ROTATIONAL PERIOD DETERMINATION AND TAXONOMIC CLASSIFICATION FOR ASTEROID 8080 INTEL

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CCD photometric observation of outer main-belt asteroid 8080 Intel was obtained in order to measure the rotation period and find the color indexes B-V and V-R. These measures were performed during five different nights on 2021 Oct 9, 10, 11, 13 and 14 using the instrumentation available at the Osservatorio Astronomico Margherita Hack located on the hills near Florence (Italy).

Asteroid 8080 Intel was discovered by CERGA, Centre de Recherches en Géodynamique et Astrométrie, on November 17, 1987, from Caussols (France). It is named after the Intel 8080 microprocessor, ancestor of a series of microprocessor chips fundamental to the "PC revolution". It was chosen from the Asteroid Lightcurve Data Exchange Format (ALCDEF, 2020). It is an outer main-belt asteroid with a semi-major axis of 2.861 AU, eccentricity 0.2862, inclination 9.427°, and an orbital period of 4.84 years. Its absolute magnitude is H = 13.14 (JPL, 2021; MPC, 2021).

CCD photometric observations were carried out in 2021 October at the Osservatorio Astronomico Margherita Hack (A57). We used a 0.35-m f/8,25 Schmidt-Cassegrain telescope, a SBIG ST10 XME CCD camera, clear filter and B, V, Rc photometric filters. The pixel scale was 1 arcsec when binned at 2×2 pixels. Data processing and analysis were done with *MPO Canopus* (Warner, 2017). All the images were calibrated with dark and flat field frames using *Astroart 6.0*. Table I shows the observing circumstances and results.

Our observations were conducted in two different steps. The first step consisted in collecting 222 data points with clear filter in four different nights (2021 Oct 9, 10, 11 and 13). The derived synodic period was P = 3.5337 ± 0.0003 h with an amplitude of A = 0.36 ± 0.03 mag (Warner, 2006). Moreover, we consulted the asteroid lightcurve database (LCDB; Warner et al., 2009) and we found two previous calculated periods: P = 3.54 +/- 0.01 h (Chang et al., 2014) and P = 3.533 +/- 0.0019 h (Waszczak et al., 2015). The period we found seems to be in good agreement with the previous mentioned periods.

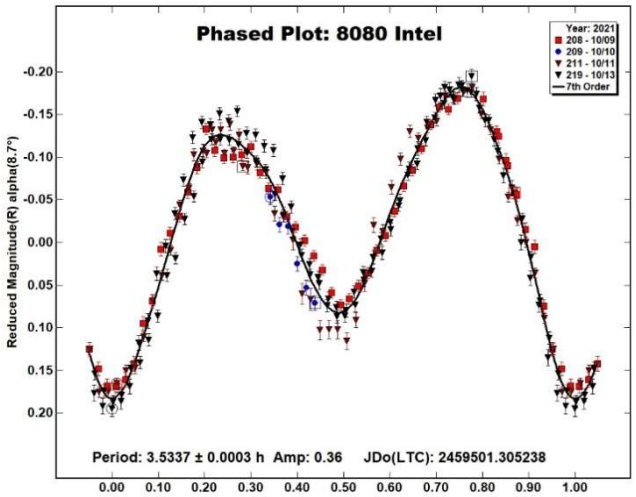

Figure 1. Phased lightcurve of 8080 Intel.

In the second step we collected further 50 data points during one night (2021 Oct 14) using filter V, Rc and B. This allowed us to determine the color indexes (V-R) = 0.46 +/- 0.03 and (B-V) = 0.75 +/- 0.05. These values are consistent with a moderate albedo M-type taxonomic class (Shevchenko and Lupishko, 1998), moreover the semi-major axis (a) of 8080 Intel is compatible with this taxonomic class (Gradie and Tedesco, 1982). We didn't find any other bibliographic reference where the taxonomic class has been derived by color indexes, in order to compare our results with others.

