

## The New Double-Mode RR Lyrae Variable USNO-A2.0 1650-01540181

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We present our discovery of a new double-mode RR Lyrae variable, USNO-A2.0 1650-01540181. The study is based on our original CCD observations, carried out at the Astrotel-Caucasus Observatory.

We present our discovery of a new double-mode RR Lyrae variable star USNO-A2.0 1650-01540181 ( $\alpha = 11^{\text{h}}41^{\text{m}}14^{\text{s}}27$ ,  $\delta = +75^{\circ}42'22''.2$ , J2000.0, 2MASS). All observations were carried out at the Astrotel-Caucasus observatory with a 300-mm Ritchey–Chretien astrograph, equipped with an unfiltered SBIG STL-11000 CCD camera. A total of 531 images, with 5-minute exposure times, were acquired between JD2454459 and JD2454533. Basic reductions of images for dark current, flat fields, and bias were carried out with the MaxIm DL software. To search for new variables, we use the VaST software (Sokolovsky and Lebedev, 2005), and for differential aperture photometry, CCDSoft (<http://www.bisque.com/Products/CCDSOFT/>). The comparison star was GSC 4550-01695 and the check star, GSC 4550-01659. We analyzed our observations using the Peranso 2.31 software. We revealed two periods: the fundamental mode period,  $P_0 = 0^{\text{d}}472809$ , and the first-overtone period,  $P_1 = 0^{\text{d}}351671$ . The ratio  $P_1/P_0 = 0.7438$  is typical of double-mode RR Lyrae variable stars (McClusky, 2008).

Figures 2–5 display the phased light curves for the following elements:

$$\text{Max} = \text{HJD } 2454459.5740 + 0^{\text{d}}472809 \times E \text{ (fundamental mode);}$$

$$\text{Max} = \text{HJD } 2454459.5443 + 0^{\text{d}}351671 \times E \text{ (first overtone).}$$

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References:

McClusky, J.V., 2008, *IBVS* No. 5825

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

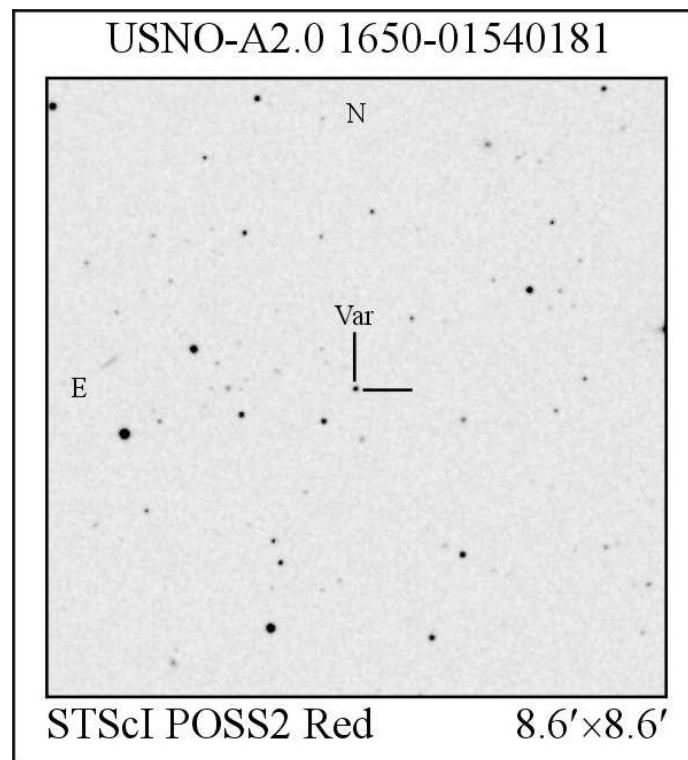


Figure 1. The finding chart.

