OSSERVARE ASTEROIDI A 700 METRI DA PIAZZA DEL CAMPO

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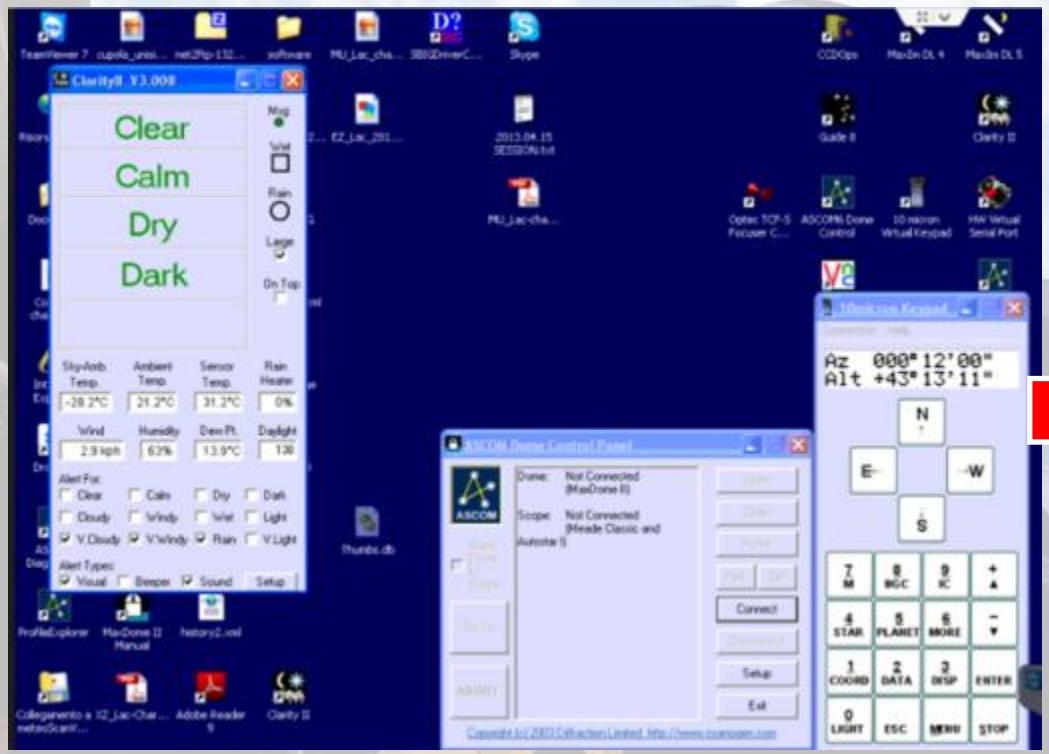
INAF – Osservatorio Astronomico di Brera

UAI – Sezione Asteroidi

XII MEETING CORPI MINORI UAI

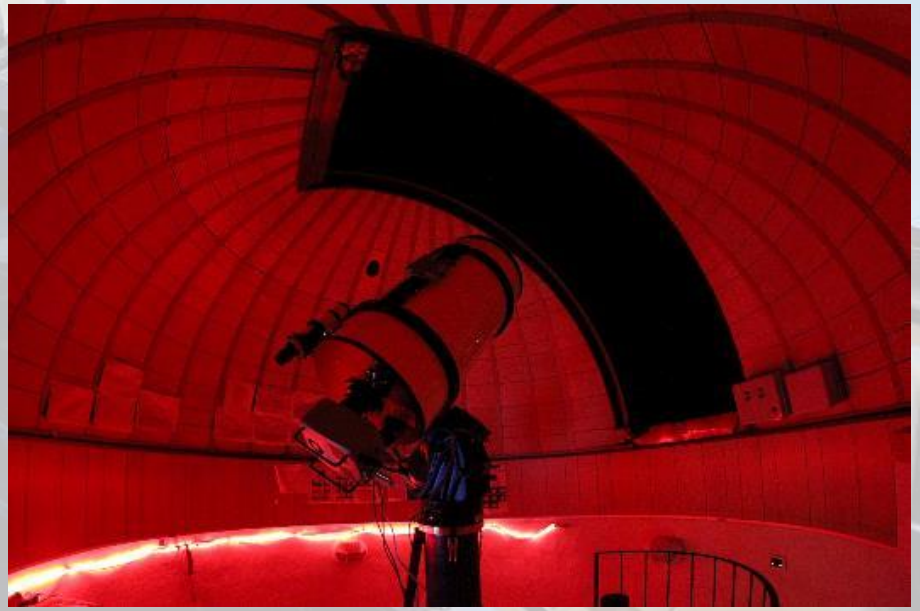
Una storia cominciata 16 anni fa…

2012: l’osservatorio è remotizzato



Cosa possiamo fare con i nostri strumenti?

