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## IN MEMORIAM: DERALD D. NYE (1935-2021)

In this space we note the March 26 passing of Derald D. Nye, retired Distributor for the *Minor Planet Bulletin*, having served in that role for 37 years from 1983 through 2019; spanning *MPB* volumes 10-46. Derald wrote of this experience on these pages (*MPB* 40, 53). Derald was a native of Kansas and graduate of Kansas State University, beginning a 30-year career with IBM that included programming work for the Saturn 1B and Saturn V rockets in the Apollo program. Derald and wife Denise were avid eclipse chasers, together making 28 expeditions until Denise's passing in 2006. They are together honored with their names merged for asteroid 3685 Derdenye. Derald's lifetime sum of eclipse expeditions reached 42, the last of which was at sea in Indonesia in 2016. I had the honor of being a shipboard expedition leader, but truth-be-told, I relied on Derald for every bit of insight. Watching that eclipse at Derald's side was the personal highlight for me. Derald's faithful quiet service and dry wit are just two of many attributes that will be missed by his friends.

Richard Binzel, Editor

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## LIGHTCURVE ANALYSIS OF ASTEROIDS (21242) 1995 WZ41 AND (44896) 1999 VB12

Caroline E. Odden, Claire Cahill, Victoria Darling, Ethan Ellsweig, Troy Mao, Katherine Wang, Yuxin Xie, Jeremy Zhou  
Phillips Academy Observatory (MPC I12)  
180 Main Street  
Andover, MA 01810 USA  
ceodden@andover.edu

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Photometric observations of asteroids (21242) 1995 WZ41 and (144896) 1999 VB12 were made from the Phillips Academy Observatory (PAO) from 2020 December 23 to 2021 February 25. The respective rotational periods and amplitudes were determined to be: (21242) 1995 WZ41,  $P = 5.452 \pm 0.001$  h,  $A = 0.58 \pm 0.07$  mag; (44896) 1999 VB12,  $P = 8.054 \pm 0.001$  h,  $A = 0.69 \pm 0.07$  mag.

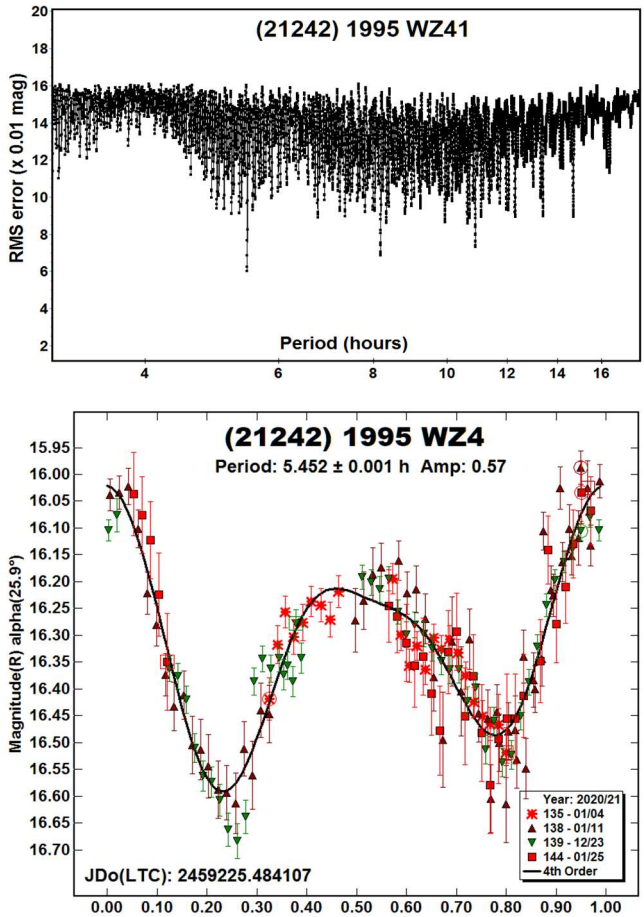
CCD photometric observations of the asteroids were made from the Phillips Academy Observatory. The asteroids were chosen from the CALL (2020) website. All observations were made with a 0.50-m  $f/6.8$  Ritchey-Chrétien (RC) Astrograph telescope manufactured by PlaneWave Instruments and Andor Tech iKon DW436 CCD camera with a 2048×2048 array of 13.5-micron pixels. The resulting image scale was 0.81 arcseconds per pixel. All images were corrected using dark frames, flat-fields, and bias frames using *AstroImageJ* software (Collins et. al., 2017; Collins, 2018). All exposures were taken through a luminance filter at -50°C and were unbinned. Exposures were 300 s in length and unguided.

