

LIGHTCURVE OF 62 ERATO

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The lightcurve period of 62 Erato is found to be 9.2213 ± 0.0007 hours, with an observed amplitude of 0.116 ± 0.005 mag.

Lightcurve observations of 62 Erato were made at Linhaceira Observatory during December 2004 and January 2005. Linhaceira roll-of-roof Observatory is located in the center of Portugal, and is MPC code 938. It is equipped with a 0.25 m SCT (F/6.9) with a MX916 CCD. All images were collected unfiltered in 2x2 binning, and pre-processed with bias, dark and flat-field frames. The CCD images were photometric reduced with Herbert Rabb *Astrometrica* software. *Astrometrica* is intended to astrometry, but its PSF measurements also give good flux data. Together with a set of stars, the differential magnitude asteroid-stars were made (Warner, 2003). The stamped time was always checked against German radio standard signal DCF 77, through the sessions. The CCD images acquisition rate was 15 to 24 hourly. This target was selected from the Collaborative Asteroid Lightcurve Link (CALL) website (Warner, 2004), and crosschecked against a list of lightcurves (Harris and Warner, 2003).

No previous lightcurves have been published for this asteroid, at least at acquisition time (see below). To date, this was the lowest numbered asteroid not having that information. Named after the Greek Muse of poetry, the asteroid was discovered on 1860 Sept. 14 at Berlin by O. Lesser and W. Forster. A diameter of 99.3 ± 2.1 km and an albedo of 0.090 ± 0.004 were determined by Tedesco (1989). The absolute magnitude is 8.76 with a slope parameter of 0.15 (MPCOrb). The observing details are listed in Table I. From 2004 Dec. 27 to 2005 Jan. 19, seven sessions were conducted and during that period Erato ranged from 12.6 to 13.2 V magnitude. Using CourbRot (Behrend, 2001) the computed period and lightcurve stack from all seven observational sessions shows a rotation period of 9.2213 ± 0.0007 hours, and an amplitude of 0.116 ± 0.005 magnitude. The computed epoch of maximum brightness is $2004-12-27.966 \pm 0.006$ UT. These data and conclusion are in perfect agreement with one published recently (Durkee, 2005). Durkee also checked our data results at Behrend site (Behrend) to exclude a different, less likely solution.

References

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Table I: Observing details for 62 Erato

UT Date	Exp. (sec)	Points	Phase Coverage (%)
2004 Dec 28	120	120	57
2005 Jan 03	120	96	48
2005 Jan 07	120	144	69
2005 Jan 17	150	75	56
2005 Jan 18	125	66	50
2005 Jan 19	125	60	45
2005 Jan 20	125	75	55

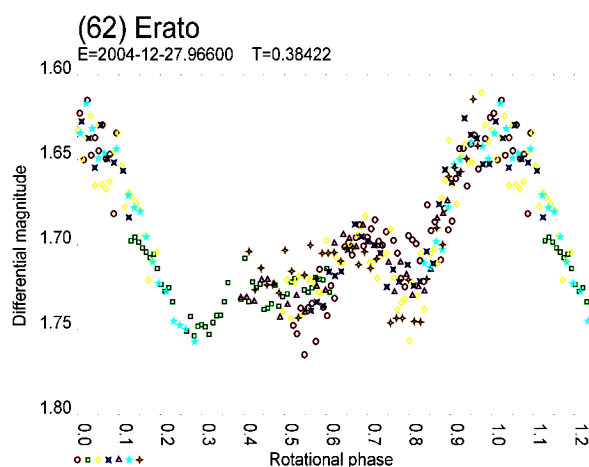


Figure 1: Each small symbols at the lower left part of the figure represents one night of observations, centered respectively on 2004-12-28, 2005-1-3, 7, 17, 18, 19 and 20.

ASTERIOD LIGHTCURVE ANALYSIS AT HUNTERS HILL OBSERVATORY AND COLLABORATING STATIONS – AUTUMN/WINTER 2005

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Lightcurves for the following asteroids were obtained at Hunters Hill Observatory and four collaborating stations and then analysed to determine the synodic period and amplitude: (4949) 1988 WE, (5386) 1975 TH₆, 6456 Golombek, 6556 Arcimboldo, (8567) 1996 HW₁, (12331) 1992 UH₆, and (30825) 1990 TG₁.