- **Cupola** da 3 metri
- **Telescopio** Maksutov-Cassegrain 30 cm f/5.6
- **CCD camera** Sbig STL-6303 *(3072 x 2048 9 micron pixels)*
- **Filtri fotometrici** BVRI +Clear Johnson-Cousins
- **Focheggiatore** Optec TCF-S

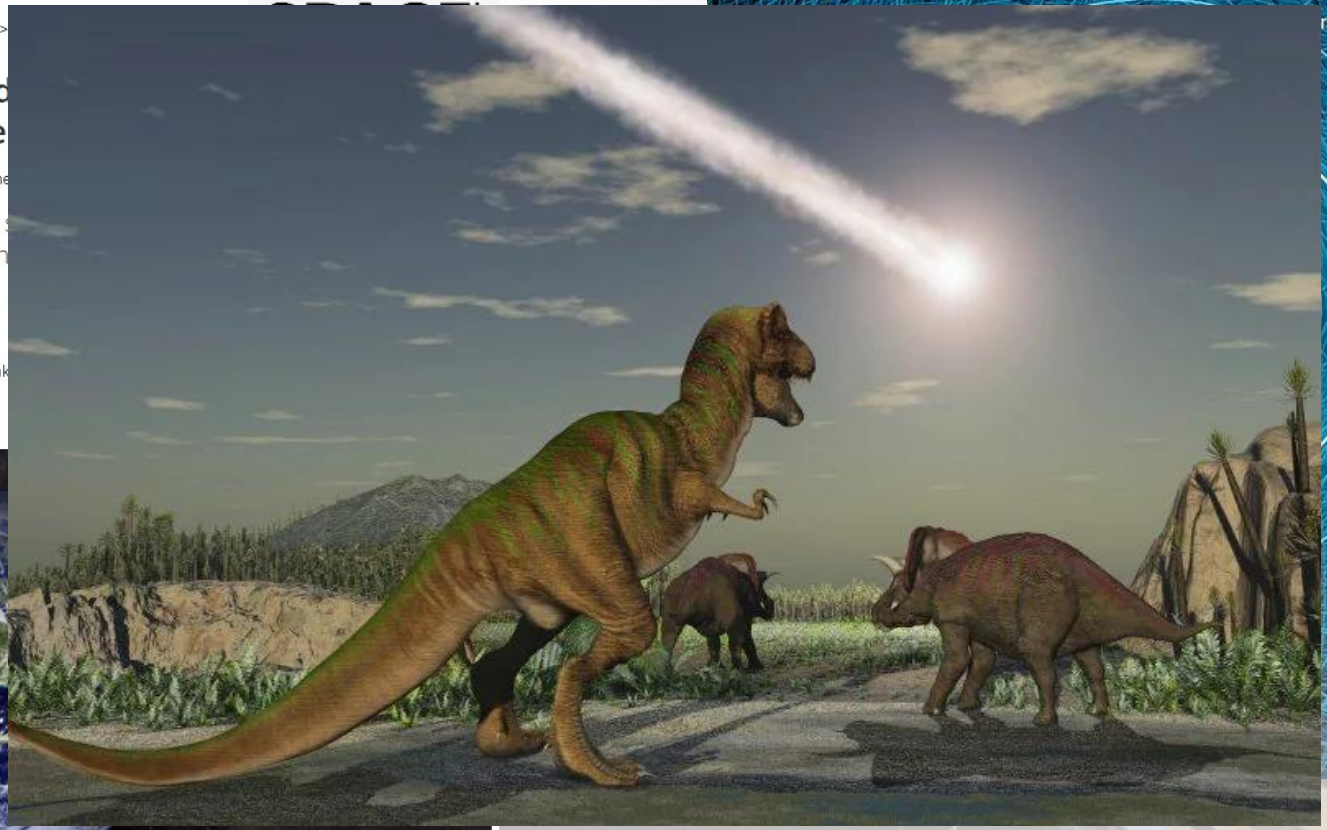


Fotometria

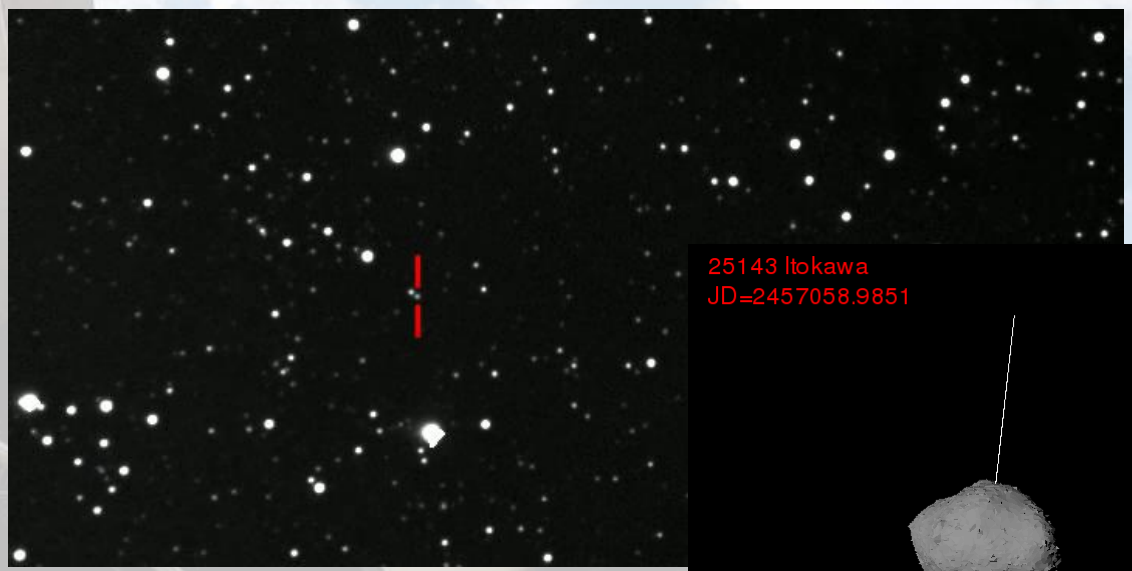
Campi di ricerca *(e limiti)*

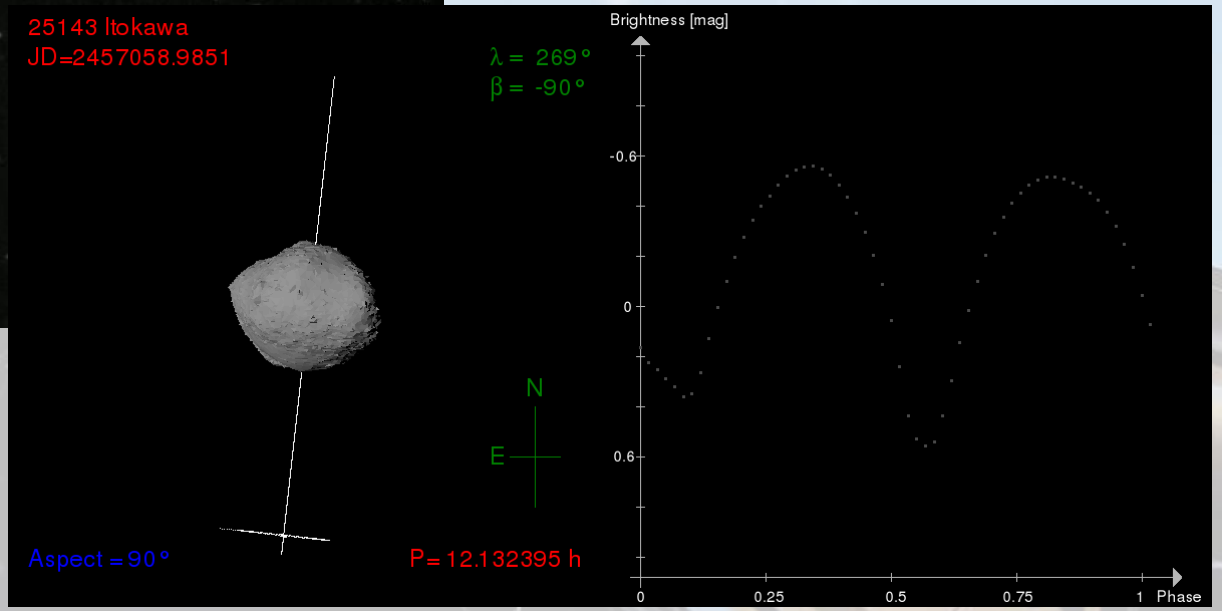
- **Asteroidi** *(mag <15.5)*
  Occultazioni stellari *(mag <11)*
- **Stelle variabili** *(mag <16)*
- **Pianeti extrasolari** *(mag <13)*
- **Blazars (AGN)** *(mag <17.5)*

Perché gli asteroidi?

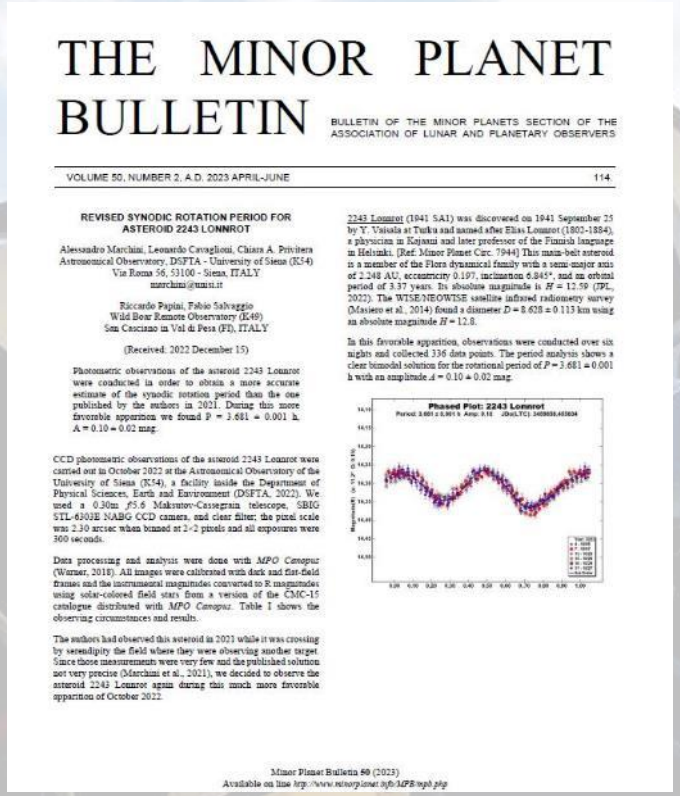


Determinazione del periodo di rotazione





Determinazione del periodo di rotazione



THE MINOR PLANET BULLETIN

BULLETIN OF THE MINOR PLANETS SECTION OF THE ASSOCIATION OF LUNAR AND PLANETARY OBSERVERS

VOLUME 50, NUMBER 2, A.D. 2023 APRIL-JUNE 114

REVISED SYNODIC ROTATION PERIOD FOR ASTEROID 2243 LONNROT

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(Received: 2022 December 15)

Photometric observations of the asteroid 2243 Lonnrot were conducted in order to obtain a more accurate estimate of the synodic rotation period than the one published by the authors in 2021. During this more favorable apparition we found $P = 3.681 \pm 0.001$ h, $A = 0.10 \pm 0.02$ mag.

CCD photometric observations of the asteroid 2243 Lonnrot were carried out in October 2022 at the Astronomical Observatory of the University of Siena (K54), a facility inside the Department of Physical Sciences, Earth and Environment (DSFTA, 2022). We used a 0.30m f/5.6 Maksutov-Cassegrain telescope, SBIG STL-6303E NABG CCD camera, and clear filter; the pixel scale was 2.30 arcsec when binned at 2×2 pixels and all exposures were 300 seconds.