*MPO Canopus* (Warner, 2018) was used to make photometric measurements of the images using differential photometry as well as to generate the final lightcurves. Comparison stars were chosen to have near solar-color, a B-V value close to 0.8, and a V-R value close to 0.45 (Warner, 2012). In addition, brighter comparison stars were favored. Data merging and period analysis were done with *MPO Canopus* using the Fourier Analysis for Lightcurves (FALC) algorithm developed by Alan Harris (Harris et al., 1989) and modified by Petr Pravec (Warner, 2012). The research was conducted for the Astronomy Research course at Phillips Academy, a high school in Andover, Massachusetts.

| Number | Name      | 20yy/mm/dd        | Phase      | L <sub>PAB</sub> | B <sub>PAB</sub> | Period(h) | P.E.  | Amp  | A.E. | Grp  |
|--------|-----------|-------------------|------------|------------------|------------------|-----------|-------|------|------|------|
| 21242  | 1995 WZ41 | 20/12/23–21/01/25 | 21.7, 29.5 | 65               | -12              | 5.452     | 0.001 | 0.57 | 0.03 | MB-M |
| 44896  | 1999 VB12 | 21/01/08–02/05    | 4.4, 14.0  | 108              | 8                | 8.056     | 0.001 | 0.65 | 0.03 | MB-M |

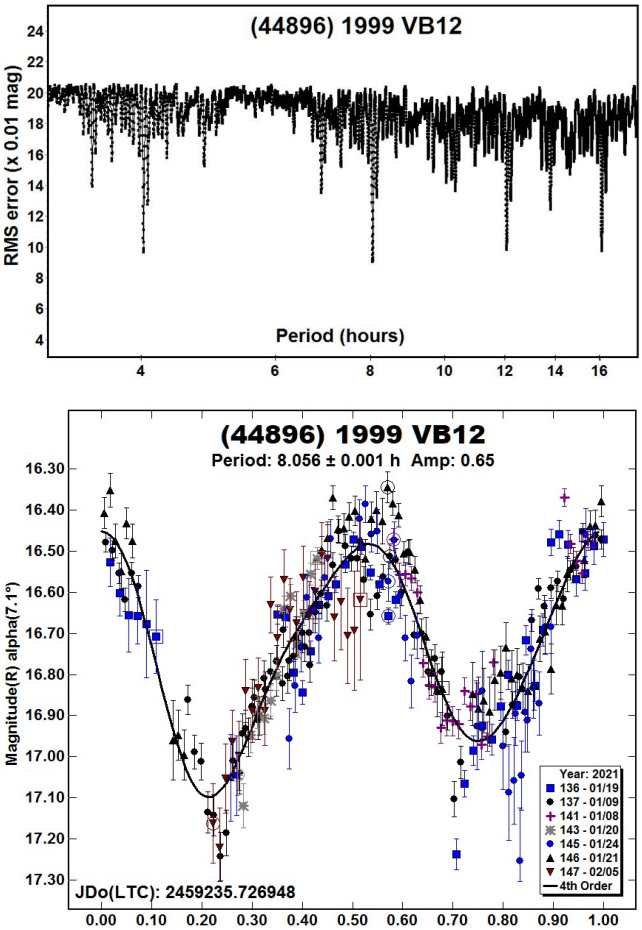
Table I. Observing circumstances and results. The phase angle is given for the first and last date. If preceded by an asterisk, the phase angle reached an extremum during the period. L<sub>PAB</sub> and B<sub>PAB</sub> are the approximate phase angle bisector longitude/latitude at mid-date range (see Harris et al., 1984). Grp is the asteroid family/group (Warner et al., 2009).

