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USNO-B1.0 1381-0460341: a New Eclipsing Binary System Near V1500 Cyg

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Star Name:	USNO-A2.0 1350-13606605, USNO-B1.0 1381-0460341		
Coordinates (J2000):	21 11 12.45, +48 09 31.4		
Variability type:	EW;	**Limits, System:**	18.75 - 19.5 (V);
Period:	0.2994 d;	**Epoch(min):**	JD 2453562.3878

Remarks:

Several sessions of high-temporal-resolution BVRcIc photometry of V1500 Cyg (Nova Cygni 1975) field were carried out by one of the authors (E.P. Pavlenko) using the 2.6-m Shajn telescope of the Crimean Astrophysical Observatory equipped with an FLI IMG 1001E CCD camera (Litvinchova & Pavlenko 2006). We analysed images taken on May 9; July 8, 10; August 2 and 5, 2005 with the VAST software (Sokolovsky & Lebedev, 2005). As a result, we detected a previously unknown variable star USNO-B1.0 1381-0460341, in 4 arcminutes from V1500 Cyg, near the edge of our CCD images. It lies in the galactic plane, l = 89.78 deg., b = -0.02 deg.

The variable is an EW type eclipsing binary with the light elements: HJDmin = 2453562.3878 + 0.2994 x E. Its maximum brightness is 18.75m (V), the amplitude of variability is about 0.75 mag (V). The observed colors of USNO-B1.0 1381-0460341 are the following: B-V = 1.46+/-0.09; V-R = 0.82+/-0.05; R-I = 0.83+/-0.04. The values of interstellar reddening for V1500 Cyg are E(B-V) = 0.45, E(V-R) = 0.35 and E(R-I) = 0.37 (Kaluzny & Semeniuk, 1987). If these values are the same for the very close USNO-B1.0 1381-0460341, then the intrinsic colors could be B-V = 1.01, V-R = 0.47 and R-I = 0.46. There is no evidence for a color change during eclipses. BVRcIc magnitudes were calibrated using the standards C1, C2, and C3 near V1500 Cyg (Kaluzny & Semeniuk, 1987). Using the empiric period-luminosity-color relation for W UMa type stars (Rucinski, 2006), we can estimate the distance to our EW binary. The uncertainty of the above relation is +/-0.25 Mv, it affects the resulting distance stronger than the uncertainty in interstellar extinction. The distance to USNO-B1.0 1381-0460341 can be estimated as 2400+/-300 pc.

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References:

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Litvinchova, A. A., Pavlenko, E. P., 2006, in Binary Stars as Critical Tools and Tests in Contemporary Astrophysics, IAU Symposium no. 240, held 22-25 August, 2006 in Prague, Czech Republic, S240-92
Rucinski, S.M., 2004, New Astronomy Reviews, 48, 703
Sokolovsky, K., Lebedev, A., 2005, in 12th Young Scientists' Conference on Astronomy and Space Physics, Kyiv, Ukraine, April 19-23, 2005, eds.: Simon, A.; Golovin, A., p.79 (VAST: http://saistud.sai.msu.ru/vast)