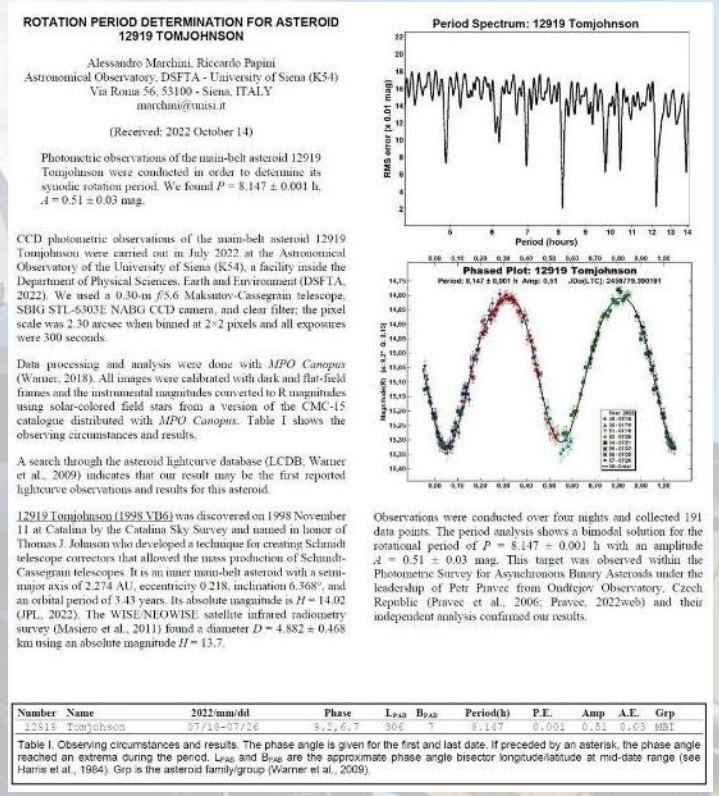
Data processing and analysis were done with *MPO Canopus* (Warner, 2018). All images were calibrated with dark and flat-field frames and the instrumental magnitudes converted to R magnitudes using solar-colored field stars from a version of the CMC-15 catalogue distributed with *MPO Canopus*. Table I shows the observing circumstances and results.

The authors had observed this asteroid in 2021 while it was crossing by serendipity the field where they were observing another target. Since those measurements were very few and the published solution not very precise (Marchini et al., 2021), we decided to observe the asteroid 2243 Lonnrot again during this much more favorable apparition of October 2022.

2243 Lonnrot (1941 SA1) was discovered on 1941 September 25 by Y. Vaisala at Turku and named after Elias Lonnrot (1802-1884), a physician in Kajaani and later professor of the Finnish language in Helsinki. [Ref: Minor Planet Circ. 7944] This main-belt asteroid is a member of the Flora dynamical family with a semi-major axis of 2.248 AU, eccentricity 0.197, inclination 6.845°, and an orbital period of 3.37 years. Its absolute magnitude is $H = 12.59$ (JPL, 2022). The WISE/NEOWISE satellite infrared radiometry survey (Masiero et al., 2014) found a diameter $D = 8.628 \pm 0.113$ km using an absolute magnitude $H = 12.8$.

In this favorable apparition, observations were conducted over six nights and collected 336 data points. The period analysis shows a clear bimodal solution for the rotational period of $P = 3.681 \pm 0.001$ h with an amplitude $A = 0.10 \pm 0.02$ mag.

Minor Planet Bulletin 50 (2023)
Available on line http://www.minorplanet.info/MPB/mpb.php



ROTATION PERIOD DETERMINATION FOR ASTEROID 12919 TOMJOHNSON

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(Received: 2022 October 14)

Photometric observations of the main-belt asteroid 12919 Tomjohnson were conducted in order to determine its synodic rotation period. We found $P = 8.147 \pm 0.001$ h, $A = 0.51 \pm 0.03$ mag.

CCD photometric observations of the main-belt asteroid 12919 Tomjohnson were carried out in July 2022 at the Astronomical Observatory of the University of Siena (K54), a facility inside the Department of Physical Sciences, Earth and Environment (DSFTA, 2022). We used a 0.30-m f/5.6 Maksutov-Cassegrain telescope, SBIG STL-6303E NABG CCD camera, and clear filter; the pixel scale was 2.30 arcsec when binned at 2×2 pixels and all exposures were 300 seconds.

Data processing and analysis were done with *MPO Canopus* (Warner, 2018). All images were calibrated with dark and flat-field frames and the instrumental magnitudes converted to R magnitudes using solar-colored field stars from a version of the CMC-15 catalogue distributed with *MPO Canopus*. Table I shows the observing circumstances and results.

A search through the asteroid lightcurve database (LCDB; Warner et al., 2009) indicates that our result may be the first reported lightcurve observations and results for this asteroid.

12919 Tomjohnson (1998 VD6) was discovered on 1998 November 11 at Catalina by the Catalina Sky Survey and named in honor of Thomas J. Johnson who developed a technique for creating Schmidt telescope correctors that allowed the mass production of Schmidt-Cassegrain telescopes. It is an inner main-belt asteroid with a semi-major axis of 2.274 AU, eccentricity 0.218, inclination 6.368°, and an orbital period of 3.43 years. Its absolute magnitude is $H = 14.02$ (JPL, 2022). The WISE/NEOWISE satellite infrared radiometry survey (Masiero et al., 2011) found a diameter $D = 4.882 \pm 0.468$ km using an absolute magnitude $H = 13.7$.

