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DISCOVERY OF A δ SCUTI STAR IN V469 Cyg

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V469 Cygni was first identified as a variable star by Wachmann (1940), with a light curve and ephemeris elements published later (Wachmann, 1948). The system was also apparently independently discovered to be an eclipsing binary by Whitney (1947). We added V469 Cygni to our ongoing program of monitoring eccentric orbit, apsidal motion and other systems for period changes based on its appearance on a list of apsidal systems published by Hegedüs (1988). This system was observed at Appalachian State University's Dark Sky Observatory, using the 0.80-m telescope equipped with a Photometrics (now Roper) CH200 CCD camera with a Tek 1024^2 chip and Bessel filter set. Observations obtained of secondary eclipse on the night of UT 12 July, 2003 showed light variations characteristic of δ Scuti behavior. A recent compilation of δ Scuti stars by Rodríguez et al. (2000) lists 86 stars that are members of multiple systems, with only nine found in eclipsing binaries (Rodríguez and Breger, 2001). V469 Cyg now appears to be an additional system. We note that a search for δ Scuti stars in binary systems is under way by Szekely (2003). The data were reduced using Mira AP software.[†] The instrumental light curves for the observed secondary, in the B,V and R filters are shown in Figure 1.

The pulsations have a period of about 40 minutes and a total amplitude of about 0.02 magnitudes. A primary eclipse was observed on UT 24 August, 2003 (Figure 2). While the pulsations are visible across secondary, their amplitude appears to drop greatly in primary, possibly indicating that the δ Scuti star is the hotter of the pair of stars. However, the pulsation may simply not be visible due to the steeper scale of the primary eclipse.

We had in fact already observed a primary eclipse (in the V filter, only) in 1997 but had not noticed the variations due to the scale of the eclipse and because we had little outside eclipse coverage. We have also obtained other eclipses, for a total of five. The times of minimum light for the five events are given in Table 1.

Our times of minimum and their standard errors were calculated using the method of Kwee & van Woerden (1956), using an algorithm by Ghedini (1982). The times for each filter are listed individually since some do not overlap by their formal errors. This appears to be due to differences of the pulsation amplitude with color. The pulsation contribution makes it difficult to get an accurate time of minimum light. In the case of JD 2452876, clouds interrupted the observations briefly, with more V images having been randomly

[†] The Mira AP software is produced by Axiom Research Inc.

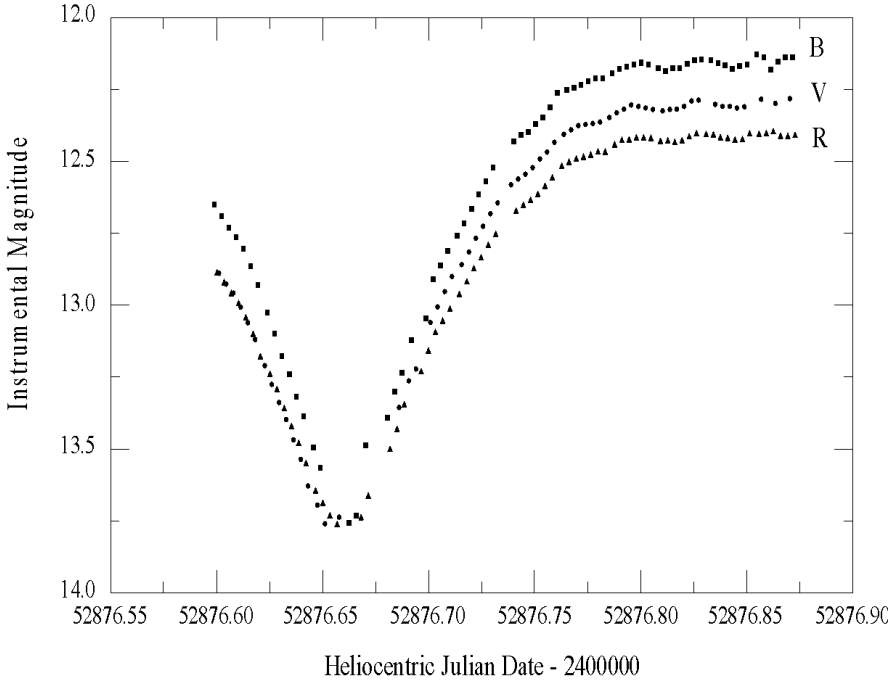

Figure 1. Secondary eclipse of V469 Cyg on the night of UT 12 July 2003.