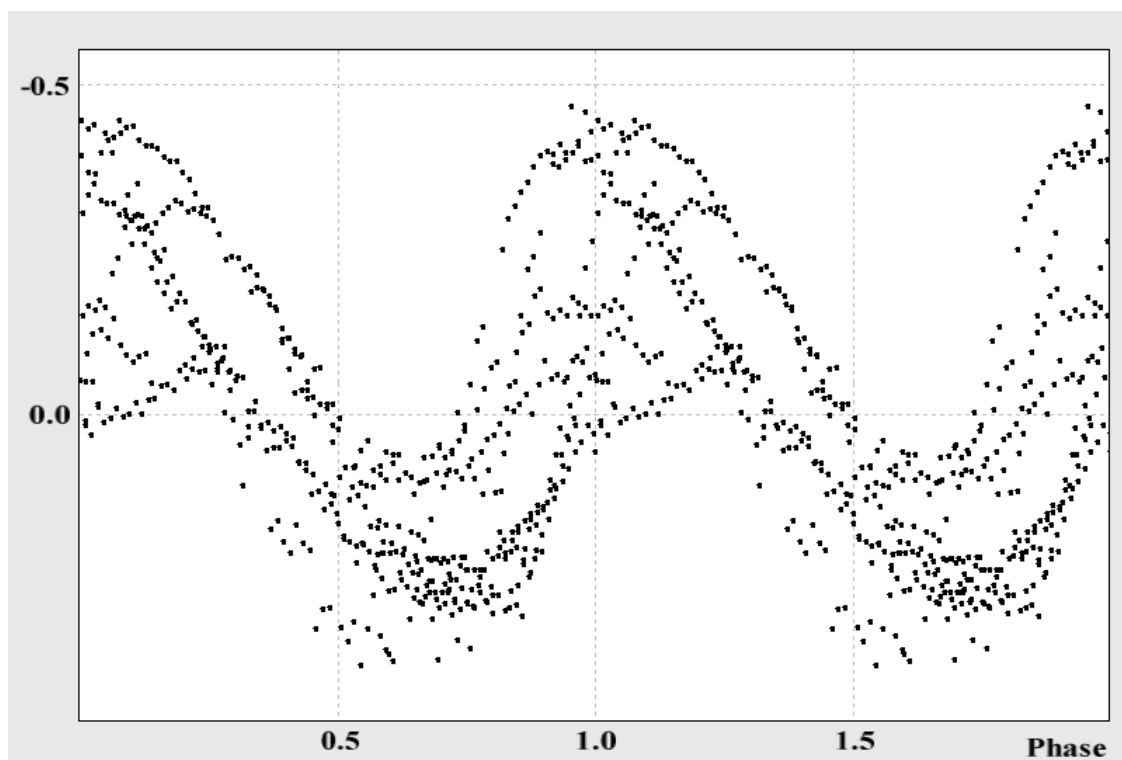


Figure 2. The first-overtone phased light curve.  $P = 0^d351671$ .