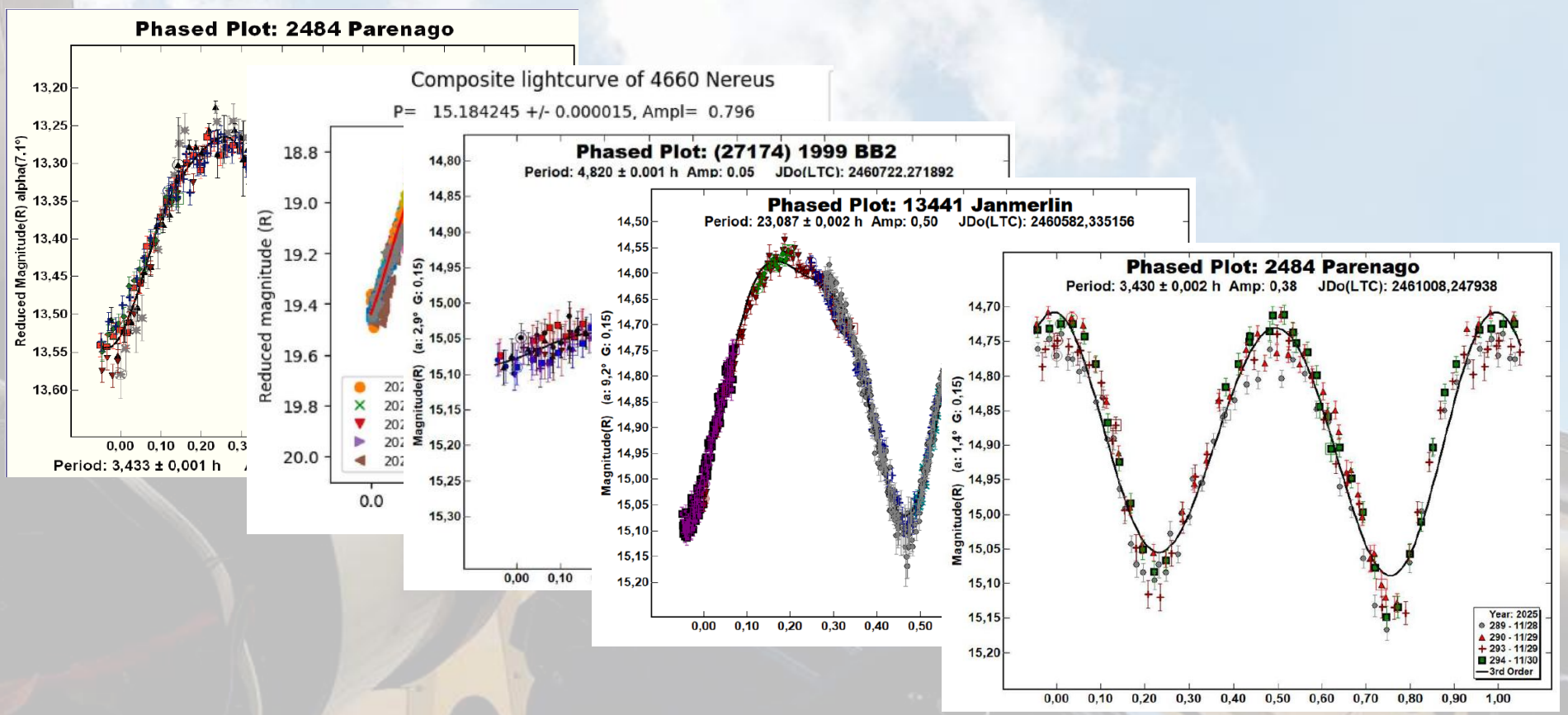
Observations were conducted over four nights and collected 191 data points. The period analysis shows a bimodal solution for the rotational period of $P = 8.147 \pm 0.001$ h with an amplitude $A = 0.51 \pm 0.03$ mag. This target was observed within the Photometric Survey for Asynchronous Binary Asteroids under the leadership of Petr Pravec from Ondrejov Observatory, Czech Republic (Pravec et al., 2006; Pravec, 2022web) and their independent analysis confirmed our results.

Number	Name	2022/mm/dd	Phase	L_{PAB}	B_{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
12919	Tomjohnson	07/19-07/26	8.2,6.7	306	7	8.147	0.001	0.51	0.03	MBI

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).

Più di 400 asteroidi osservati dal 2014

Il nostro «bestiario»



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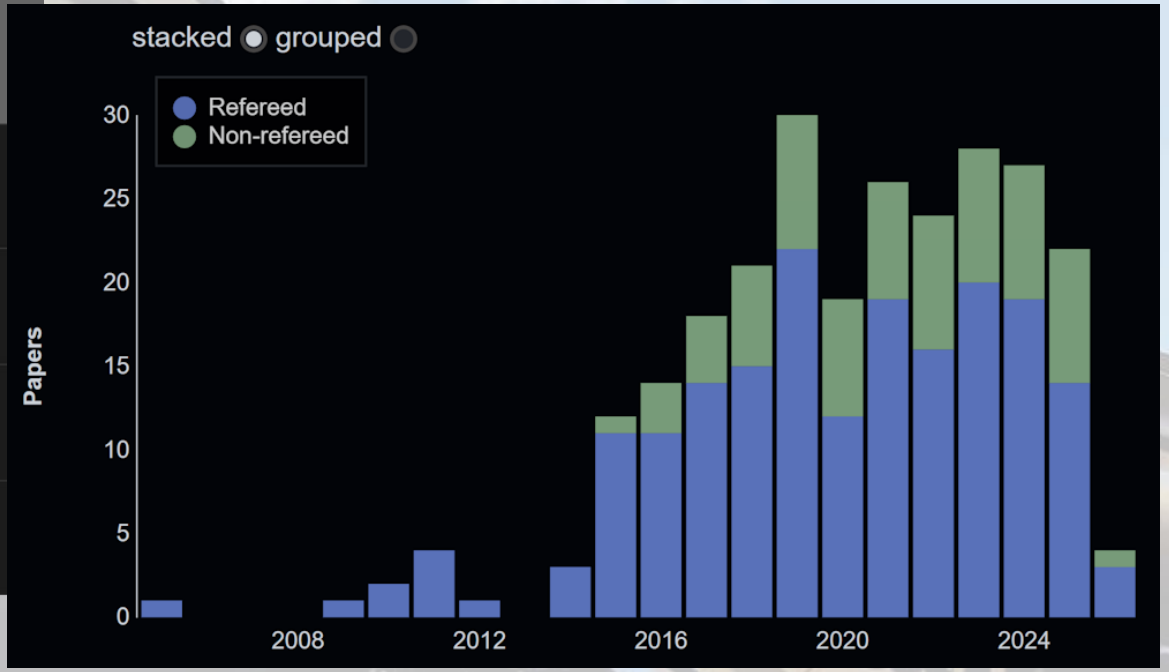
UniSi - AGN AGN & blazars	60



