

THE ROTATION PERIOD AND VARIABILITY AMPLITUDE OF 1664 FELIX

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Photometric monitoring of 1664 Felix was carried out in 2022 February through a Johnson V filter. Based on 90 images collected over two nights, we find a best-fit rotation period of 3.345 ± 0.001 hours, in good agreement with previous results, and a V-band variability amplitude of 0.45 ± 0.02 mag that is slightly larger than previously reported from observations through a clear filter.

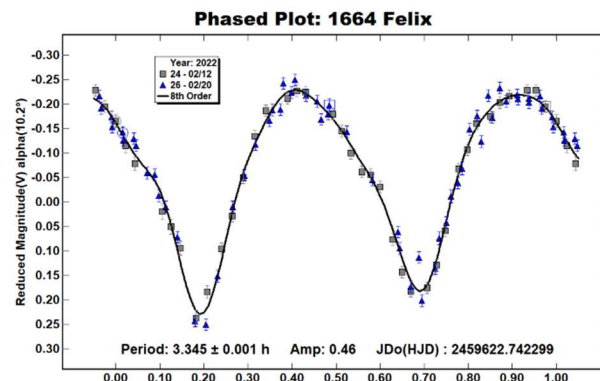
Asteroid 1664 Felix was discovered on 1929 February 04 by Belgian astronomer Eugène Delporte at the Royal Observatory of Belgium in Uccle (JPL, 2022). 1664 Felix is an inner main belt asteroid (family 9104; Warner et al., 2009) with orbital semi-major axis $a = 2.34$ AU. Observations of 1664 Felix in 2008 March by Higgins et al. (2008) constrained its rotation period to be 3.3454 ± 0.0002 h, with a variability amplitude of 0.38 ± 0.01 mag through a clear filter. A similar rotation period of 3.344855 ± 0.000010 hours was determined by Ďurech et al. (2020) from observations collected by the Asteroid Terrestrial-impact Last Alert System (ATLAS) program.

As part of the course work for the Georgia State University class *Astronomical Techniques and Instrumentation*, observations of 1664 Felix were obtained at GSU's Hard Labor Creek Observatory in 2022 February. Monitoring through the Johnson V filter was carried out with the 24-inch Miller Telescope, an $f/6.5$ Planewave Corrected Dall-Kirkham Astrogaph, equipped with an Apogee Alta CCD with 2048×2048 pixels, giving a field of view of 26.3 arcmin $\times$ 26.3 arcmin and a pixel scale of 0.77 arcsec. A total of 36 images were collected on UT date Feb 12 with exposure times of 4 min, and an additional 54 images were collected on UT date Feb 20 with exposure times of 5 min.

All images were reduced in *IRAF* following standard procedures, which included bias and overscan subtraction, dark subtraction, and flat fielding. Aperture photometry of the asteroid and 7 field stars was carried out in *IRAF* with an aperture radius of 7 pix for the Feb 12 images and a radius of 9 pix for the images collected on Feb 20. APASS V-band photometry of the field stars (Henden et al., 2009) was used to convert instrumental magnitudes to calibrated magnitudes.

The rotation period of 1664 Felix was determined from the calibrated magnitudes with *MPO Canopus*, which implements the Fourier Analysis of Light Curves (FALC) algorithm of Harris et al. (1989). The best-fit period was found to be 3.345 ± 0.001 hours with

a V-band variability amplitude of 0.45 ± 0.02 mag. This rotation period is in excellent agreement with that determined by Higgins et al. (2008) and Ďurech et al. (2020). The V-band variability amplitude we find is somewhat larger than that reported for observations through a clear filter by Higgins et al. (2008).



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Number	Name	yyyy mm/dd	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
1664	Felix	2022 02/12-02/20	10.15, 7.24	154	9	3.345	0.001	0.45	0.02	9104

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).