Hunters Hill Observatory is equipped with a 0.36m SCT fitted with a Meade f/3.3 focal reducer and either a Starlight Xpress MX716 CCD at f/3 or an SBIG ST-8E CCD at f/4. The targets were observed with combinations of 1x1 and 2x2 binning with fixed temperatures between -10 and -30 degrees (dependant on ambient temperature). Pixel scale at 1x1 binning is 1.32 arcsecs. All observations were made using a Clear filter with guided exposure times ranging from 120 seconds to 300 seconds. MaxIm DL/CCD, driven by ACP4 and more recently, MPO Connections, was used for telescope and camera control whilst calibration and image measurements were undertaken by MPO Canopus.

Ondrejov Observatory is equipped as described in Pravec et al. (1998) though they have fitted a new Apogee AP7p. Absolute

calibrations were done in the Cousins R system using Landolt (1992) standards to a level of 0.01 mag for Ondrejov data for (6456) and (30825). Modra Observatory is equipped with a 0.6-m f/5.5 reflector and AP8p CCD-camera in its primary focus. FOV is 25 arcmin squared with a pixel scale of 1.5 arcsec. Images were taken with exposures of 60s with a Clear filter. MaxIm DL was used for all image calibration. Carbuncle Hill Observatory is equipped with 0.35m f/6.5 SCT and SBIG ST-10XME CCD camera binned 3x3. This system produced image dimensions of 21x14 arcmin. All observations were taken through the Clear filter. MaxIm DL/CCD was used for image calibration with dark/bias and flat field correction.

Targets were chosen either from the list provided by Warner (2005) and from a list of suitable targets provided by Pravec (2005a), but even the earlier targets chosen from Warner's list fit with the criteria of the Survey of Asynchronous Binary Asteroids (Pravec, 2005b). Results are summarised in the table below with the individual plots presented at the end. Additional comment, where appropriate, is provided.

The strategy of all collaborating stations is to work objects carefully for potential deviations that would indicate the presence of a satellite. Considerable effort is made to identify and eliminate sources of observational errors that might corrupt the observations and lead to false attenuation events. It is particularly important to identify and eliminate data points affected by faint background stars, bad pixels, and cosmic ray hits.

(5386) 1995 TH₆: Gianluca Masi of the Bellatrix Observatory, observing from Chile, provided additional data.

(6456) Golombek: Peter Kusnirak, Ondrejov Observatory, and Adrian Galad, Jozef Vilagi and Leos Kornos, Modra Observatory, provided additional data. Final analysis was performed by Petr Pravec, who determined the refined period and an absolute R magnitude estimate of $H_R = 15.58 \pm 0.2$, assuming $G = 0.15 \pm 0.2$.

(8567) 1996 HW₁: Peter Kusnirak, Ondrejov Observatory, Donald Pray, Carbuncle Hill Observatory, and Adrian Galad, Jozef Vilagi and Leos Kornos, Modra Observatory provided additional data. Petr Pravec found the final period.

(12331) 1992 UH₆: The target is of such low amplitude that a long period cannot be ruled out.

(30825) 1990 TG₁: Jozef Vilagi and Stefan Gajdos, Modra Observatory, and Peter Kusnirak, Ondrejov Observatory provided additional data. Analysis by Petr Pravec revealed an absolute R magnitude estimate of $H_R = 14.31 \pm 0.2$, assuming $G = 0.15 \pm 0.2$.

#	Name	Date Range	Sess	Period	PE	Amp	U
		2005		(hrs)			
4949	1988 WE	02 Oct – 10 Oct	4	2.6798	0.0002	0.12	3
5386	1975 TH ₆	31 Jul – 24 Aug	7	16.841	0.002	0.24	3
6456	Golombek	30 Jul – 25 Aug	10	2.50129	0.00004	0.13	3–
6556	Arcimboldo	23 Sep – 01 Oct	3	2.5159	0.0002	0.16	3
8567	1996 HW ₁	04 Jul – 05 Jul	6	8.7573	0.0009	0.25	3
12331	1992 UH ₆	07 Aug – 26 Aug	4	2.727	0.004	0.02	1
30825	1990 TG ₁	17 Jan – 14 Feb	9	2.62428	0.00005	0.11	3

U values determined by Petr Pravec, Astronomical Institute, Czech Republic