Light Curve

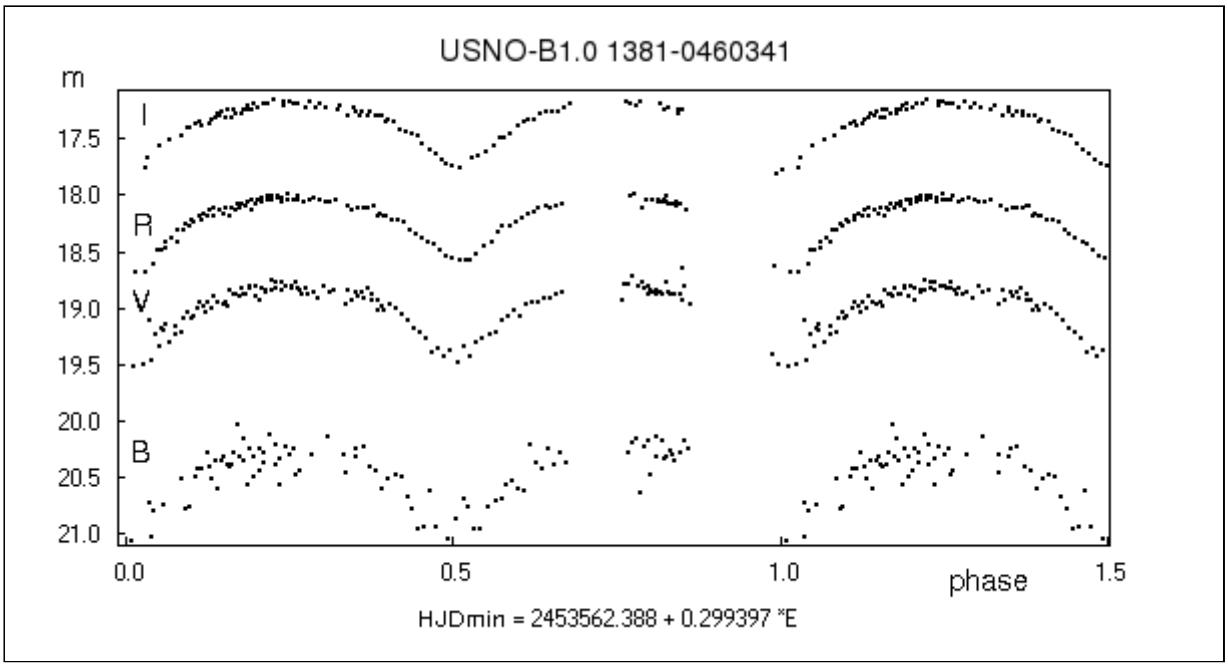

Fig. 1. B, V, Rc and Ic phased light curves.

Finding Chart

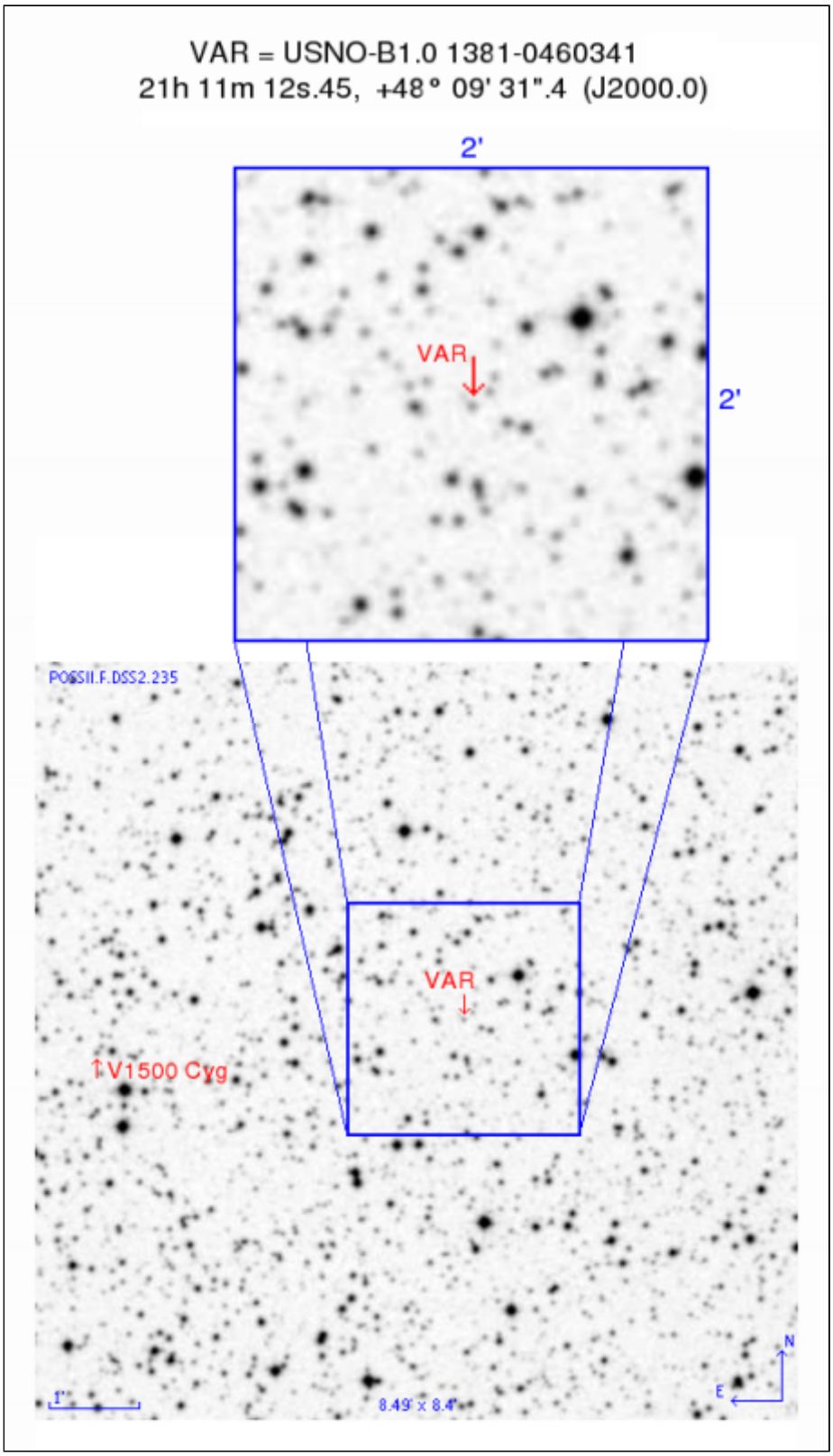

Fig. 2. The finding chart. V1500 Cyg is also shown.

Data Source

1. usno-b1-1381-0460341_ccd.dat