Un laboratorio di astrofisica per gli studenti

2026: Tommaso discute la sua tesi

PHOTOMETRIC OBSERVATIONS OF ASTEROIDS 2484 PARENAGO, 3807 PAGELS, AND 7631 VOKROUHLICKY

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(Received: 2026 January 15)

Photometric observations of three main-belt asteroids were conducted to verify or determine their synodic rotation periods. For 2484 Parenago, we found P = 3.430 ± 0.002 h with A = 0.38 ± 0.04 mag. For 3807 Pagels, we found P = 3.287 ± 0.001 h with A = 0.10 ± 0.02 mag. For 7631 Vokrouhlicky, we present a preliminary solution with P = 75.24 ± 0.24 h with A = 0.56 ± 0.05 mag.

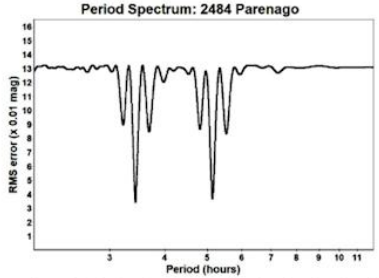
CCD photometric observations of three main-belt asteroids were carried out in 2025 October-December at the Astronomical Observatory of the University of Siena (K54). We used a 0.30-m *f*/5.6 Maksutov-Cassegrain telescope and SBIG STL-6303E NABG CCD camera; the pixel scale was 2.30 arcsec when binned at 2×2 pixels. We used a Clear filter and 300 seconds of exposure time.

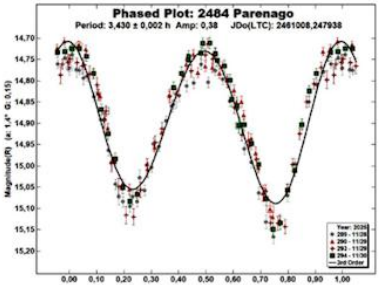
Data processing and analysis were done with *MPO Canopus* (Warner, 2018). All images were calibrated with dark and flat-field frames and the instrumental magnitudes converted to R magnitudes using solar-colored field stars from a version of the CMC-15 catalogue distributed with *MPO Canopus*. Table I shows the observing circumstances and results.

A search through the asteroid lightcurve database (LCDB; Warner et al., 2009) indicates that our result may be the first reported lightcurve observations and results for 7631 Vokrouhlicky.

2484 Parenago (1928 TK) was discovered by G.N. Neujmin at Simeis on 1928 October 7 and named in memory of Pavel Petrovich Parenago (1906-1960), a professor at Moscow University, a corresponding member of the U.S.S.R. Academy of Sciences and the founder of the Moscow school of stellar astronomy. It is an inner main-belt asteroid with a semi-major axis of 2.343 AU, eccentricity 0.254, inclination 1.201°, and an orbital period of 3.59 years. Its absolute magnitude is H = 13.27 (JPL, 2026). The NEOWISE satellite infrared radiometry survey (Meinzer et al., 2019) found a diameter D = 6.266 ± 0.249 km using an absolute magnitude H = 14.0 and a geometric albedo of p_V = 0.113.

Observations were conducted over two nights and collected 168 data points. The period analysis confirms a rotational period of P = 3.430 ± 0.002 h with an amplitude A = 0.38 ± 0.04 mag, in agreement with the result found by the same authors in 2014 (Marchini et al., 2015) and the previously results published in the LCDB (Behrend, 2014web; Pravec et al., 2014web).



