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LIGHTCURVE BASED ROTATIONAL PERIOD FOR ASTEROIDS 1995 WZ41 AND 99942 APOPHIS

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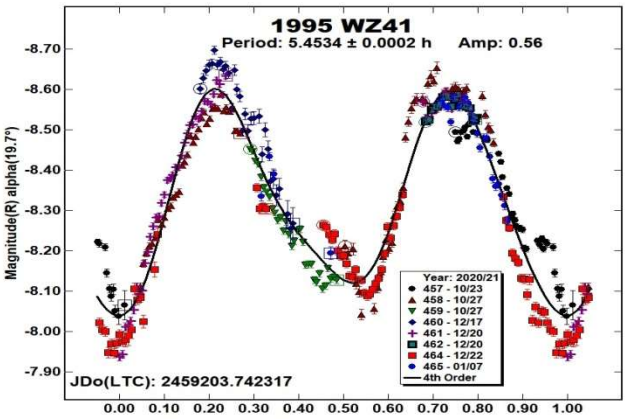
Asteroids (21242) 1995 WZ41 and 99942 Apophis were studied during the late 2020 and early 2021 at the Observatorio Estelar Carl Sagan at Universidad de Sonora. We obtained for the former a period P = 5.4534 ± 0.0002 h and A = 0.56 mag, and for the later P = 30.4966 ± 0.0033 h and A = 0.63 mag.

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).

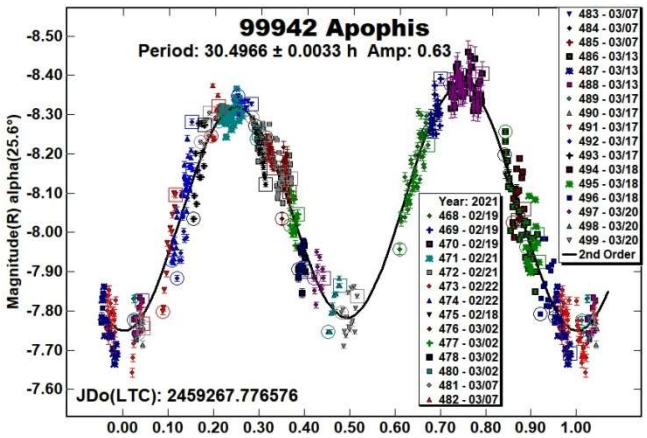
(21242) 1995 WZ41 is a main-belt asteroid discovered on 25 November 1995 by Ueda and Kaneda at Kushiro (Park and Chamberlain, 2021). This asteroid was observed during six nights between 23 October 2020 and 7 January 2021. A 4th order fit was used to obtain a result of P = 5.4534 ± 0.0002 h and A = 0.56 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 ± 0.01 h and A = 0.47 mag which was the only period we found published.

Number	Name	20yy mm/dd	Phase	L_{PAB}	B_{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
21242	1995 WZ41	20-21 10/23-01/07	*19.8,26.6	57.7	-4.3	5.4534	0.0002	0.56	0.10	MB
99942	Apophis	21 02/18-03/20	*25.8,45.3	154.4	-11.1	30.4966	0.0033	0.63	0.10	ATEN

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 extrema during the period. L_{PAB} and B_{PAB} 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).



99942 Apophis. This Aten near-Earth asteroid (NEA) was observed in 2021 March 18 to April 20. A total of 70 h was used to obtain a lightcurve with P = 30.4966 ± 0.0033 h in a 2nd order fit. It must be noted that the light curve is not complete as it lacks coverage around the 0.60 mark of the period, regardless, all other data points fall within the expected tendency of the lightcurve. The lightcurve shows a typical two maxima and two minima for an ellipsoidal body. The difference between the second maximum and minimum is larger (0.6 mag) than between the first pair (0.5 mag). Our result is similar to others published by Beherend (2005) with 30.57 ± 0.01 h, Oey (2014) had 30.53 ± 0.05 h, Pravec et al. (2014) at 30.56 h and Warner (2021) 30.67 ± 0.06 h.



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