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**PERIOD DETERMINATION FOR V576 HERCULIS AND V1116 CYGNI**

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V576 Herculis and V1116 Cygni are suspected RR Lyrae stars listed in the General Catalog of Variable Stars (GCVS) without periods. Both stars were observed with the 24-inch Cassegrain reflecting telescope and Tektronics 1024 × 1024 CCD camera at Wellesley College between May 1999 and September 2000. During each night of observation, we took twilight flats in each filter, dark and bias images, and several variable star images in each of the *R* and *V* filters. Images were processed with standard techniques in IRAF. We did differential photometry on each variable compared to several comparison stars in the field and between all pairs of comparisons. We chose the most stable pair of comparisons as the primary comparison and check star. After an approximate period was determined with least square fitting following the prescription of Horne and Baliunas (1986), we made phase diagrams and refined the period visually. When the period is changed by the listed uncertainty, the phase diagram data from the earliest cycle is definitely out of alignment with the data from the oldest cycle.

We note that the position of both stars in the GCVS is incorrect. A recent SIMBAD search turned up two papers by Kato (1999) which confirm the positions we found. V576 Herculis is GSC 2105-1084; the comparison we used is GSC 2105-274 and the check is GSC 2105-70. Neither V1116 Cygni nor its comparison and check stars have a Guide Star catalog number, so we give a finder chart in Figure 1.

V1116 Cygni was observed on 17 different nights with a total of 85 images in each filter. We have determined an ephemeris of:

$$\begin{aligned} \text{Max} = \text{HJD } 2451809.589 + 0^{\text{d}}53854 \times E. \\ \pm 4 \qquad \qquad \pm 5 \end{aligned} \tag{1}$$

The phase diagram for the *V* filter is given in Figure 2. The *V* filter amplitude is 1.2 magnitudes, and the *R* filter amplitude is approximately one magnitude.

V576 Herculis was observed on 14 different nights with a total of 112 images in each filter. We have determined an ephemeris of:

$$\begin{aligned} \text{Max} = \text{HJD } 2451802.649 + 0^{\text{d}}40378 \times E. \\ \pm 4 \qquad \qquad \pm 5 \end{aligned} \tag{2}$$

The phase diagram for the *V* filter is given in Figure 3. The *V* filter amplitude is about 1.25 magnitudes, and the *R* filter amplitude is about one magnitude.

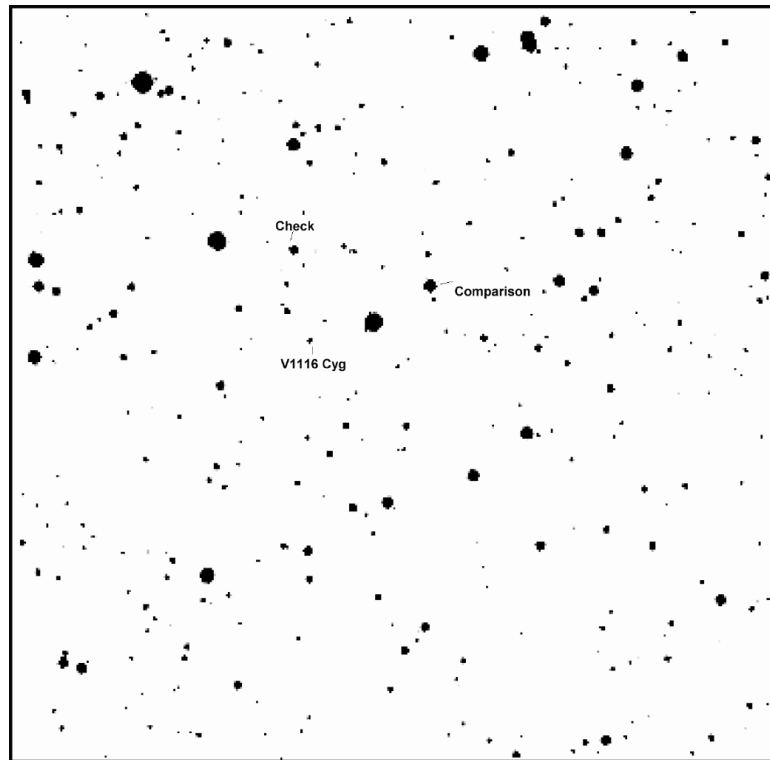


Figure 1. A finder chart for V1116 Cygni. Each side is about 15''

