

Variability of AC Psc

[T. Kryachko](#)^{#1}, [A. Samokhvalov](#)^{#2}, [B. Satovskiy](#)^{#1}, [D. Denisenko](#)^{#3}, [A. V. Khruslov](#)^{#4}

#1. Astrotel Observatory, Karachay-Cherkessia, Russia;

#2. Surgut, Russia;

#3. Space Research Institute (IKI), Moscow, Russia;

#4. Tula, Russia.

Received: 14.03.2008; accepted: 6.05.2008

(E-mail for contact: bredfild@mail.ru, sav@surgut.ru, bs25@mail.ru, denis@hea.iki.rssi.ru, khruslov@bk.ru)

Star Name:	AC Psc, GSC 0584-01274, 1RXS J232128.6+063633 (?), NSVS 14605916		
Coordinates (J2000):	23 21 35.77, +06 35 56.8		
Variability type:	EA;	Limits, System:	0.07-1.02 (delta mag, unfiltered);
Period:	0.335307 d;	Epoch(min):	JD 2454479.21947

Remarks:

Variability of GSC 0584-01274 = AC Psc was discovered by Pinto and Romano (1973). The GCVS classifies AC Psc as an irregular (L-type) variable. Based on ROTSE-I data (Wozniak et al., 2004), Khruslov (2006) found that AC Psc was actually an EA star with the following elements:

$$\text{Min I} = \text{JD}2451458.768 + 0.3353\text{d} \times \text{E}$$

and magnitude range 13.6 - 14.6 - 14.1 (R). We have further investigated the light curve of AC Psc using our new observations as well as archival NEAT observations to confirm the eclipsing nature and to improve the period.

For CCD photometry, T. Kryachko and A. Samokhvalov used the 300-mm Ritchey-Chretien Astrotel-Caucasus telescope equipped with a SBIG STL-11000 CCD camera. Images were taken without any filters. In total, 318 observations were obtained on JD 2454430-2454479. The comparison star was GSC 0584-00247 and the check star, GSC 0584-00639. Six primary minima of the eclipsing binary were observed. The minima timings are the following:

$$\text{HJD}2454430.26635 \pm 0.00042$$

$$2454472.17977 \pm 0.00048$$

$$2454473.18516 \pm 0.00045$$

$$2454477.20762 \pm 0.00039$$

$$2454478.21565 \pm 0.00083$$

$$2454479.21947 \pm 0.00021$$

To increase the observation baseline, we added the data of the NEAT project (Pravdo et al., 1999). Thirty unfiltered CCD images were downloaded by D. Denisenko from the SkyMorph database (<http://skys.gsfc.nasa.gov/skymorph/skymorph.html>). They cover 11 nights from 2001 October 5 to 2003 July 31 (JD 2452187-2452851). Photometry was performed using USNO-A2 0900-20384832 (R = 14.6) as a comparison star.

Combining our CCD photometry and our measurements of the NEAT images made using MaxIm DL software allowed us to improve the period and deduce the following elements:

Min I = HJD2454479.21947 + 0.335307 x E.

D = 0.15 P. J-H = 0.653 (2MASS).

All available observations (NSVS, NEAT and CCD data) were analyzed together using the period-search software developed by Dr. V.P. Goranskij for Windows environment. The phased light curve is presented in the Figure. The top panel shows the Astrotel-Caucasus photometry and the bottom panel, NEAT data.

We confirm the eclipsing nature of AC Psc. The variable belongs to the Algol type, but with features of the light curve indicating significant chromospheric activity of the components (the heights of maxima are different - O'Connell effect; the light curve resembles those of EB variables; slight changes of the light curve occur around maxima). This is also confirmed by the possible identification with the X-ray source 1RXS J232128.6+063633 112" away. One cannot exclude the variable belonging to the RS CVn type; then it is possible that the distortion wave is moving along the phase, which is characteristic of the stars of this kind (compare CCD and NEAT data).