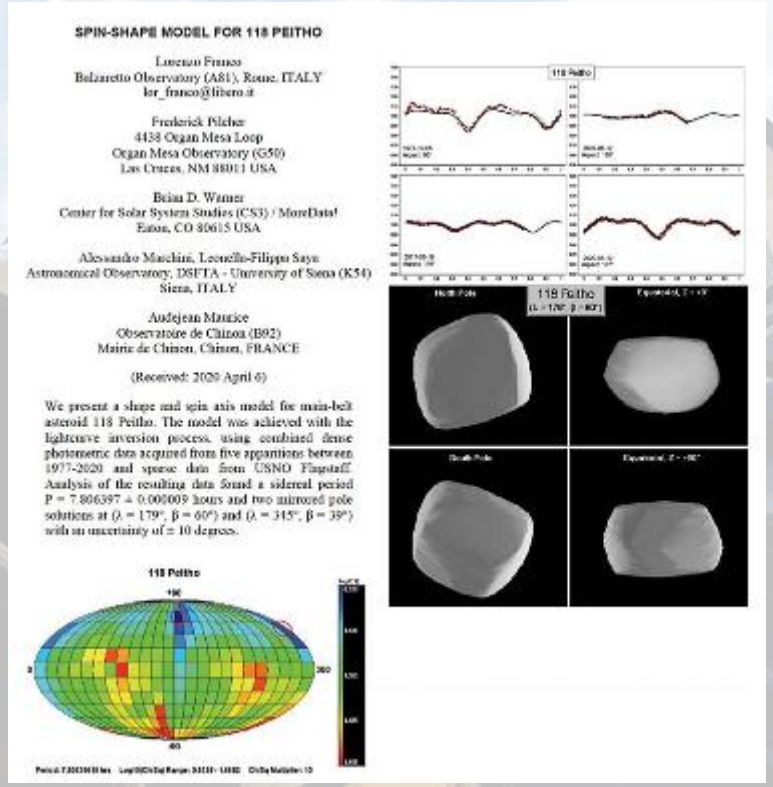


Acknowledgements

Tommaso Iozia is a student of the course in Mathematics at the University of Siena. He collaborated in images acquisition and further light curve and period analysis on the collected data. He is also preparing a bachelor's thesis in Mathematics, exploring the most used algorithms for period analysis on astronomical time series data. For these reasons, he deservedly appears as an author.

2026: Tommaso discute la sua tesi

Modellizzazione 3D di asteroidi



SPIN-SHAPE MODEL FOR 118 PEITHO

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Frederick Pilcher
4438 Organ Mesa Loop
Organ Mesa Observatory (G50)
Las Cruces, NM 88011 USA

Brian D. Warner
Center for Solar System Studies (CS3) / MoreData!
Eaton, CO 80615 USA

Alessandro Marchini, Lucrello-Filippo Sayn
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Siena, ITALY

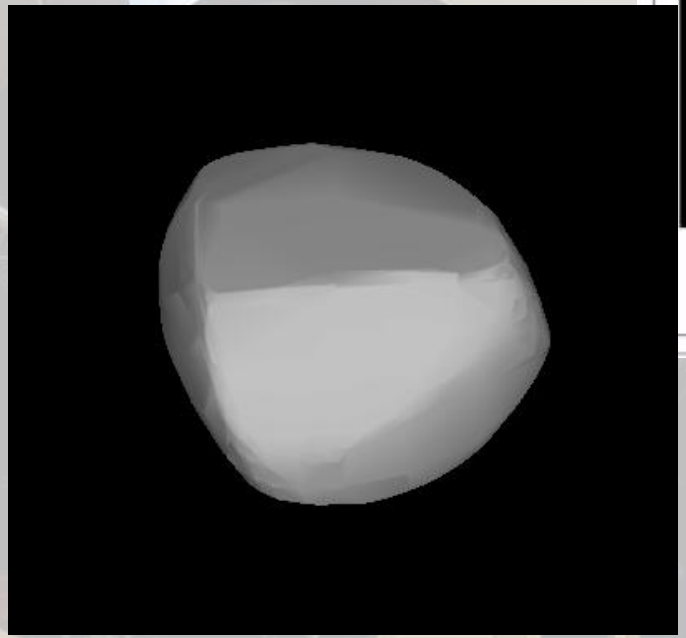
Audejean Maurice
Observatoire de Chinon (B92)
Mairie de Chinon, Chinon, FRANCE

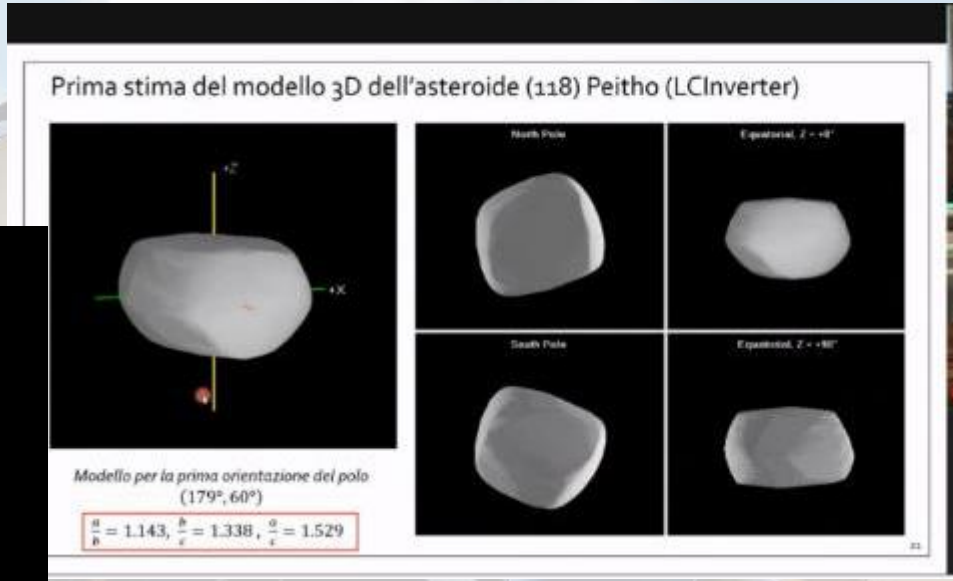
(Received: 2020 April 6)

