

Strömgren photometry of the δ Sct star V402 Cep

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Abstract

A preliminary analysis of photometric observations carried out during the 2003 and 2005 campaigns of the δ Scuti-type variable star V402 Cep is presented. We show the results of the Strömgren uvby photometry. A few $H\beta$ -Crawford measurements were also collected for calibration purposes in order to place this star inside the HR diagram.

Introduction

V402 Cephei (SAO 4125, HIP 2299, $m_v=10.44$ mag) is a variable star newly discovered during the HIPPARCOS mission and classified as δ Scuti-type variable. The Variability Annex of the Hipparcos Catalogue (Perryman & ESA 1997) reports V402 Cep to have a period of 0.1229 d with Hp magnitudes ranging between 10.56 and 10.64 mag. The spectral type is listed as F2. In Kazarovets et al. (1999) and Rodríguez et al. (2000) V402 Cep is listed as a δ Scuti-type star. Beckstrand et al. (2000) observed it during seven nights and confirmed a primary period of about three hours.

Observations

The observations were carried out during two nights in November/December 2003 and six nights in October 2005, using the 90 cm telescope at Sierra Nevada Observatory, Spain. The telescope is equipped with a six channel uvby β photometer for simultaneous measurements in uvby or in the $H\beta$ channels, respectively (Nielsen 1983). The data consist of 1341 measurements in the Strömgren uvby bands. Additionally, a few $H\beta$ data were also obtained. The comparison stars were C1=SAO 4131 ($m_v = 9.67$, A2) and C2=SAO 4110 ($m_v = 9.30$, F5).

Analysis

The analysis of this star was carried out with the Fourier Transform method and we found four frequencies present in the data as shown in Table 1. Further observations are needed to obtain a more detailed picture of the pulsational behaviour of this star. The new indices obtained are: $(b - y) = 0.325 \pm 0.002$, $m_1 = 0.164 \pm 0.002$, $c_1 = 0.762 \pm 0.003$ and $\beta = 2.732 \pm 0.003$.

The stellar fundamental parameters of V402 Cep have been determined with the program TempLogG (Kupka & Bruntt 2001), giving $M = 1.72 M_\odot$, $\log T_{\text{eff}} = 3.851$, $\log g = 3.75$ and $[\text{Fe}/\text{H}] = 0.33$.

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Frequency (c/d)	Amp (mag)	Phase (rad)
8.1361	0.065	1.618
7.9633	0.026	0.337
16.2751	0.013	4.840
9.2641	0.011	4.095
$T_0 = 2452945.0$		

Table 1: Results of the Fourier analysis of the v data.

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