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GSC 2137:3085 – A SUSPECTED NEW VARIABLE

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Name of the object:
GSC 2137:3085

Equatorial coordinates:	Equinox:
R.A. = 19 ^h 23 ^m 48 ^s DEC. = 29°42'27"	2000

Observatory and telescope:
Sawyer 24" telescope at Whitin Observatory, Wellesley College

Detector:	Photometrics PM512 CCD for observations from 1994 June through June 1997 and Photometrics TK 1024AB CCD Camera beginning July 1997
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Filter(s):	Johnson and Cousins <i>BVRI</i>
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Comparison star(s):	GSC 2137:2083
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Check star(s):	GSC 2137:2326
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Transformed to a standard system:	Yes
Standard stars (field) used:	Transformations of differential data use M67 as standards. Transformation of Mt. Hopkins data used Fields SA 94 (stars 392, 394, 305, 308) and SA 111 (stars: 773, 775, 1925, 1965, 1969) of Landolt 1973, 1983, 1992

Type of variability:	Possibly Small Amplitude Red Variable
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Remarks:

The variability was discovered while monitoring the activity of symbiotic star BF Cygni using differential photometry at Whittin Observatory. It was noticed during the analysis that one of the comparison stars for BF Cygni was showing a larger variation in brightness than the other comparison stars. The magnitudes of the comparison stars in the field were obtained using the Smithsonian 48" telescope with a standard *BVRI* filter set at Whipple Observatory on Mt. Hopkins 1995 September 11. All sky photometry was done using Landolt (1992) standard stars in the SA 94 and SA 111 fields. The field is shown in Figure 1 with BF Cygni, the suspected new variable, the comparison star, and the check star all identified. The magnitudes of the four identified stars from the Whipple Observatory data are given in Table 1. We note that the suspected variable had a $B - V$ color of 1.84 on that date.

From the differential photometry taken at Wellesley College, we find the suspected new variable varies from about 13^m61 to 13^m86 in V (0^m25 amplitude), 12^m63 to 12^m78 in R (0^m15 amplitude), and 11^m56 to 11^m70 in I (0^m14 amplitude). The standard deviation of the differential magnitude between the suspected variable and the comparison star is about three times larger than that for the differential magnitude between the comparison and check stars as can be seen in the light curves in Figure 2. No evidence of periodicity was found.

Table 1

Star	RA (2000)	Dec (2000)	B [mag]	V [mag]	R [mag]	I [mag]
BF Cygni	$19^h23^m53^s5$	$29^\circ40'29''$	13.08	12.36	11.16	9.54
NSV = GSC2137:3085	$19^h23^m48^s1$	$29^\circ42'27''$	15.56	13.72	12.64	11.53
Comp = GSC2137:2086	$19^h23^m46^s2$	$29^\circ43'59''$	13.47	12.96	12.65	12.41
Check = GSC2137:2326	$19^h23^m56^s4$	$29^\circ43'58''$	13.79	13.28	12.95	12.72

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References:

- Landolt, A. U. 1973, *Astron. J.*, 78, 959
 Landolt, A. U. 1983, *Astron. J.*, 88, 439
 Landolt, A. U. 1992, *Astron. J.*, 104, 340

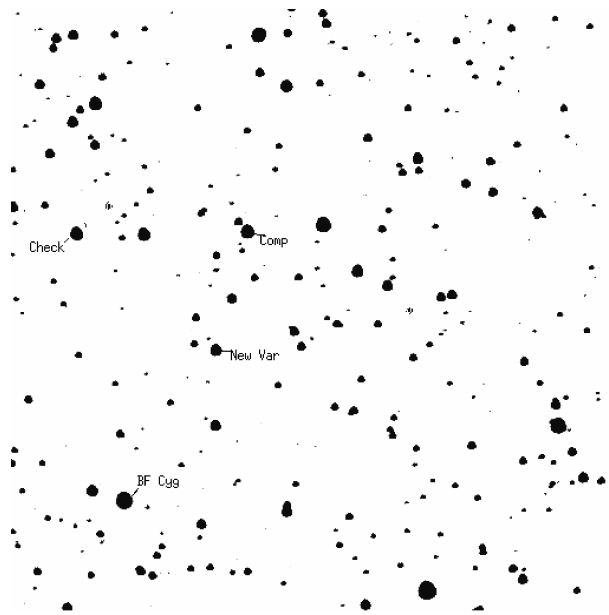


Figure 1. The finder chart for the new variable. North is up and East is left. The size of the field shown is about 9 arcminutes square.

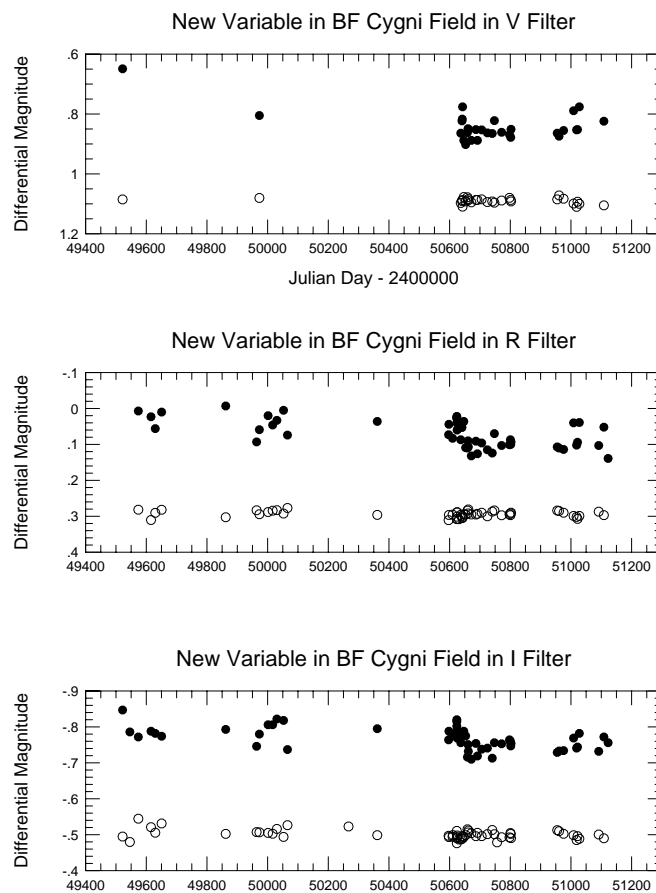


Figure 2. Light curves for the new variable (filled circles). Open circles denote the magnitude difference between the comparison and the check star.