TWO NEW ECLIPSING BINARY SYSTEMS IN CEPHEUS:
THE W UMa NSV 14312 AND THE ECCENTRIC EA GSC 3992_0847

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NSV 14312 (WR 30, GSC 3992_0731) is one of the $R_C I_C$ suspected variables reported by Weber (1958), and listed in the NSV Catalogue (Kholopov, 1982) as a Cepheid with a photographic variation range between $11^{m}\!.8$ and $12^{m}\!.6$.

To study variability of this star, NSV 14312 was included in a collaborative observing program between the US Naval Observatory Flagstaff Station, the Grup d'Estudis As- tronomics, and Esteve Duran Observatory. The suspected variable was monitored in the $BVR_C I_C$ bands with the 1.0-m Ritchey–Chretien telescope at the USNO Flagstaff Station, and in the V band with the 0.4-m Schmidt–Cassegrain telescope at Piera Observatory.
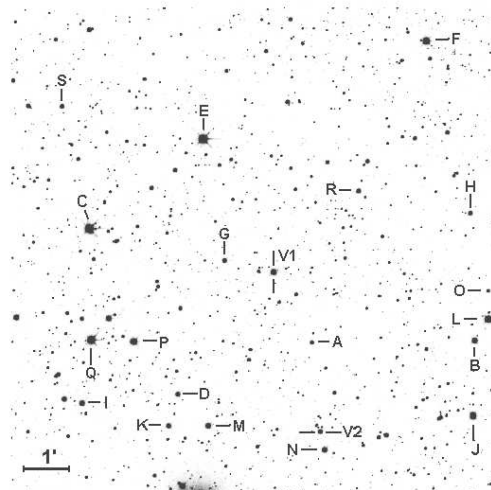

Figure 1. Field of NSV 14312. V1 = NSV 14312 and V2 = GSC 3992_0847. North is up.

Several stars in the field of NSV 14312 were placed in the standard system by using Landolt (1992) standards. GSC 3992_0548 and GSC 3992_0491 were used as primary comparison and check stars respectively. The field of NSV 14312 is shown in Figure 1,

Table 1

Star	GSC	V	$B - V$	$V - R$	$R - I$
A	3992-0033	13.572 ± 0.017	1.452 ± 0.030	0.778 ± 0.022	0.712 ± 0.021
B	3992-0111	12.063 ± 0.013	0.763 ± 0.013	0.413 ± 0.018	0.373 ± 0.022
C	3992-0154	10.256 ± 0.036	0.346 ± 0.018	0.250 ± 0.021	0.290 ± 0.022
D	3992-0316	12.860 ± 0.015	0.677 ± 0.017	0.412 ± 0.022	0.422 ± 0.026
E	3992-0349	10.197 ± 0.041	0.641 ± 0.029	0.366 ± 0.037	0.373 ± 0.042
F	3992-0371	11.134 ± 0.024	0.420 ± 0.018	0.246 ± 0.062	0.219 ± 0.075
G	3992-0393	12.918 ± 0.017	1.261 ± 0.018	0.690 ± 0.016	0.683 ± 0.016
H	3992-0444	13.088 ± 0.010	1.533 ± 0.018	0.815 ± 0.019	0.708 ± 0.038
I	3992-0450	12.277 ± 0.013	0.511 ± 0.017	0.298 ± 0.018	0.322 ± 0.018
J	3992-0491	11.721 ± 0.010	0.596 ± 0.013	0.348 ± 0.020	0.381 ± 0.024
K	3992-0596	12.666 ± 0.016	1.418 ± 0.021	0.785 ± 0.020	0.731 ± 0.020
L	3992-0677	11.161 ± 0.015	0.238 ± 0.019	0.134 ± 0.020	0.168 ± 0.020
M	3992-0750	12.244 ± 0.015	1.356 ± 0.019	0.738 ± 0.018	0.685 ± 0.021
N	3992-0772	12.296 ± 0.013	1.131 ± 0.056	0.642 ± 0.015	0.614 ± 0.018
O	3992-0781	14.174 ± 0.023	0.679 ± 0.031	0.413 ± 0.033	0.417 ± 0.049
P	3992-0850	11.384 ± 0.017	1.088 ± 0.022	0.597 ± 0.020	0.573 ± 0.026
Q	3992-0882	10.556 ± 0.036	1.142 ± 0.031	0.617 ± 0.032	0.576 ± 0.039
R	3992-1035	12.909 ± 0.013	0.768 ± 0.018	0.438 ± 0.022	0.416 ± 0.032
S	3992-1419	13.253 ± 0.020	1.407 ± 0.027	0.753 ± 0.031	0.749 ± 0.033

whereas Table 1 lists the standard V magnitudes and color indices of comparison stars near the variable.

