

# A systematic search for rapid photometric variability in southern symbiotic stars I. V648 Car<sup>†</sup>

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**Abstract.** We present the first results from the systematic observational campaign aimed at studying rapid photometric variability (i.e., flickering) in southern symbiotic stars. In particular, we report on the discovery of strong flickering from V648Car (also known as SS73-17), a poorly studied system belonging to the small class of hard X-ray emitting symbiotic stars. To our knowledge, with a U-band flickering amplitude  $>0.6$ mag over time scales of minutes, it is one of the most significant flickering ever reported from a symbiotic star.

**Keywords.** Binaries: symbiotic — stars: individual (V648 Car  $\equiv$  SS73-17) — techniques: photometric

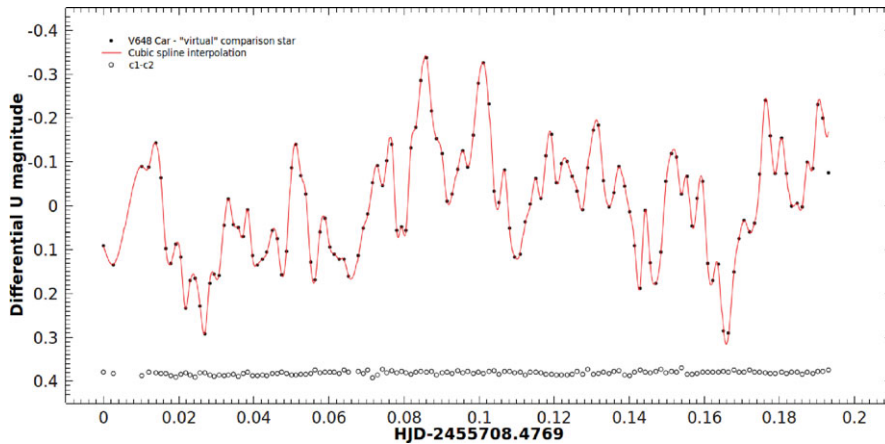
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## 1. Introduction

V648 Car was an anonymous red variable star of magnitude  $V \sim 10$  until it was realized that its position was coincident (within the error circle) with source IGR J10109-5746, discovered at hard X-rays by the *INTEGRAL* satellite (Masetti *et al.* 2006; Kuiper *et al.* 2006; Bird *et al.* 2010).

At several studies of V648 Car in the X-ray domain, it has however not yet corresponded a parallel detailed investigation in the optical. Nonetheless, by virtue of its hard X-ray character, we decided to include it in our list of prior objects to be targeted during the first phase of our systematic search for flickering in southern symbiotic stars (Angeloni *et al.*, 2012). Here, we present the outcome of our fast photometric monitoring of V648 Car conducted with the Swope Telescope at the Las Campanas Observatory, Chile.

<sup>†</sup> Based on observations obtained at the Swope Telescope, Las Campanas Observatory, Chile.  
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**Figure 1.** Differential light curves of V648 Car obtained through *ensemble* photometry. The cadence of the observations is  $\sim 112$  s, and the maximum recorded amplitude amounts to 0.63 mag. For the sake of comparison, the differential light curve of the two brightest comparison stars is also shown. The typical photometric error is 4mmag.

## 2. Results

In Fig. 1 we present the light curve of V648 Car (black point) obtained via *ensemble* differential photometry. During the 4.5 hours of continuous monitoring, V648 Car showed a remarkably large flickering with a recorded maximum amplitude of 0.63 mag, and with variations  $> 0.5$  mag over a period shorter than 15 minutes. To our knowledge, this is amongst the largest flickering ever reported from a symbiotic star, comparable to the flickering amplitude of the well-studied symbiotic CH Cyg during its 1998 active state (Sokoloski & Kenyon 2003, Contini *et al.* 2009).

## 3. Discussion

Considering its nature of hard X-ray emitter, and the remarkable properties of the flickering that we just discovered, V648 Car bears outstanding similarities with other very active symbiotic stars (e.g., T CrB, CH Cyg, MWC560) also known to host massive WDs and to have experienced recurrent outbursts in the recent past. It appears thus reasonable to extend these similarities by suggesting that in the future V648 Car will likely experience an outburst typical of a nova-like symbiotic, while the inferred high-mass of its WD brings additional weight to the candidature of symbiotic stars as progenitors of type Ia supernovae.

## References

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