

## **GSC 1374–01131, a High-Amplitude Delta Scuti Star with an Eclipsing Component**

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I present the discovery of an eclipsing component in light variations of the known High-Amplitude Delta Scuti star GSC 1374–01131 based on the Catalina Surveys publicly available data.

### **1 Introduction**

The variability of GSC 1374–01131 = VSX J074722.4+220414 ( $\alpha = 07^{\text{h}}47^{\text{m}}22^{\text{s}}.470$ ,  $\delta = +22^{\circ}04'13''.95$ , J2000, UCAC4) was reported in 2011 by S. Roland, N. Martinez, and S. Bruzzone in the AAVSO Variable Star Index (VSX; [www.aavso.org/vsx/](http://www.aavso.org/vsx/)). From a single night of their observations, the variable was classified as a HADS (High-Amplitude Delta Scuti) star, with the light elements:

$$\text{HJD}(\text{max}) = 2454846.73 + 0.08 \times E.$$

I reinvestigated the star using the currently available Catalina Surveys data (Drake et al. 2009; CSS J074722.5+220413). The observations I used are available online in the html version of this paper.

### **2 Results**

According to my study, the variable is a HADS star with an eclipsing component (EA or EB type). The light elements of the pulsating and eclipsing components of the light variations are the following:

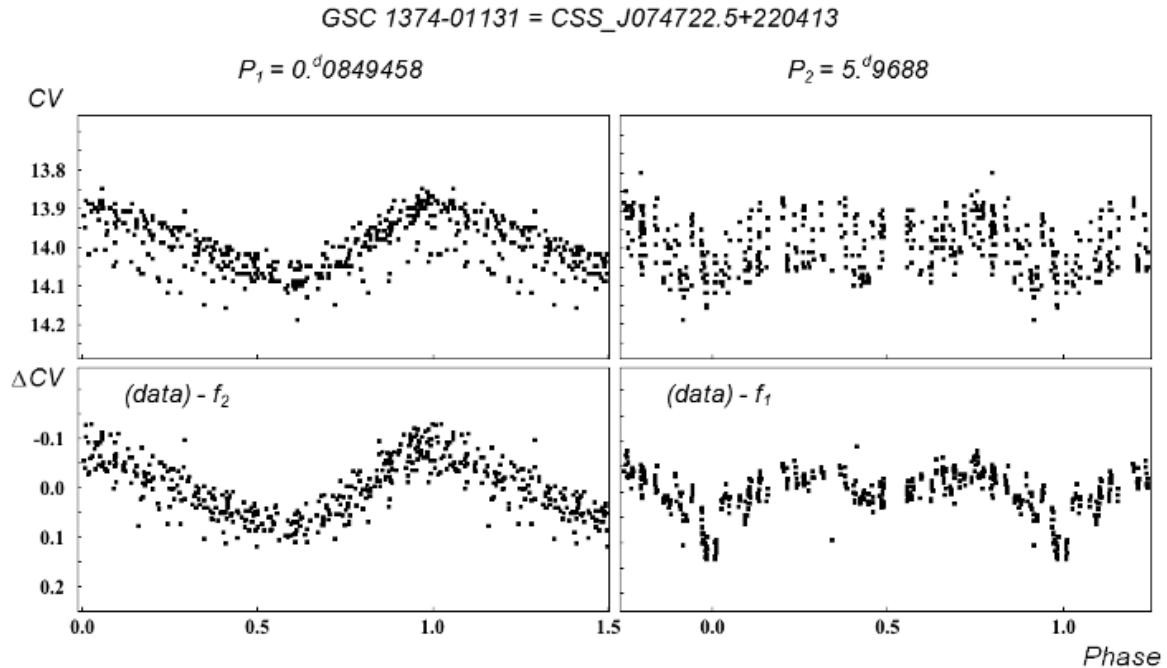
$$\text{HJD}(\text{max}) = 2454846.734 + 0.0849458 \times E$$

and

$$\text{JD}(\text{min}) = 2455004.25 + 5.9688 \times E.$$

The light curves of GSC 1374–01131 are displayed in Fig. 1.

Brightness measurements of GSC 1374–01131 are also available in other electronic archives, but they are not usable for several reasons. The NSVS (Woźniak et al. 2004) and SuperWASP (Butters et al. 2010) surveys contain photometry for the combined brightness of the variable and its two brighter neighbors (TYC 1374 1314 1,  $V = 11.538$  and TYC 1374 1358 1,  $V = 10.861$ ; Fig. 2). Nevertheless, a weak short-period signal



**Figure 1.** The light curves of GSC 1374–01131 based on Catalina data, folded with periods of pulsations and eclipses. Upper panels: raw data; lower panels: the folded light curves with the other variation pre-whitened.

can be detected in the 1SWASP data, but large photometric errors make its analysis impossible. In the ASAS-3 (Pojmanski 2002) data, the brightness measurements do refer to GSC 1374–01131, but uncertainties and data scattering are also very large.

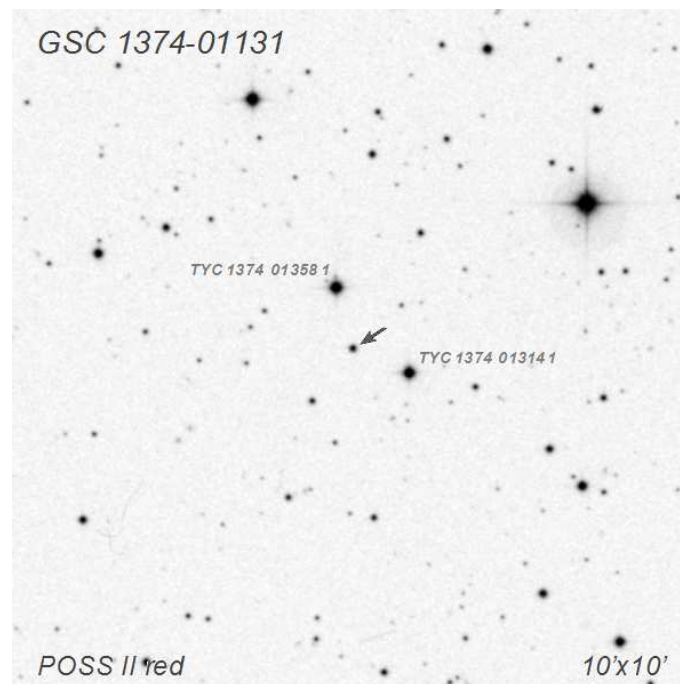
### 3 Discussion

Eclipsing  $\delta$  Scuti stars, EA+DSCTC, are well known. For these stars, pulsation amplitudes are low (within  $0^m1$ ) and eclipse amplitudes are large. The only case of an EA+HADS (EA+DSCT in the GCVS designations of variability types) contained in the AAVSO Variable Star Index is V1264 Cen. The total amplitude of its pulsation component is as large as  $0^m2$ , the eclipse amplitude being  $1^m75$  (GCVS, Samus et al. 2007–2012). In the case of GSC 1374–01131, the pulsation and eclipsing variability components have comparable amplitudes. The observed eclipse is probably partial.

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**Figure 2.** The finding chart of GSC 1374-01131 and its neighbors.

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