Observations show that NSV 14312 is not a Cepheid but an EW eclipsing binary system with a period of about 19 hours. This object has an amplitude variation of 0.34 ± 0.01 magnitudes at primary minimum and 0.31 ± 0.01 magnitudes at secondary minimum (Figure 2). Standardized photometry gives an average maximum V magnitude of 11.603 ± 0.005 for this star, and also average color indices $B - V = +0.730 \pm 0.015$, $V - R = +0.440 \pm 0.009$, and $R - I = +0.425 \pm 0.015$. Observations spanned a 742 day period between October 1995 and November 1997, with the computed ephemeris:

$$\text{Min. I} = \text{HJD } 2450433.3516 + 0.805074 \times E.$$
$$\pm 0.0010 \quad \pm 0.000004$$

While monitoring the light changes of NSV 14312, the variability of GSC 3992_0847 was discovered from CCD frames taken at the Piera Observatory. Photometric data indicates that this object is an EA eclipsing binary system with a period over 6.6 days. The variable fades 0.69 ± 0.02 magnitudes at primary minimum and 0.54 ± 0.02 magnitudes at secondary minimum. Observations also show that the components of this system follow eccentric orbits, since the secondary minimum is at phase 0.423 (Figure 3). The star has an average maximum V magnitude of 12.80 ± 0.02, and average color indices $B - V = 0.482 \pm 0.011$, $V - R = 0.271 \pm 0.017$, and $R - I = 0.302 \pm 0.030$. The computed ephemeris for GSC 3992_0847 is:

$$\text{Min. I} = \text{HJD } 2450421.4411 + 6.61844 \times E.$$
$$\pm 0.0010 \quad \pm 0.00002$$

We would like to thank Josep M. Gomez for his work in determining the period of GSC 3992_0847 and computing its ephemeris.
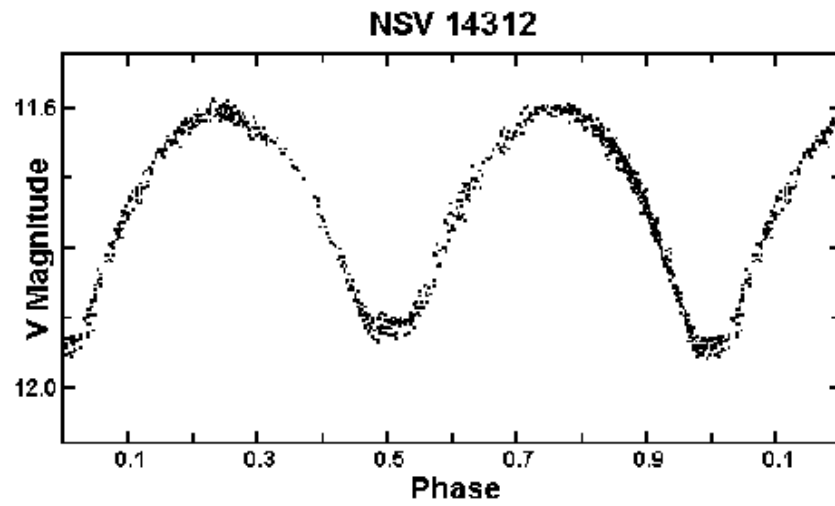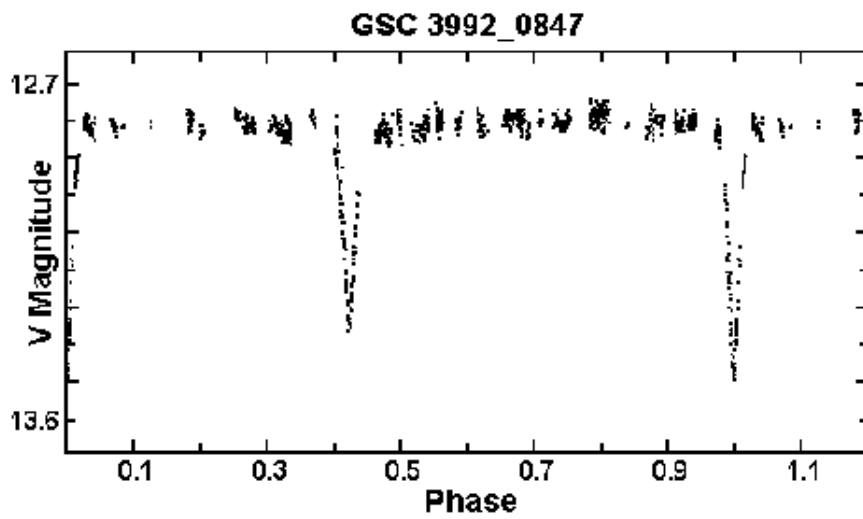
Figure 2.

Figure 3.

References:

Landolt, A.U., 1992, *AJ*, **104**, 340
Kholopov, P. N. (ed.), 1982, New Catalogue of Suspected Variable Stars, Moscow
Weber, R., 1958, *JO*, **41**, 74

ERRATUM FOR IBVS 4807

The original title of IBVS 4807 contained an error:

"Two New Eclipsing Binary Systems in Cepheus: the W UMa NSV 14312 and the Eccentric EA GSC 3992_30847"

The correct GSC number is, as used in the body of the paper: 3992_0847 .

The Editors