GSC 02799-00902: A NEW δ Sct VARIABLE

ZHANG, X.B.; ZHANG, R.X.

National Astronomical Observatories, Chinese Academy of Sciences, Beijing 100012, China

GSC 02799-00902 ($\alpha_{2000} = 01^{\mathrm{h}}01^{\mathrm{m}}26\overset{\mathrm{s}}{.}55$, $\delta_{2000} = +38°03'13''\!.0$) is a never-studied faint star ($V \simeq 11.1$ mag) in the field of the eclipsing binary WZ And. In the 2004 observation season, we have made a time-series CCD photometry of WZ And (Zhang & Zhang, 2006). GSC 2799-902 was observed as one of the reference stars. Nelson (2000) also used this star as comparison for WZ And. During data reductions, we found that it could be a new pulsating variable star. To identify its spectral type as well as the variation classification, spectroscopy of the star was performed later. In this paper, we report the discovery of this new variable. A preliminary discussion on the properties and pulsating nature of the star is given.

Our photometric observations were carried out at the Xinglong Station of NAOC on three nights between 12 and 14 October, 2004. The data were collected using the 85-cm reflector with a AP7P 512×512 CCD camera. A single Johnson V filter was used. The exposure time was 60 seconds for each measurement. The star GSC 02799-00396 was used as the comparison star. The spectroscopy was made on 25 Oct., 2004 with the 2.16-m telescope at the Xinglong Station of NAOC. A Zeiss universal spectrograph was used with a Tektronix $1\,\mathrm{k} \times 1\,\mathrm{k}$ CCD and a 200 $\mathrm{\mathring{A}\,mm^{-1}}$ grating. A He-Ar lamp was used for wavelength calibration.

The light curves obtained for the star are shown in Fig. 1. It shows that GSC 02799-00902 is obviously an oscillating variable with an observed total V amplitude of about 0.04 mag. The spectrum presented in Fig. 2 suggests a spectral type of F0-F2 for the star. Therefore we conclude that GSC 02799-00902 could be a new δ Scuti variable.

To search for periodicity of the light variations, a Fourier analysis was performed by using the algorithm `Period98` (Sperl, 1998). The step-by-step amplitude spectra produced from the data are shown in Fig. 3. The Fourier analysis reveals a dominant pulsating frequency f_1 at 9.9046 c/d. Another frequency could be detected at $f_2 = 5.3804$ c/d, though the S/N ratio is relatively low. It seems that this star could be oscillating with multi-period. The main results of the frequency analysis are given in Table 1. With the 2-frequency model, a fitting to the observed light curve is made as shown in Fig. 1.
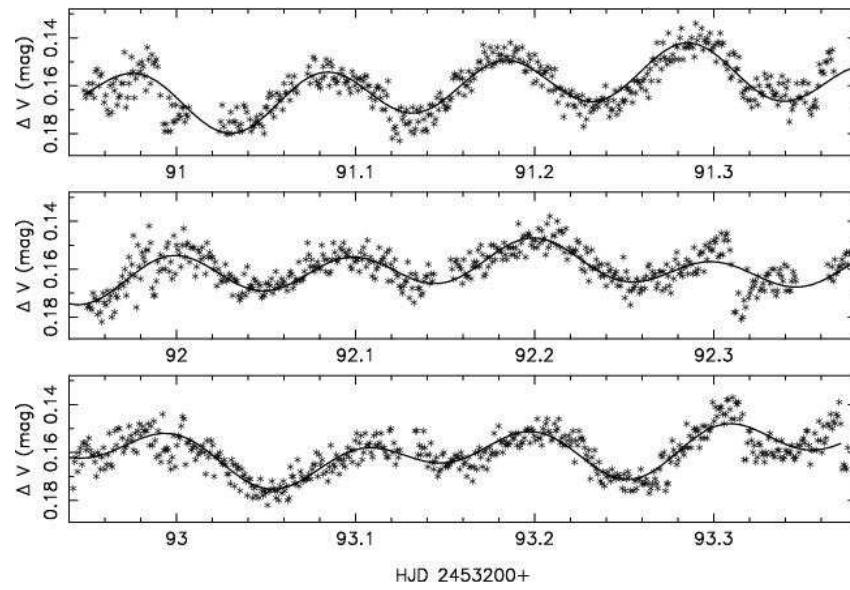
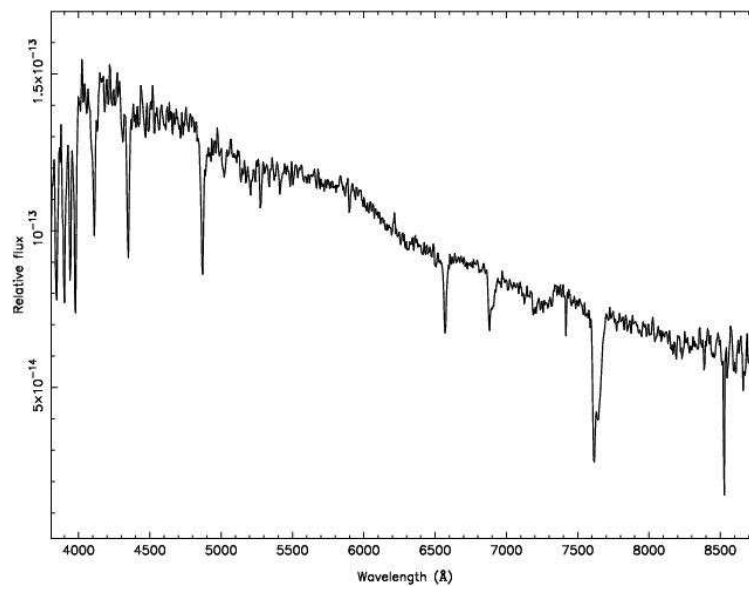**Figure 1.** Observed *V*-band light curve of GSC 02799-00902, fitted with a 2-frequency model