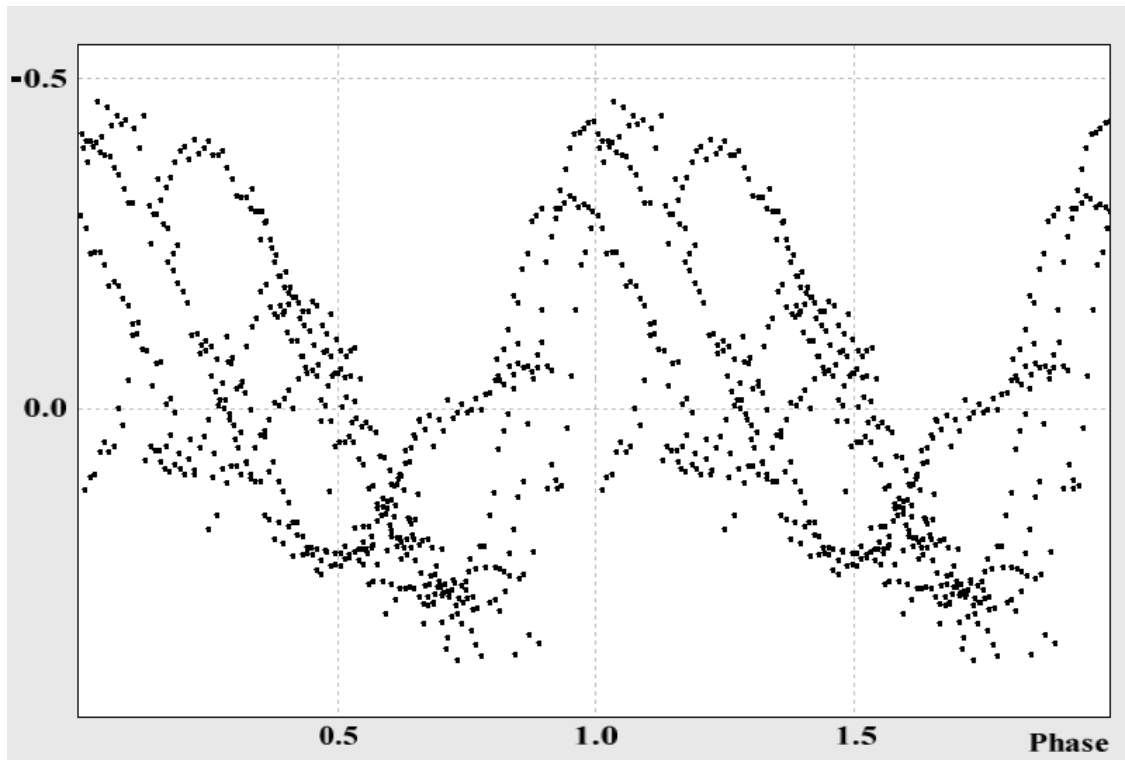


Figure 3. The fundamental-mode phased light curve.  $P = 0^{\text{d}}.472809$ .

