PULSATIONS OF V927 HERCULIS

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V927 Herculis ($\alpha_{2000} = 16^h56^m19^s9$, $\delta_{2000} = +50°07'36''8$, HIP 82883, HD 234366, GSC 03506-01493) was found to be a variable star by the HIPPARCOS satellite. The Variability Annex of the HIPPARCOS Catalogue (ESA 1997) reports V927 Her to have a period of $0^d130528$ with H_p magnitudes ranging between 10.125 to 10.233. The spectral type is listed as F5, but no further classification is given. Duerbeck (1997) lists V927 Her (although it is identified as V925 Her) as an F5 V and classifies it as a pulsator, which would make it a δ Scuti candidate.

As part of our ongoing δ Scuti star program we selected stars from the Variability Annex of the HIPPARCOS Catalogue that showed δ Scuti type characteristics. During the summer of 1999 several of these variable stars were observed with the David Derrick Telescope of the Orson Pratt Observatory at Brigham Young University (Hereafter DDT). Observations were made with a Pictor 416XT CCD mounted at the Newtonian focus of the telescope. This gave a plate scale of 0.93 arcsec/pixel. Observations were made through a standard Johnson V filter modeled after Bessell (1990). In this paper we will report only the observations of V927 Her. Five nights of data were obtained between 20 May and 22 July 1999. The CCD field for the DDT is shown in Fig. 1.

All frames were reduced using standard IRAF functions. Apparent magnitudes were determined using the comparison star (GSC 03506-01588 ($V = 10.56$), TYCHO 3506-1588-1 ($V_J = 10.54$)) labeled Comp 1 in Fig. 1. From this we found an average magnitude of V927 Her of $V_J = 9.92$.

From the light curves produced six times of maximum light were determined. These times are given in Table 1. From a linear regression we found an ephemeris for V927 Her as given in Eq. 1. This value is in agreement with the value from HIPPARCOS.

$$\text{HJD}_{\text{max}} = 2451318.7659 + 0.13053 \, (\pm \, 0.00001) \times E. \qquad (1)$$

