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SYNODIC ROTATION PERIOD FOR KORONIS FAMILY OBJECT (452) HAMILTONIA

Francis P. Wilkin, Joseph J. Maier
Union College, Department of Physics and Astronomy,
807 Union St., Schenectady, NY 12308
wilkinf@union.edu

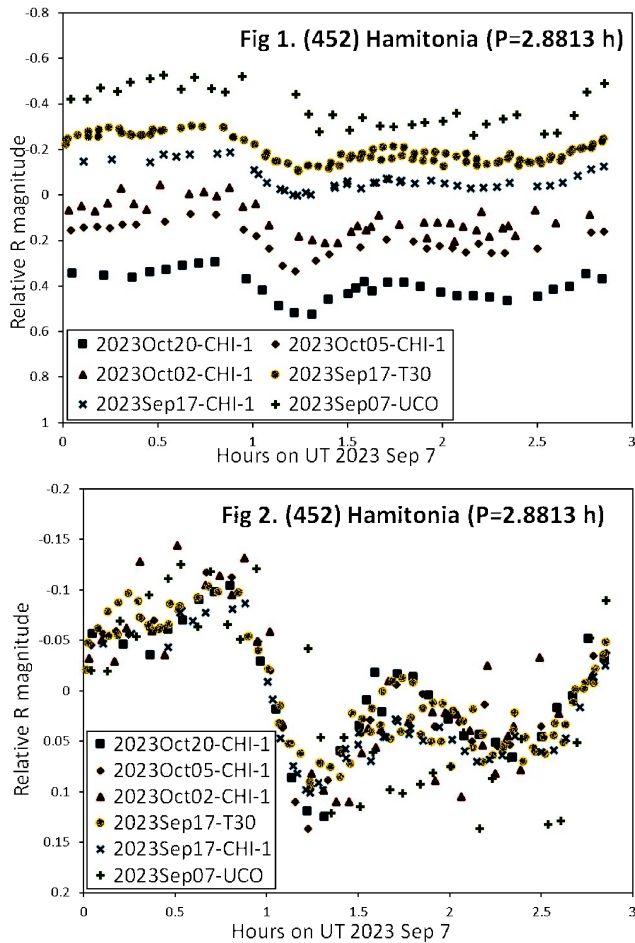
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We present new lightcurves for (452) Hamiltonia in 2023. Observations of Hamiltonia were made at the Union College Observatory and two remote facilities. We derived a single apparition period 2.8813 ± 0.0001 h.

Previously measured periods for (452) Hamiltonia include 2.8813 ± 0.0001 h (Pilcher, 2010), and 2.88 ± 0.01 h (Aznar Macías et al., (2018). We observed (452) Hamiltonia as part of our project at the Union College Observatory (UCO) to characterize Koronis family asteroids (e.g. Wilkin et al., 2022; Crowley and Wilkin, 2023) and to extend the sample completeness (Slivan et al., 2003; Slivan et al., 2024). Specifically, our goal for (452) Hamiltonia is to lengthen the overall time span of observations during the 2023 apparition, so that when combined with earlier observations of Slivan et al. (2023) in July and August, we obtain a more precise synodic rotation period than those previously available.

Observational planning was done using the *Koronisfamily.com* web tool (Slivan, 2003). We recorded lightcurves on a total of five nights using telescopes at three observatories. Telescope and camera properties are given in Table I. All observing runs had similar spans of 2.8-3.8 h. The final run on CHI-1 used exposure time 300 s, in distinction to those listed in Table I. Bias, dark, and twilight-flat field corrections were performed in *AstroImage J* (AIJ; Collins et al., 2017) for the UCO images, and photometry was performed on all images in AIJ. Corrections for light-travel time were applied using ephemerides from the NASA Horizons app (NASA, 2024).

Similar lightcurve shapes were obtained on all nights, although some variation is seen (Fig. 1). To determine a period value, we used the final run, on Oct 20, and the two runs on Sep 17, which as seen in Fig. 1, have considerably higher quality than the earliest run, at UCO. Relative magnitude values of each night were shifted in brightness to produce a self-consistent composite (Fig. 2). Based upon our observations spanning 44 nights, we obtain period 2.8813 ± 0.0001 h and amplitude 0.19 ± 0.02 mag. Note that the datapoints for both figures are identical. Observations reported here are further analyzed by Slivan et al. (2024) together with lightcurves that they recorded earlier in the apparition, to determine the improved synodic period needed for sidereal period determination.



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Name	Site	Telescope	Camera	Bin	T_exp(s)	Filter	FOV(')	Scale(''/pix)
UCO	Schenectady, NY	0.51-m RC f/8.1	SBIG STXL-11002	2×2	240	R	30×20	0.93
CHI-1	Rio Hurtado, Chile	0.61-m RC f/6.8	QHY 600M Pro	2×2	240	r'	31.8×31.8	1.22
T30	Coonabarabran, Aus	0.50-m RC f/6.8	ML16200	1×1	180	R	27.8×41.6	0.81

Table I. Telescopes and Cameras. T30=Sliding Spring Observatory; Chi-1=El Sauce Observatory; UCO = Union College Observatory

Number	Name	yyyy mm/dd	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
452	Hamiltonia	2023 09/07-10/20	4.0, 0.5	2	1	2.8813	0.0001	0.19	0.02	KOR

Table II. Observing circumstances and results. The phase angle is given for the first and last dates. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude/latitude at mid-date range. Grp is the asteroid family/group.