols are after correction of interstellar reddening which corresponds to E(B−V)=0.6. Colors at premaximum halt are situated narrow region on the diagram. Reddening corrected colors of light at premaximum halt and at maximum are very similar to those of early type supergiants.

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References:

Duerbeck, H. W., 1981, *Publ. Astron. Soc. Pac.*, **93**, 165
Gonzalez-Riestra, R., Shore, S. N., Starrfield, S. and Krautter, J., 1996, *IAU Circ.*, No. 6295
Johnson, H.L. and Morgan, W.W., 1953, *Astrophys. J.*, **117**, 313
Norimoto, Y., 1996, private communication
Ohshima, O., 1988, *I.B.V.S.*, No. 3135
Ohshima, O., Ayani, K. Shimizu, M. and Yamamoto, T., 1995,*I.A.U. Circ.*, No. 6214.
Seitter, W. C., 1989, in *Physics of Classical Novae*, Springer-Verlag, ed. Cassatella, A. and Viotti, R., p.79
van den Bergh, S. and Younger, P.F., 1987, *Astron. Astrophys. Suppl.*, **70**,125.
Yamamoto, M., 1995, *I.A.U. Circ.*, No. 6213