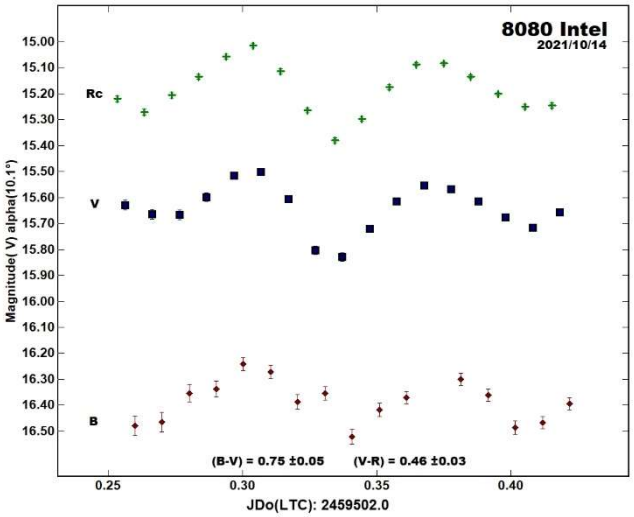

Figure 2. (B-V) and (V-R) raw plot of 8080 Intel.

Number	Name	2021 mm/dd	Pts	Phase	L_{PAB}	B_{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
8080	Intel	09/10-13/10	222	8.7-9.8	11.3	12.7	3.5337	±0.0003	0.36	0.03	OMB

Table I. Observing circumstances and results. Pts is the number of data points. The phase angle is given for the first and last date. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude and latitude at mid-date range (see Harris et al., 1984). Grp is the asteroid family/group (Warner et al., 2009).

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ROTATION PERIOD FOR ASTEROID (125072) 2001 UG

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CMOS photometric observations of asteroid (125072) 2001 UG were performed by the author at The Studios Observatory in January 2022. The synodic rotation period was determined as 9.27 ± 0.01 h with amplitude 0.68 ± 0.04 mag.

Asteroid (125072) 2001 UG (=1985 YO1 = 1998 WU33) is in a Mars crossing orbit. It was discovered at Socorro on 2001 October 16 by LINEAR. A search of the asteroid lightcurve database (LCDB, Warner et al., 2009) indicates no previous reported rotation period for this asteroid.

We report observations performed at The Studios Observatory, Grantham, U.K. (Z52) using a Meade 14" (0.36 m) LX200 ACF OTA operating at f/10 with a Takahashi FS-102 4" f/8 refractor as guide scope. The OTAs are mounted on a Paramount MEII robotic mount. The 14" OTA is equipped with Moonlite CSL 2.5-inch large format motorized focuser and a QHY600M cooled CMOS camera (binned 2×2). A Chroma 50mm square Clear filter was used for all observations. All guiding was carried out using a ZWO ASI1600M-Cooled CMOS camera binned 2×2. The main imaging QHY600M camera is based on a 36mm × 24mm Sony IMX455 sensor with 3.76um pixels. The image scale, after 2×2 binning, was 0.448 arcsecs per pixel.

Sequence Generator Pro was used for all image centering, capture, and focusing. *PHD2* was used for all guiding. *TheSkyX Professional* software was used for all telescope control and initial focusing. *TheSkyX Professional* was also used to calibrate all science images using bias, dark, dark-for-flat, and flat-field frames. All flat-field images were obtained using a wall-mounted whiteboard illuminated by an A4-size electroluminescent (EL) panel. A recent library of bias, dark and dark-for-flat frames was used in the calibration process, no scaling of dark frames was necessary.

All data processing of the calibrated images and subsequent period analysis was performed using *MPO Canopus* (BDW Publishing 2018). Differential photometry measurements were performed using the Comp Star Selector (CSS) and Star-B-Gone procedures of *MPO Canopus*. Unless otherwise stated the asteroid and five solar-like stars were used for all photometric comparisons. The Sony IMX455 sensor has a peak spectral response in the green visual band so V band magnitudes and V-R colour indexes were used throughout the data processing.

The asteroid's magnitude ranged from 16.2 V to 16.3 V during the observing period. Period analysis was performed using the Fourier analysis algorithm (FALC) of *MPO Canopus* developed by Alan Harris (Harris et al., 1989). All likely periods from 1 hour onwards were examined.