

Received 19 November; accepted 20 November.

A New High Amplitude Delta Scuti Star on the Scanned Moscow Archive Plates

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We present the discovery, photographic and V-band CCD observation of a new High Amplitude Delta Scuti star USNO-A2.0 0975-09853705.

Several years ago, we started digitization, with 2540 dpi resolution, of plates of the Moscow archive with two CREO EverSmart Supreme II scanners of the Sternberg Astronomical Institute. Later, we initiated the search for new variable stars on these scanned images. We analyze the scans with the VAST software (Sokolovsky and Lebedev, 2005) which is based on the well-known SExtractor package (Bertin and Arnouts, 1996). Some results of our pilot projects have already been published (see, for example, Manannikov et al., 2006, and Kolesnikova et al., 2007). Here we report the first finding on the scans of $10^\circ \times 10^\circ$ (30 cm \times 30 cm) plates of Crimean astrograph centered on 66 Oph ($\alpha = 18^{\text{h}}00^{\text{m}}3$, $\delta = +4^\circ22'$, J2000.0).

The star USNO-A2.0 0975-09853705 ($\alpha = 17^{\text{h}}51^{\text{m}}37^{\text{s}}.90$, $\delta = +8^\circ44'01''.5$ (J2000.0, 2MASS)) was found to be variable on 114 scans of the 66 Oph field (JD2442867–46977) with a period, a variability amplitude, and a shape of the phased light curve typical of the High Amplitude Delta Scuti stars. Our B_{pg} magnitudes were calibrated using photographic blue magnitudes of neighboring USNO-A2.0 stars (Monet et al., 1998).

To confirm the classification, we undertook additional CCD observations using a SBIG ST2000XM CCD camera and the 60-cm reflector of the Crimean Laboratory (Sternberg Astronomical Institute). 345 V-band brightness measurements were obtained on four nights in 2007: July 8–22, JD2454290–304. The images were dark subtracted, flat-fielded and analyzed with the aperture photometry package developed by V.P. Goranskij. The comparison and check stars are marked in Fig. 1. The accuracy of our photometry is $0^{\text{m}}024$.

Both from our photographic and CCD data, we find the following light elements:

$$\text{Max} = \text{HJD } 2454304.3997 + 0^{\text{d}}0999541 \times E.$$

The corresponding phased light curves are shown in Fig. 2. The V-band variability amplitude is about $0^{\text{m}}6$. $M - m = 0^{\text{p}}29$. Our photographic and CCD data are available electronically from the html version of this paper.

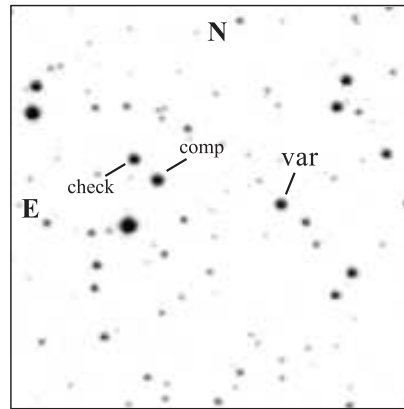


Figure 1. A $3' \times 3'$ finding chart. The new HADS (var), comparison and check stars are marked.

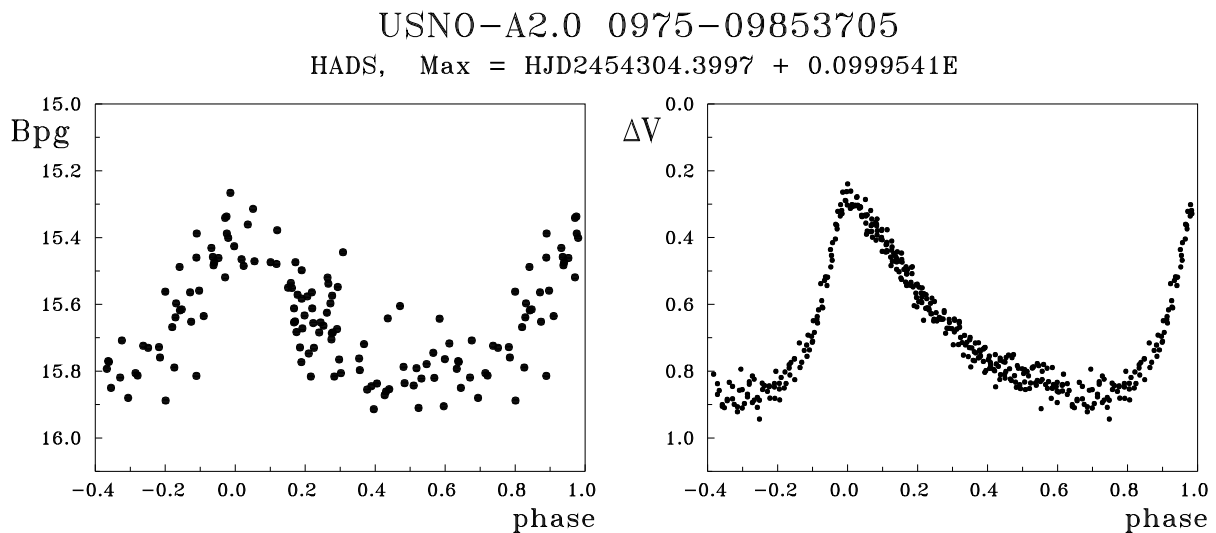


Figure 2. The photographic and V -band CCD phased light curves of the newly discovered High Amplitude Delta Scuti star.

Acknowledgements: This study was supported, in part, by the Russian Foundation for Basic Research through grants Nos. 05-02-16289 and 05-02-16688.

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