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A PECULIAR NEW VARIABLE STAR NEAR THE WIDE BINARY L266-18A/B

For several years we have conducted a spectroscopic and photometric investigation of faint common proper motion binaries which contain suspected white dwarf components (see Oswalt et al., 1991; Oswalt & Smith,1995; Smith & Oswalt, 1995). In the course of acquiring spectra of the binary L266-18A/B in Centaurus, one of us (TDO) noticed an exceedingly red object within the TV guider field which does not appear on the original survey plates.

Our initial impression was that this object might be a third component that was below the plate limit at the time Luyten conducted his survey of common proper motion binaries. Luyten (1974) reported the following data for L266-18A/B:

L266-18A: $\alpha_{1950}= 16^{h}18^{m}18^{s}$; $\delta_{1950}= -50°45'$ $m_{pg}= 16.4$; a-f
L266-18B: $m_{pg}= 17.5$; k-m; p.a.= 25°; sep.= 5"

A finder chart prepared from one of our V-filter CCD frames is presented in Figure 1. Since this object appears to have no prior references in the literature we have adopted the temporary designation L266-18 "C", but we do so with the caveat that it may not share motion with L266-18A/B.

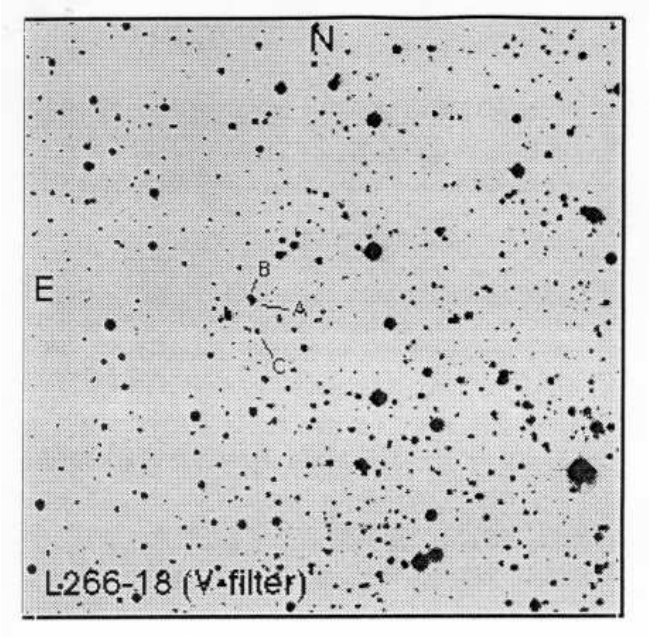

Figure 1. V-band finder chart for L266-18A/B. Suspected red variable star is labelled "C". Field is 6.′76 square, centered on $\alpha_{1950}= 16^{h}18^{m}26^{s}$; $\delta_{1950}= -50°43'$ 47". Orientation is North up, East to left.

The proper motion of the pair is listed as $\mu = 0''.15/\mathrm{y}$, $\theta = 188°$. Because it is a very crowded field, the possibility that we have misidentified L266-18A/B cannot be ruled out. No objects within the field exhibit Luyten's (1974) reported proper motion, and the position angle of the most likely pair ($\sim$40°) also differs from that reported by Luyten. However, our spectra show that the selected pair consists of nearly identical DA white dwarf components—unlikely for a randomly chosen pair of stars. Both exhibit unusually red continua and a broad depression near 6700 Å, suggesting the presence of unresolved M-type component(s).

Spectrophotometry of all three stars was obtained in May 1989 at the Cerro Tololo Inter-American Observatory using the 4-m telescope equipped with the R-C spectrograph, folded Schmidt camera and 2D-FRUTTI photon-counting detector. This configuration yielded a spectral coverage of $\sim 3500 - 7200$ Å and a reciprocal resolution of ~ 7 Å. The 300 μ slit width used corresponded to $\sim 1''.7$ on the sky, a good match to the seeing at the time of the integrations ($\sim 1''.5$). During the night, the photometric standards LTT3864 and LTT7987 were observed and all spectra were bracketed by He-Ar spectra. Flux and wavelength calibrations were performed at the CTIO La Serena computer facilities using the standard IRAF reduction package.

The spectrum of L266-18 "C" presented in Figure 2 is definitely that of a late-type star. However, it is remarkably weak in blue continuum and in the depth of TiO bands. The absence of Balmer emission weakens our initial hypotheses that it is a Mira-type long period variable or a young dust- or disk-enshrouded low-mass star.