(21242) 1995 WZ41. This main-belt asteroid was discovered in 1995 at Kushiro Observatory (JPL) and did not have any previous rotational period results in the Asteroid Lightcurve Database (LCDB) (Warner et al., 2009). Images were taken over four nights from 2020 December 23 to 2021 February 25.



Analysis of 169 data points indicated a rotational period of  $5.452 \pm 0.001$  h with amplitude  $0.57 \pm 0.03$  mag. The composite lightcurve is well covered, and a bimodal solution is expected given the amplitude (Harris et. al, 2014). The period spectrum favors strongly the reported period.

(44896) 1999 VB12. Discovered at Fountain Hills in 1999 by C. W. Juels (JPL, 2019), this main-belt asteroid did not have any rotational period recorded in the Asteroid Lightcurve Database (LCDB) (Warner et al., 2009).



Images were taken over six nights from 2021 January 8 to February 5. Analysis of 268 data points yielded a rotational period of  $8.056 \pm 0.001$  h with amplitude  $0.57 \pm 0.03$  mag. Some data were removed due to background star contamination. This resulted in small gaps between 0.05 and 0.20 phase. However, sessions 136 and 137 extend before and after these gaps, and the bimodal solution is expected given the amplitude (Harris et. al, 2014).

Acknowledgements

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<http://www.minorplanet.info/lightcurvedatabase.html>

# LIGHTCURVE BASED ROTATIONAL PERIOD FOR ASTEROIDS 1995 WZ41 AND 99942 APOPHIS

Pablo Loera-González, Lorenzo Olguín & Julio Saucedo-Morales  
Departamento de Investigación en Física  
Universidad de Sonora  
Hermosillo, Sonora, México  
pablo.loera@unison.mx

Ramona Núñez-López  
Departamento de Física, Matemáticas e Ingeniería  
Universidad de Sonora, Unidad Regional Norte  
Caborca, Sonora, México

Rafael Domínguez-González  
Hermosillo, Sonora, México

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Asteroids (21242) 1995 WZ41 and 99942 Apophis were studied during the late 2020 and early 2021 at the Observatorio Estelar Carl Sagan at Universidad de Sonora. We obtained for the former a period  $P = 5.4534 \pm 0.0002$  h and  $A = 0.56$  mag, and for the later  $P = 30.4966 \pm 0.0033$  h and  $A = 0.63$  mag.

Results from observations taken from October 2020 to April 2021 are presented. All observations were taken with EOCS 16-inch SCT telescope and a SBIG ST9 CCD. Images are unfiltered and had exposure time adjusted between 120 s and 240 s according to the object's brightness at the observing date. During the observation season we chose two asteroids: main belt 1995 WZ41 and NEA 99942 Apophis, the later as part of our collaboration with the 99942 Apophis 2021 observing campaign from the International Asteroid Warning Network. Images were reduced in a typical bias-dark-flat manner and photometric measurements conducted on *MPO Canopus* version 10.7.3.0 (Warner, 2017).

(21242) 1995 WZ41 is a main-belt asteroid discovered on 25 November 1995 by Ueda and Kaneda at Kushiro (Park and Chamberlain, 2021). This asteroid was observed during six nights between 23 October 2020 and 7 January 2021. A 4<sup>th</sup> order fit was used to obtain a result of  $P = 5.4534 \pm 0.0002$  h and  $A = 0.56$  mag. The resulting lightcurve shows a two maxima and two minima structure typical of an ellipsoidal body. While the two maximum points are fairly equal (the second one looks somewhat lower but the scatter of data points blurs the distinction), the minima show difference having the second less pronounced than the first. Two "shoulders" can be seen at the 0.3 and 0.9 mark of the period but it is unclear if they are a feature of the lightcurve or just an effect of noise. We encourage further observations at better observing conditions to improve the quality of the lightcurve and reduce data dispersion. This result is similar to the one obtained by Zeigler (2021) of  $P = 5.456 \pm 0.01$  h and  $A = 0.47$  mag which was the only period we found published.