References:

Khruslov A.V., 2006, IBVS 5699

Pinto, G., Romano, G., 1973, Memorie Soc. Astron. Ital., 44, 273

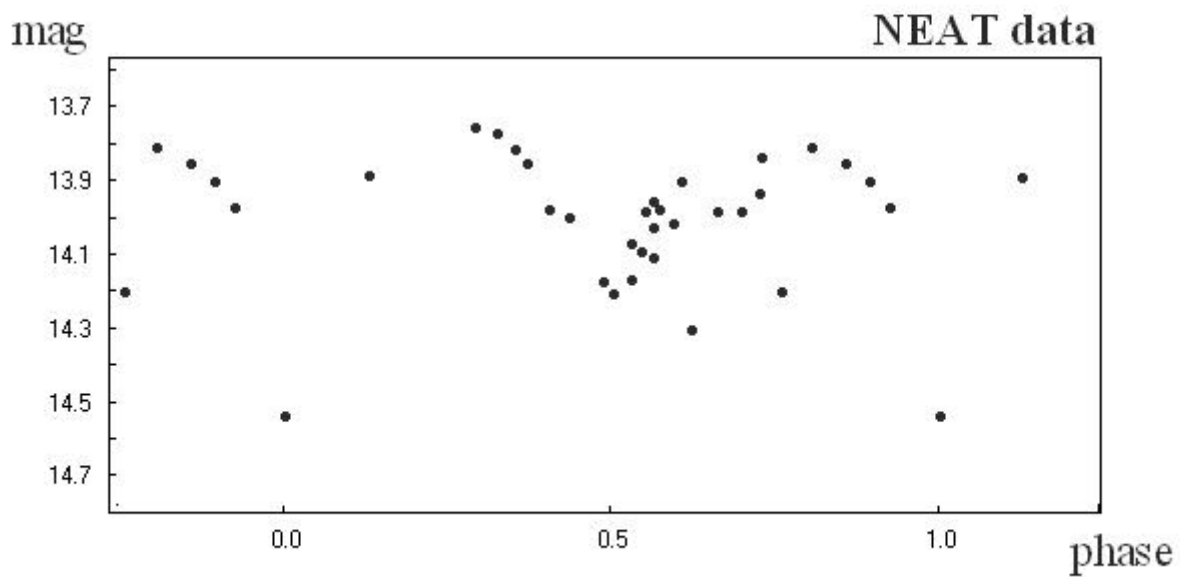
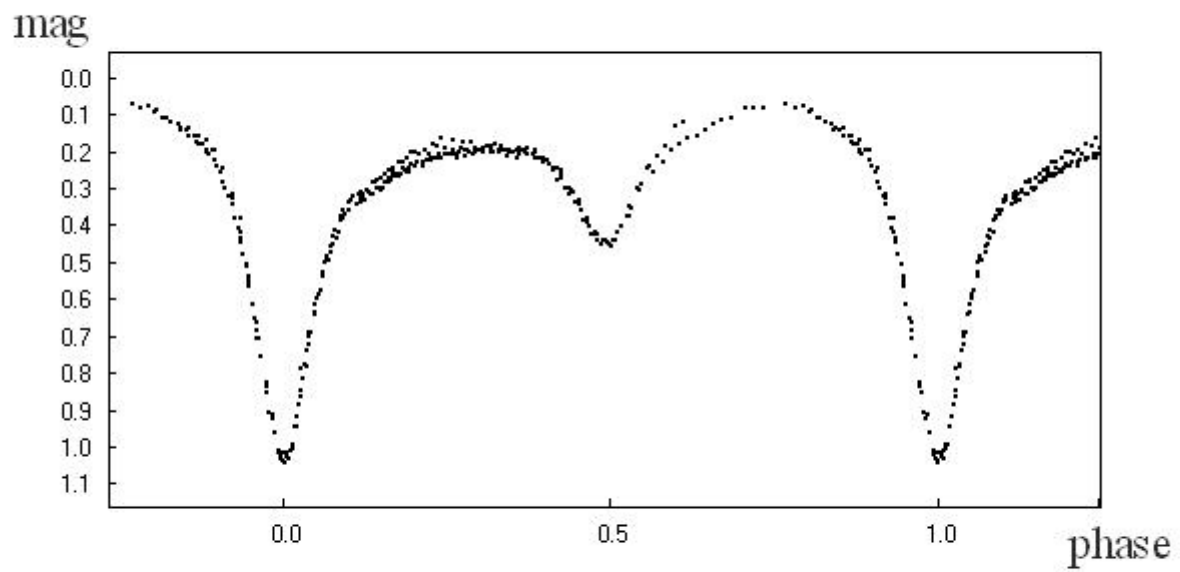
Pravdo, S.H., Rabinowitz, D.L., Helin, E.F. et al., 1999, Astron. J., 117, 1616

Wozniak, P.R., Vestrand, W.T., Akerlof, C.W. et al., 2004, Astron. J., 127, 2436

Light Curve

AC Psc

HJD 2454479.21947 + 0.335307 E



Data Source

1. [data.txt](#)