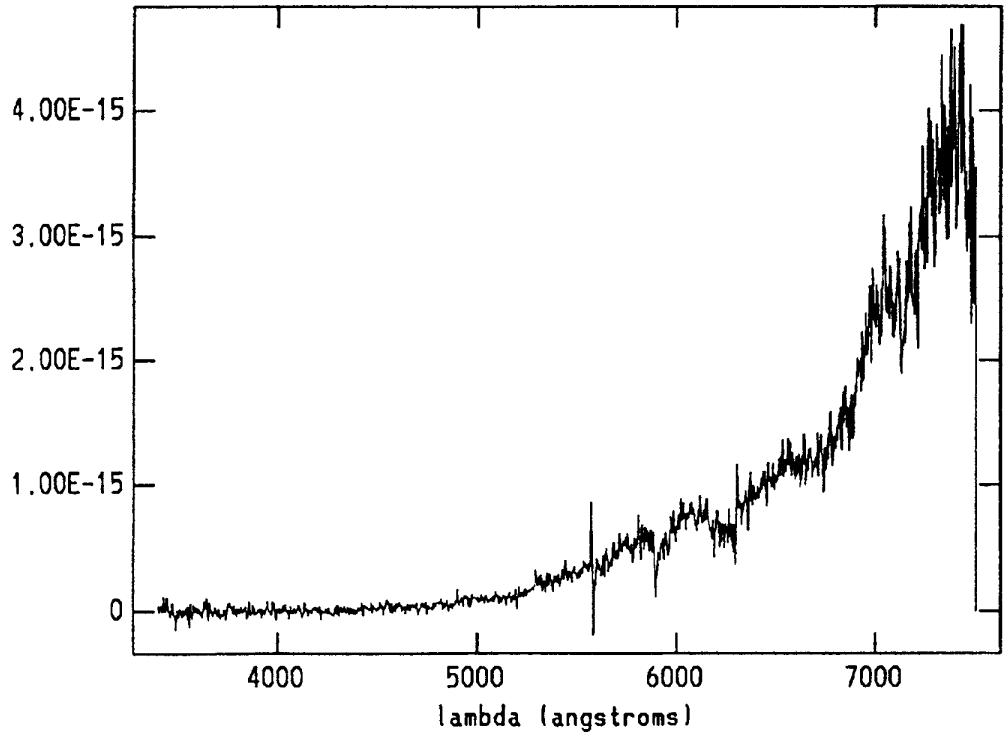

Figure 2. Optical spectrum of L266-18 "C" obtained with the CTIO 4-m telescope on 1989 May 8 UT. Flux (F_λ) is in units of ergs $\mathrm{cm}^{-2}\mathrm{s}^{-1}\text{Å}^{-1}$; resolution is ~ 7 Å. Discontinuities near 5600 and 6300 Å are due to incomplete night sky subtraction.

JHK photometry of the L266-18A/B field was obtained in 1990 April with the NASA IRTF 3.0-m telescope and Primo-1 aperture photometer, using a 5.″6 diaphragm and 15″ N-S chop. The detector was a single channel InSb phototube. Table 1 summarizes our JHK observations. Because of the relatively long integration times required, instrumental JHK magnitudes, rather than colors were extinction-corrected and transformed to the standard $JHK_{C.I.T.}$ system used at the IRTF. L266-18A/B is a pair of close separation and the observations were made at high air mass; as an internal check, the magnitudes of "C" also were measured differentially relative to L266-18A and B (both assumed nonvariable), and found to be consistent.

Table 1
JHK Photometry at IRTF (1990 Apr. 2 UT)

Filter	L266-18A	L266-18B	L266-18C
$J(\sigma)$	12.91 (.04)	13.40 (.04)	10.35 (.03)
$H(\sigma)$	12.52 (.03)	13.39 (.03)	9.14 (.03)
$K(\sigma)$	12.39 (.03)	13.77 (.04)	8.60 (.03)

$BVRI$ photometry was obtained in 1992 August at CTIO with the 0.9-m telescope using the Tek 1024 CCD. These observations are summarized in Table 2. As before, magnitudes were corrected for atmospheric extinction and transformed to the standard system; differential magnitudes relative to L266-18A/B also were computed as a check. The extreme red color of "C" is evident; star "C" was near the B-filter frame limit, and yet its image was saturated in the I-filter frame (hence no I magnitude is reported for "C" in Table 2.

Table 2
BVRI Photometry at CTIO (1992 Aug. 24 UT)

Filter	L266-18A	L266-18B	L266-18C
$B(\sigma)$	16.85 (.02)	16.79 (.02)	21.06 (.11)
$V(\sigma)$	15.50 (.01)	15.54 (.01)	17.33 (.01)
$R(\sigma)$	14.68 (.01)	14.68 (.01)	14.94 (.01)
$I(\sigma)$	13.83 (.01)	13.85 (.01)	————

Additional $BVRI$ photometry was attempted in 1993 June using the CTIO 1.5-m telescope equipped with the Tek 1024 CCD. Because the night was not photometric only differential measures could be extracted from these frames (see Table 3). Relative to both components L266-18A and B, star "C" brightened by ~ 1.20 and ~ 0.13 magnitudes in B and V, respectively, while dimming by ~ 0.10 magnitude in R. We conclude that "C" has become somewhat brighter and bluer in recent years. Therefore the JHK and $BVRI$ magnitudes should not be directly compared, as they were obtained at substantially different phases in the unknown light curve of "C".

The preliminary observations reported here suggest that "C" is a variable star of unusual color and brightness amplitude. Determination of its proper motion, trigonometric parallax, spectrum variations, and especially its long-term light curve, are needed. Observers in the southern hemisphere are invited to contribute to this effort.

Table 3
Differential BVRI Photometry at CTIO (1993 June 24 UT)

Filter	L266-18 C-A	L266-18 C-B	L266-18 A-B
$\Delta B(\sigma)$	3.02 (.11)	3.02 (.12)	−0.01 (.01)
$\Delta V(\sigma)$	1.69 (.02)	1.68 (.02)	−0.01 (.01)
$\Delta R(\sigma)$	0.36 (.01)	0.36 (.01)	0.00 (.00)
$\Delta I(\sigma)$	−0.70 (.01)	−0.71 (.01)	−0.01 (.01)

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T.D. OSWALT
J.A. SMITH
Florida Institute of Technology
Dept. Physics & Space Sciences
150 W. University Boulevard
Melbourne, Florida 32901
USA

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