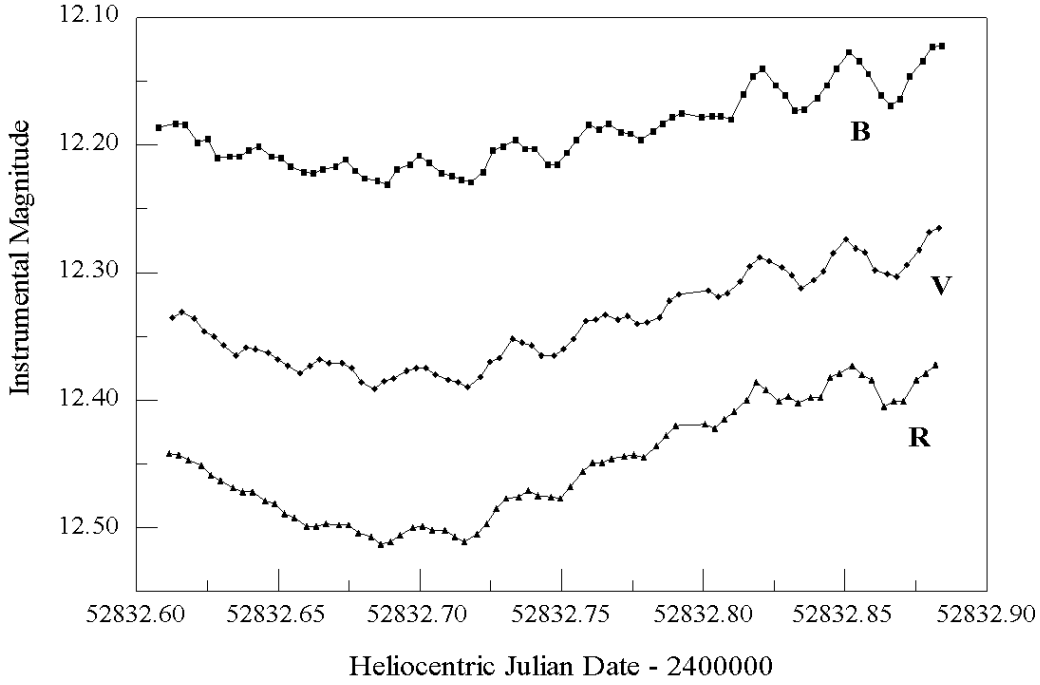

Figure 2. Primary eclipse of V469 Cyg on the night of UT 24 August 2003

Table 1. Times of minimum light.

Time of minimum (HJD-2400000)	Error	Filter	Type	O – C (GCVS)
50751.71107	0.00045	V	I	−0.07735
52832.68745	0.00059	B	II	
52832.68925	0.00058	V	II	
52832.69380	0.00057	R	II	
52876.66165	0.00079	B	I	−0.09018
52876.65885	0.00161	V	I	−0.09298
52876.66115	0.00077	R	I	−0.09068
52978.63930	0.00054	B	II	
52878.63995	0.00056	V	II	
52878.63880	0.00056	R	II	
52893.72150	0.00058	V	I	−0.09304

lost than in the B and R. The (O – C) values in Table I are computed with ephemerides from the General Catalog of Variable Stars (Kholopov et al., 1985).

A linear regression analysis of our times and those of Hoffmeister et al. (1954) and Whitney results in a new ephemeris for primary eclipse given by $HJD_{\min} = 2428814.3986 + 1.3125109E$.

The entry for V469 Cyg in Hegedüs's table of systems with eccentric orbits or displaced secondaries gives the secondary at phase 0.57. However, using our results we obtain a current phase of 0.508.

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Figure captions in this issue are swapped, Fig. 1. shows the primary eclipse, while Fig. 2. is the secondary eclipse.

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