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# Strömgren photometry of the $\delta$ Sct star V919 Her

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**Abstract.** Preliminary analysis of photometric observations carried out during 2003 and 2004 photometric campaigns of the $\delta$ Sct-type star V919 Her is presented. Analysis of the data, using the Fourier transform method, showed that the two dominant frequencies do agree well with the two frequencies found by Koen (2001). A very complicated frequency spectrum is obtained which suggests the convenience of organizing a coordinated campaign to disentangle the frequencies content.

**Key words.** Stars: variables: $\delta$ Scuti – Stars: individual: V919 Her – Stars: oscillations – Techniques: photometric

## 1. Introduction

The star V919 Her (SAO 84625, HD 151938, HIP 82346) is a variable star newly discovered during the HIPPARCOS mission and classified as a $\delta$ Scuti-type variable. The variability Annex of the Hipparcos Catalogue (ESA 1997) reports V919 Her to have a period of $0\overset{\mathrm{d}}{.}1037$ with Hp magnitudes ranging between $8\overset{\mathrm{m}}{.}42$ to $8\overset{\mathrm{m}}{.}46$. The spectral type is listed as F2. In Kazarovets et al. (1999) and Rodríguez et al. (2000) is listed as a $\delta$ Scuti-type star. With these additional observations, we are able to obtain a more detailed pulsational behaviour of this star.

## 2. Observations and results

The observations were carried out on six nights in May/June 2003 and four nights in May 2004, using the 90 cm telescope at Sierra Nevada Observatory (Spain). The telescope is equipped with a six-channel *uvbyβ* spectrograph photometer for simultaneous measurements in *uvby* or in the H$\beta$ channels (Nielsen 1983). The data consist of 1541 measurements in Strmgren *uvby* bands. Additionally, a few H$\beta$ data were also obtained. The comparison stars used were C1 = SAO 84615 (V = $8\overset{\mathrm{m}}{.}36$, A3) and C2 = SAO 84642 (V = $9\overset{\mathrm{m}}{.}03$, A5). The analysis of this star was performed using the method described in Rodríguez et al. (1998) and we found the presence of, at least, fifteen frequencies which are listed in Table 1. After prewhitening with these peaks there is still some power in the frequency spectrum, but the new peaks detected are not consistent between the different bands. Figure 1 shows the light curves of the observed data for both campaigns in the $v$ filter.

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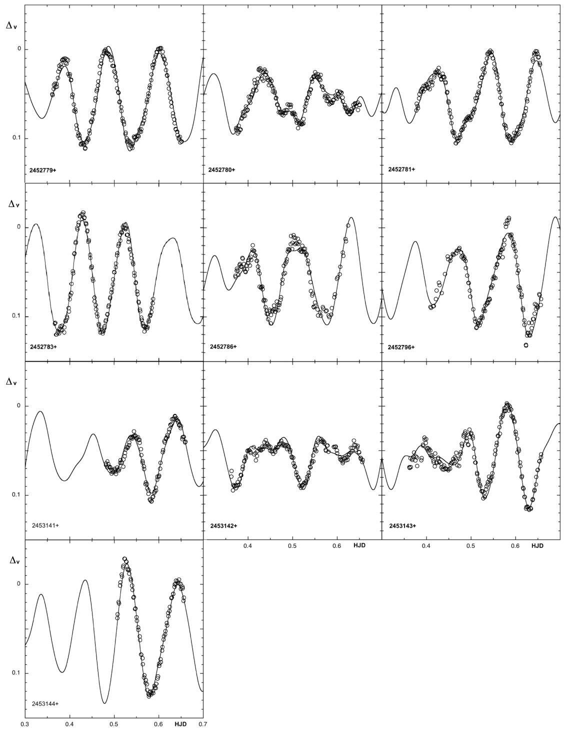


**Fig. 1.** Light curves of V919 Her obtained during 2003 and 2004 campaigns. $\Delta$v are the observed magnitude differences (Var-C1) in the *v* narrow-band. The fit of the of the frequency solution derived is shown as a solid line.

**Table 1.** Results of the Fourier analysis of the *v* data. $T_0$=2452779.0.

| Frequency (c/d) | A (mag) | Phase (rad) |
|---|---|---|
| 9.42657 | 0.0533 | 0.240 |
| 9.64507 | 0.0181 | 0.834 |
| 7.25937 | 0.0068 | 1.872 |
| 12.83665 | 0.0062 | 4.749 |
| 19.07163 | 0.0056 | 1.361 |
| 12.70866 | 0.0046 | 2.944 |
| 10.21542 | 0.0039 | 3.794 |
| 9.99177 | 0.0038 | 2.738 |
| 7.83283 | 0.0030 | 0.301 |
| 14.60388 | 0.0030 | 0.322 |
| 7.04325 | 0.0029 | 4.997 |
| 17.81190 | 0.0022 | 1.810 |
| 26.38560 | 0.0021 | 1.281 |
| 2.59150 | 0.0020 | 5.067 |
| 18.02880 | 0.0016 | 5.208 |

The color magnitude diagram shown in Figure 2 has been constructed using the measured Strömgren data. Dereddening has been calculated following Philip et al. (1976). New derived parameters of V919 Her from photometry are Mv = 1.58 $M_\odot$, log $T_{eff}$ = 3.849, log g = 3.67 and [Me/H] = 0.14.

Evolutionary tracks are from Claret (1995). The main sequence has been taken from Philip & Egret (1980), the $\delta$ Scuti instability strip from Rodríguez & Breger (2001) and the $\gamma$ Dor red border is from Handler & Shobbrook (2002).

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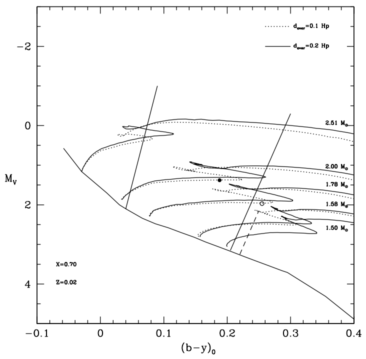


**Fig. 2.** The black dot give the position of V919 Her in the HR diagram.

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