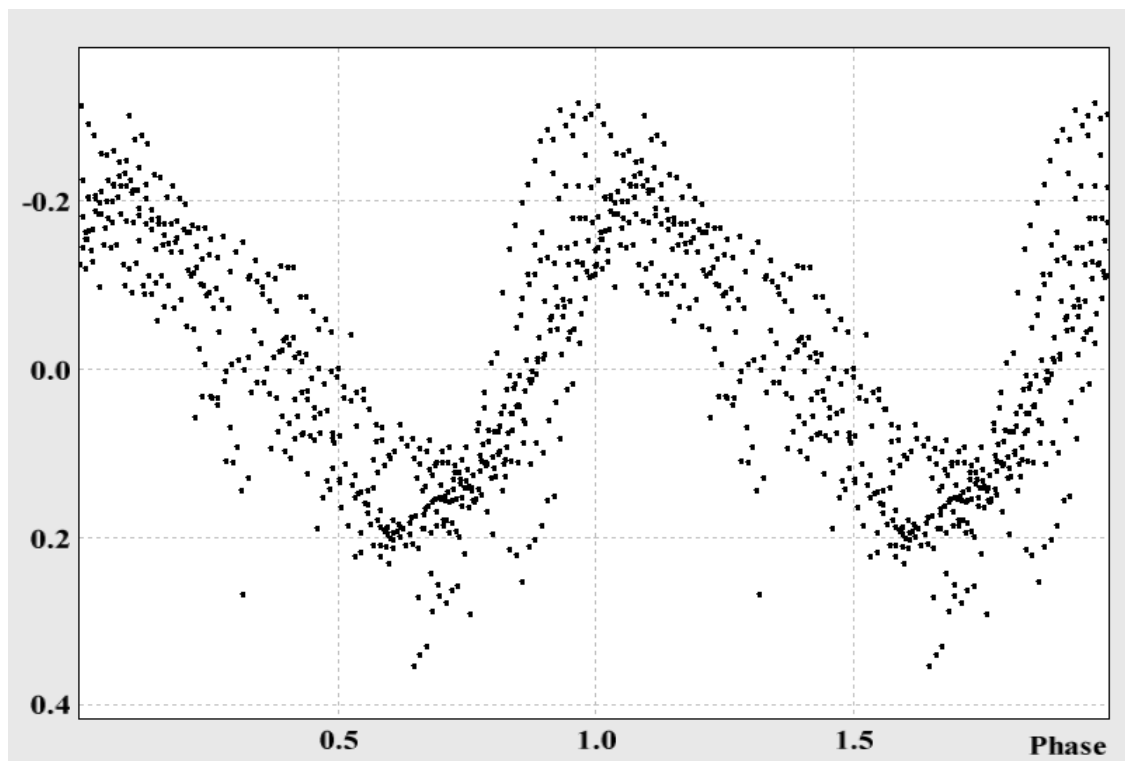
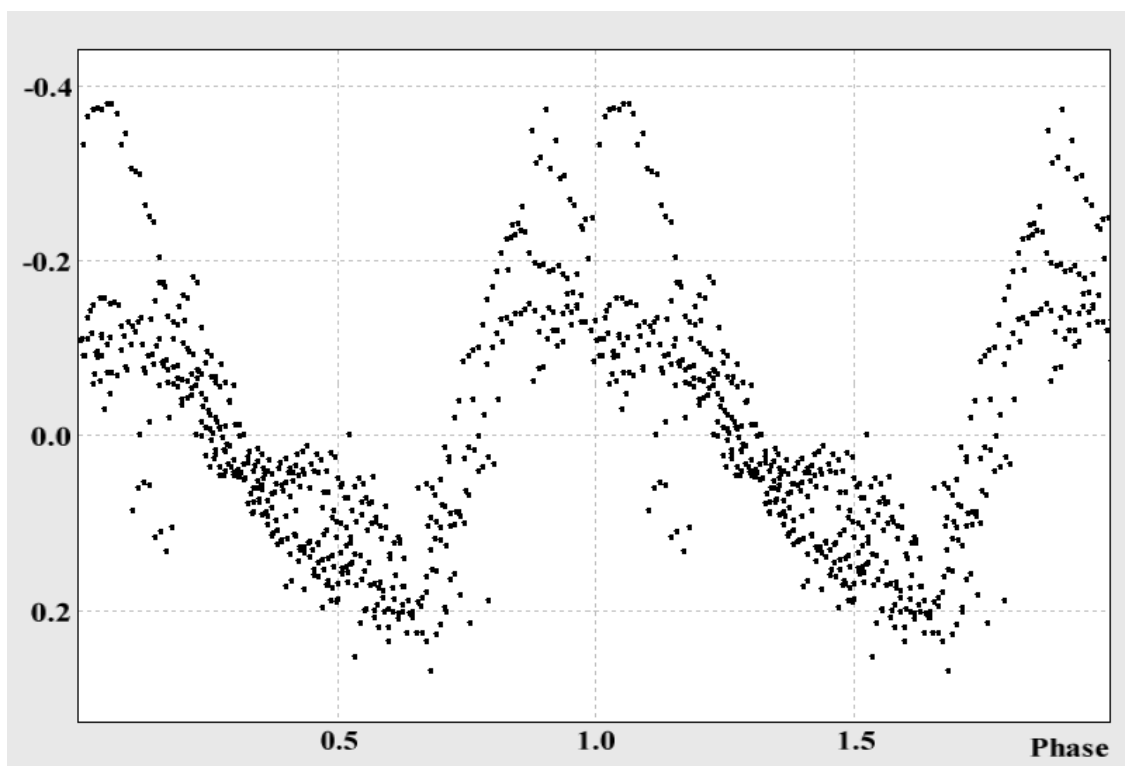


Figure 4. The first overtone after removing the fundamental mode.



**Figure 5.** The fundamental mode after removing the first overtone.