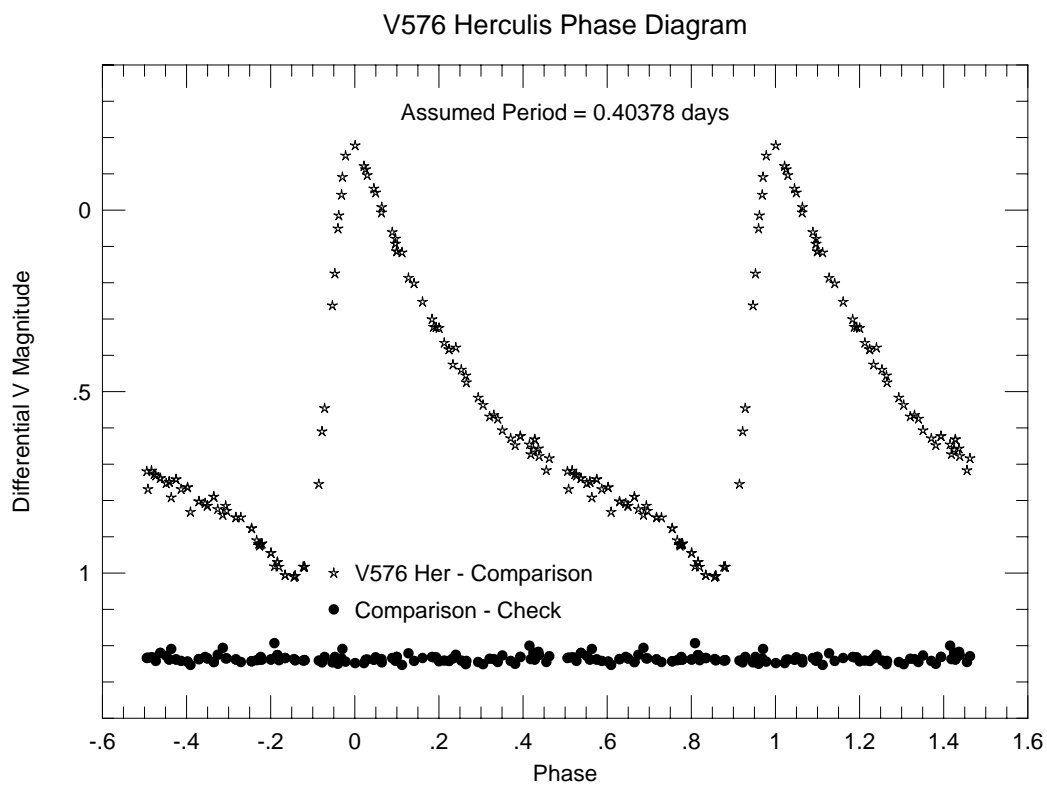
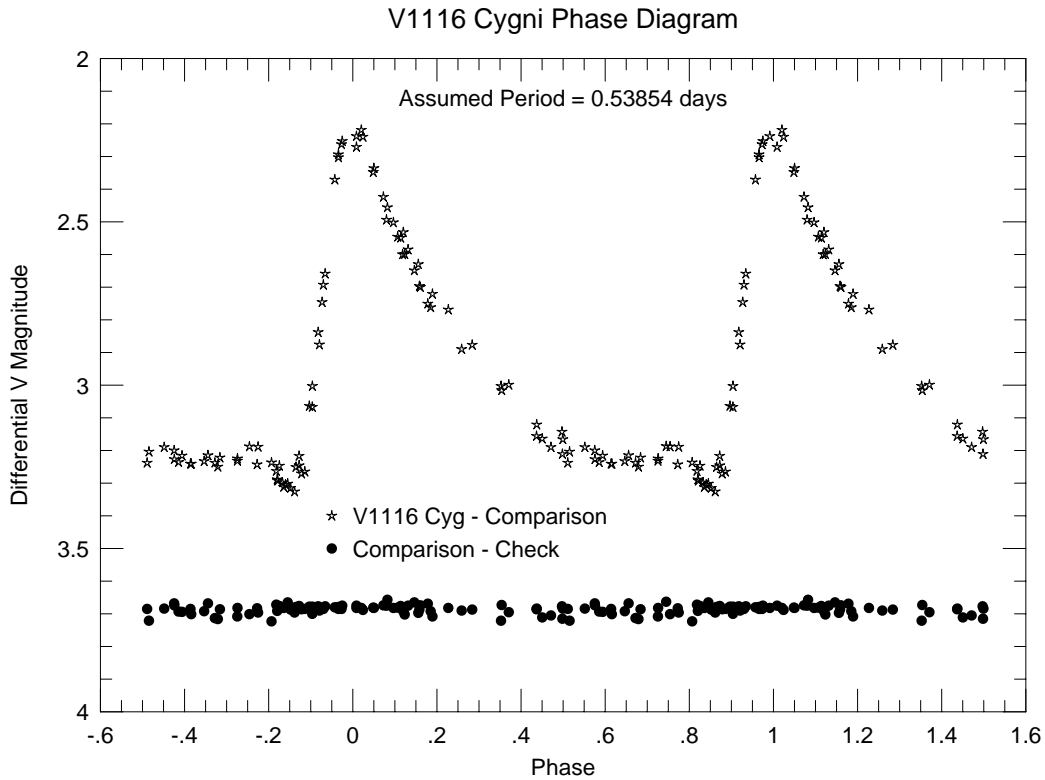


Figure 2. The V filter phase diagram for V576 Herculis using ephemeris (1)



**Figure 3.** The  $V$  filter phase diagram for V1116 Cygni using ephemeris (2)

We have thus confirmed that V576 Herculis and V1116 Cygni are RR Lyrae stars; the amplitude and the rapid increase in brightness indicates that both stars are probably of the the RRab type.

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#### References:

- Horne, J. H. & Baliunas, S. L., 1986, *Astrophys. J.*, **302**, 757  
 Kato, T., 1999, *Inf. Bull. Var. Stars*, No. 4762  
 Kato, T., 1999, *Inf. Bull. Var. Stars*, No. 4764  
 Kholopov, P. N., 1985, *General Catalog of Variable Stars*, Moscow  
 Space Telescope Science Institute, 1992, *The Guide Star Catalog*, Baltimore