Using Eq. 1 the data were phased and the curve is shown in Fig. 2. Clearly the amplitude of V927 Her is not constant. The amplitude varies from 0.05 to 0.14, with the magnitude of minimum light staying at a roughly constant value of 9.98. Due to this variable amplitude we choose to examine the data with the frequency search program Period98. From Period98 we found the presence of only two reliable frequencies in the data $f_1 = 7.6628$ c/d ($P_1 = 0^d130512$) and $f_2 = 8.0020$ c/d ($P_2 = 0^d124981$). This yields a period ratio of 0.96. A third frequency of $f = 0.57$ c/d was found that is not equivalent to $f_2 - f_1$. However, this third frequency is not considered reliable. If confirmed the third
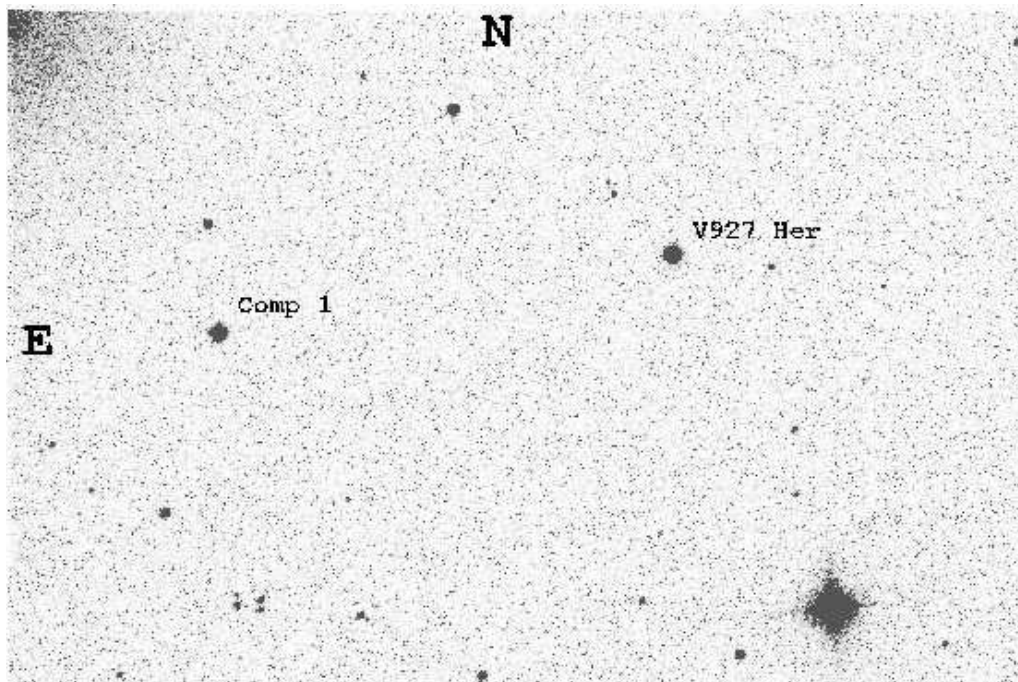
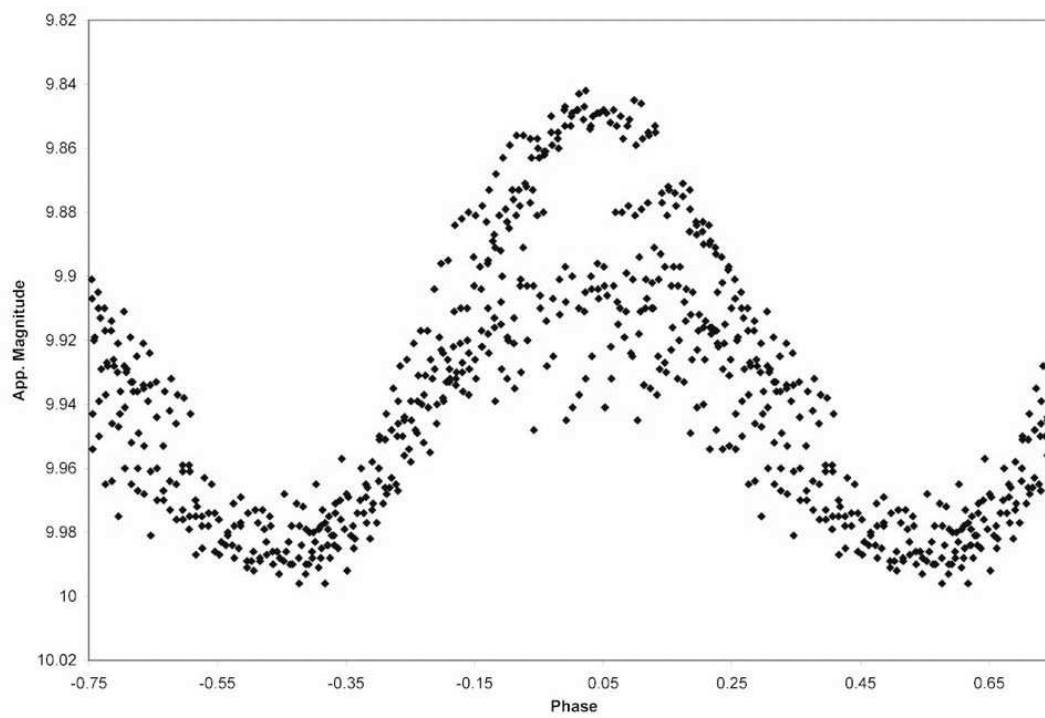**Figure 1.** CCD field of V927 Her with comparison star labeled. The field of view is $8' \times 12'$.

Figure 2. Phased light curve of V927 Herculis

Table 1: New times of maximum light for V927 Herculis

HJD 2400000.0 +	Cycle
51318.7673	0
51341.7384	176
51341.8715	177
51348.7862	230
51363.7932	345
51381.6850	482

frequency is γ Doradus like (Kaye et al. 1999). If the third period could be confirmed V927 Her would have to be considered a Hybrid.

The current data set is too small, and from a single site, for any major conclusions to be drawn. A set of Strömgren data to determine physical parameters and data from multiple sites would be useful to define the nature of this star.

References:

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