

Light curve and near-infrared spectroscopy of the Class-I eruptive variable V723 Carinae

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Discovered in 2003, the eruptive variable V723 Carinae (previously named CarI-136) was found to suffer an outburst of more than four magnitudes in the *K* band prior to 2000 (Tapia et al. MNRAS 367, 513, 2006). It is located embedded in the northern part of the dark cloud associated with the the Trumpler 14/CarI photodissociation region ($d = 2.3$ kpc). In this poster, we present a *Ks*-band light-curve for this star spanning from 1993 to 2013 showing large erratic variations in timescales of years after it was first detected in 2000. The *H-K* colour index has been measured in a few epochs and it is found to vary from 3.8 to 5.6, probably correlated to the 2.2 μ m flux. Two-epoch *Spitzer*/IRAC archive photometry (2004 and 2008) suggests that the variability prevails also at longer wavelengths, up to 8 μ m. We also present near-IR spectroscopy (1.6 to 2.5 μ m) obtained in 2012 and 2013 with the Baade 6.5m telescope and the FIRE spectrometer at Las Campanas Observatory in its long-slit high-throughput mode. The slit included V723 Car and the CarI-125, a nearby embedded source, also classified as a Class I YSO and found associated with a compact radio HII region (*op. cit.*).

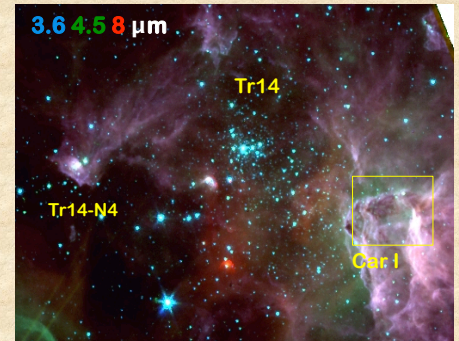


Figure 1: IRAC/*Spitzer* colour-coded image of the Northern Carina Nebula, NGC 3372. Nebula. The mosaic covers 89" by 89". The yellow rectangles mark the area shown in Figures 2 and 4.

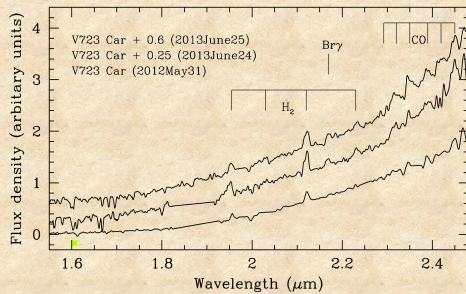


Figure 6: Near-infrared (1.5 to 2.5 μ m) spectra of V723 Carinae obtained in 2012 and 2013 with the FIRE spectrometer on the Baade telescope.

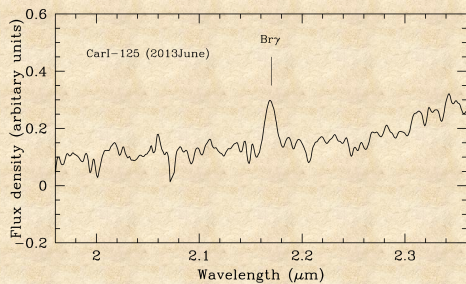


Figure 7: Near-infrared (1.9 to 2.4 μ m) spectrum of the Class I YSO CarI-125 obtained with FIRE on the Baade telescope. The Bry emission is the only spectral feature detected confirming its association with a compact HII region.

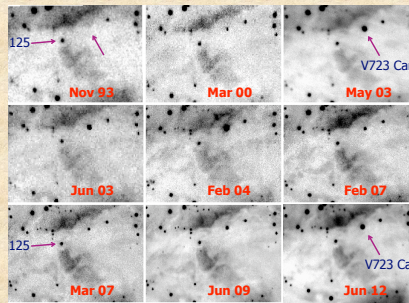


Figure 4: *K*-band images at nine epochs illustrating the erratic variations of V723 Car of more than 4 magnitudes.

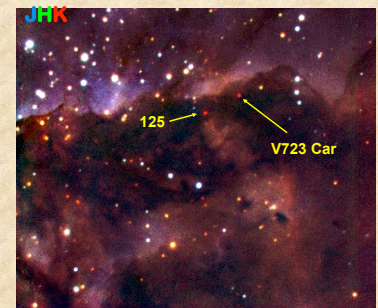


Figure 2: A *JHK* image of a section of the Car I region taken with PANIC on the Baade telescope in March 2007. The IR-variable embedded stars are labelled.

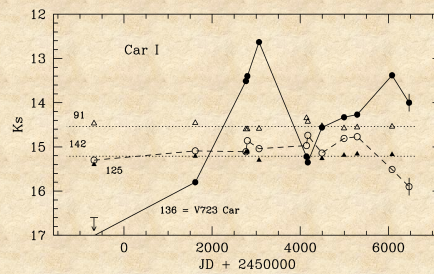


Figure 5: *Ks*-band light curves of the young variables Car I #125 and V723 Car from May 1993 to June 2013. Photometry of nearby (constant) comparison stars (#91 and #142) in the field is also shown.



Figure 3: Magellan/Baade/FourStar *JHK* mosaic of the Northern Carina Nebula, NGC 3372. The mosaic covers 89" by 89". The yellow rectangles mark the area shown in Figures 2 and 4.

The spectrum of V723 Car (Fig. 6) shows in emission the CO overtone bandheads, which seem to be variable. Most prominent is the 2.12 μ m and other H_2 lines. The faint Bry emission line is also seen in the 2013 spectra. Its SED has only been constructed (Fig. 6) from two ground-based H and K images in 2008 and 2009 combined with the archive photometry in the four IRAC bands (3.6 to 8 μ m) in 2008. No information is available at longer wavelengths and, thus, no total luminosity can be estimated.

The observed properties of V723 Car are extremely similar to those recently reported for the Class I eruptive variable V2492 Cyg (Hillenbrand et al. AJ 145, 59, 2013; Kospal et al. A&A 551, A62, 2013). In common with this star, the origin of the outburst and the present properties of V 723 Car are far from understood.

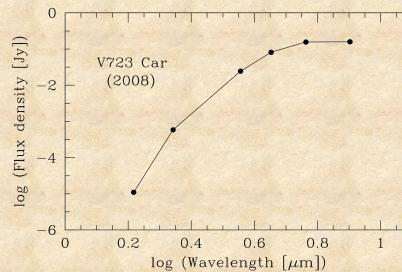


Figure 6: Spectral energy distribution of V723 Car constructed from ground-based *HK* photometry and *Spitzer*/IRAC archive fluxes in January - June 2008.

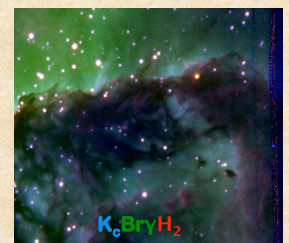


Figure 4: Colour-coded image showing the regions dominated by Bry (green) and H_2 (red) or 2.0-2.4 μ m continuum (blue) emission.

This work uses data obtained with FIRE, FourStar and PANIC instruments on Magellan telescopes at Las Campanas Observatory. MT acknowledges DGAPA grant No. IN-101813. These results will be submitted to MNRAS.