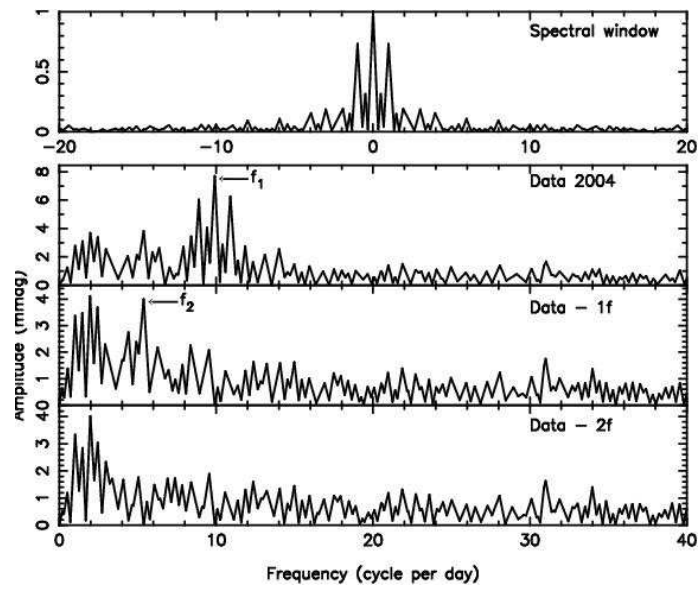**Figure 2.** The 1-D spectrum of GSC 02799-00902

Figure 3. The spectral window and amplitude spectrum of GSC 02799-00902 photometric data
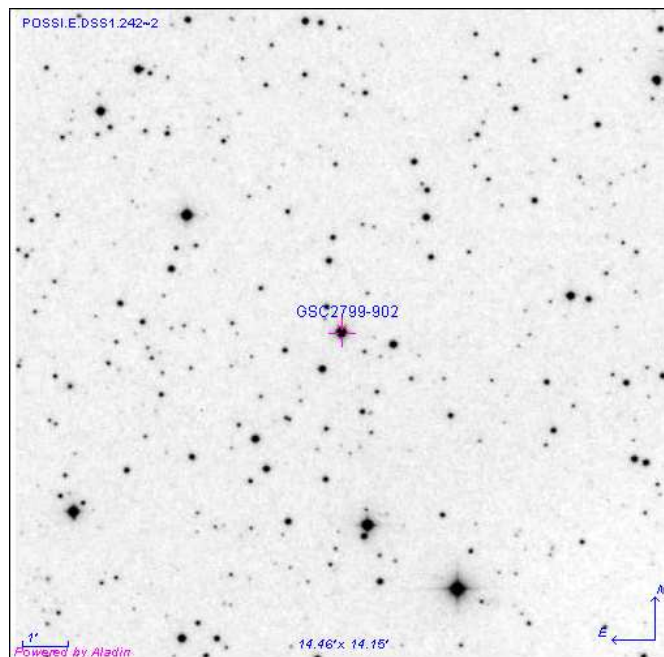
Table 1. Results of the frequency analysis

Name	Frequency (c/d)	Ampl./2 (mmag)	Phase	S/N
f_1	9.9046	7.84	0.5962629	8.4
f_2	5.3804	4.12	0.5564623	3.8

References:

Nelson, R.H., 2000, *IBVS*, No. 4840
Sperl, M., 1998, Manual for Period98 (V1.0.4). A period search-program for Windows and Unix, http://www.univie.ac.at/tops/Period98/
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