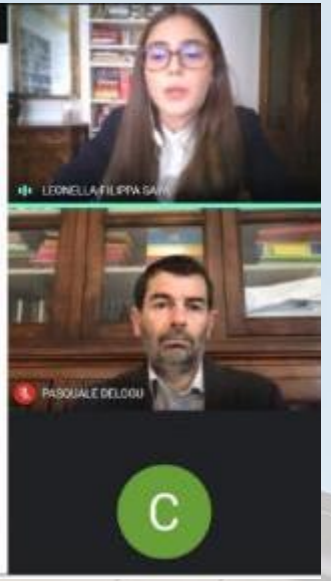
We present a shape and spin axis model for main-belt asteroid 118 Peitho. The model was achieved with the lightcurve inversion process, using combined dense photometric data acquired from five apparitions between 1977-2020 and sparse data from USNO Flagstaff. Analysis of the resulting data found a sidereal period $P = 7.806397 \pm 0.000009$ hours and two mirrored pole solutions at ($\lambda = 179°$, $\beta = 60°$) and ($\lambda = 345°$, $\beta = 39°$) with an uncertainty of ± 10 degrees.

Light Curve Inversion method

2020: Leonella discute *(online)* la sua tesi







Light Curve Inversion method

Leonardo, Joao Pedro, Lorenzo, …

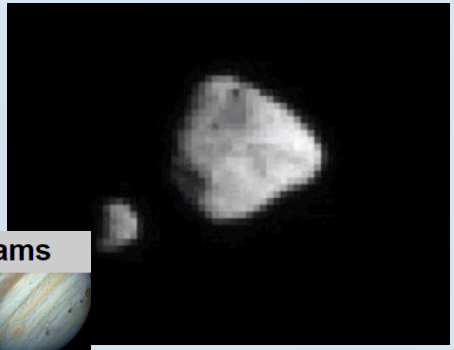
Opportunità

MAGIC I

Specchi di LST-1

Soddisfazioni

La collaborazione internazionale *BinAst*



Photometric Survey for Asynchronous Binary Asteroids

The goal of the survey is to discover asynchronous binary asteroids among small NEAs, MCs, and inner MBAs, and to do it in a controlled way that allows to simulate selection effects and biases in the obtained sample. For that, we use the photometric technique, see our paper ***Photometric Survey of Binary Near-Earth Asteroids*** that has appeared in Icarus 181 (2006) 63-93, its reprint is available here; see also newer reports and presentations mentioned here. Another paper by Pravec, ***Photometric Survey of Asynchronous Binary Asteroids*** describing the strategy of our Survey has been published in Proceedings of the Symposium on Telescope Science (The 24th Annual Conference of the Society for Astronomical Science), B. D. Warner, D. Mais, D. A. Kenyon, J. Foote (Eds.), the reprint of the paper is available here (0.4 MB). A paper by Pravec and Harris, ***Binary Asteroid Population. 1. Angular Momentum Content***, where data from this Survey were used, has appared in Icarus 190 (2007) 250-259, its reprint is available here. Several more papers with results from the Survey have appeared since then, see them linked, e.g., here.

People and stations taking part in the project coordinate their work through email, using their own e-group. We believe, however, that some basic information is useful to be presented also in a public web page, so we set up this page and provide useful information under links mentioned in following.

- Survey strategy
- People and Stations participating in the Survey
- FAQs
- Summary pages
- Additional links
- Supporting Grant Agencies and other supporting subjects

The list of asteroids targeted within the Photometric Survey for Asynchronous Binary Asteroids is given in following. Each item gives a status of the object to a given date, observatories that worked it within the Survey, and links to www pages with results summaries and/or publications.

2023 11 17 -- **(7355) Bottke** : BINARY, discovery apparition finished
Sopot, Sugarloaf Montain, Blue Mountains
CBET 5319
2013 11 09 -- **(7355) Bottke** : Done

IAU Central Bureau for Astronomical Telegrams

Electronic Telegram No. 4201

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Prepared using the Tamkin Foundation Computer Network

(3433) FEHRENBACH
D. Pray, Sugarloaf Mountain Observatory, South Deerfield, MA, U.S.A.; P. Pravec, Ondrejov Observatory; A. Marchini, F. Salvaggio, and R. Papini, Dipartimento di Scienze Fisiche, Della Terra e Dell'Ambiente, University of Siena; J. Pollock, D. Caton, and R. Hawkins, Appalachian State University (ASU); V. Benishek, Belgrade Astronomical Observatory; A. Smith, Gemini North; and D. Reichart and J. Haislip, University of North Carolina at Chapel Hill, report that photometric observations taken with a 0.50-m telescope (+ SBIG ST-10XME camera) at the Sugarloaf Mountain Observatory, a 0.30-m telescope (+ SBIG STL-6303 camera) at the Astronomical Observatory of the University of Siena, a 0.35-m telescope (+ Apogee Alta U47+ camera) at the ASU's Dark Sky Observatory near Boone, NC, USA, and a 0.35-m telescope (+ SBIG ST-8 camera)at the Sopot Observatory in Serbia during Oct. 31-Nov. 21 reveal that minor planet (3433) is a binary system with an orbital period of 19.665 +/- 0.005 hr. The primary shows a period of 3.9160 +/- 0.0003 hr and has a lightcurve amplitude of 0.27 mag at solar phases 6-11 degrees. Mutual eclipse/occultation events that are 0.10- to 0.17-magnitude deep indicate the secondary-to-primary mean-diameter ratio of 0.31. The secondary is synchronous, and it has an amplitude of 0.03 mag in the observed lightcurve, suggesting a secondary elongation of about 1.3 after removing contribution of light from the primary. The system's total V magnitude ranged between 14.2 and 15.0 over the observing run.

NOTE: These 'Central Bureau Electronic Telegrams' are sometimes superseded by text appearing later in the printed IAU Circulars.

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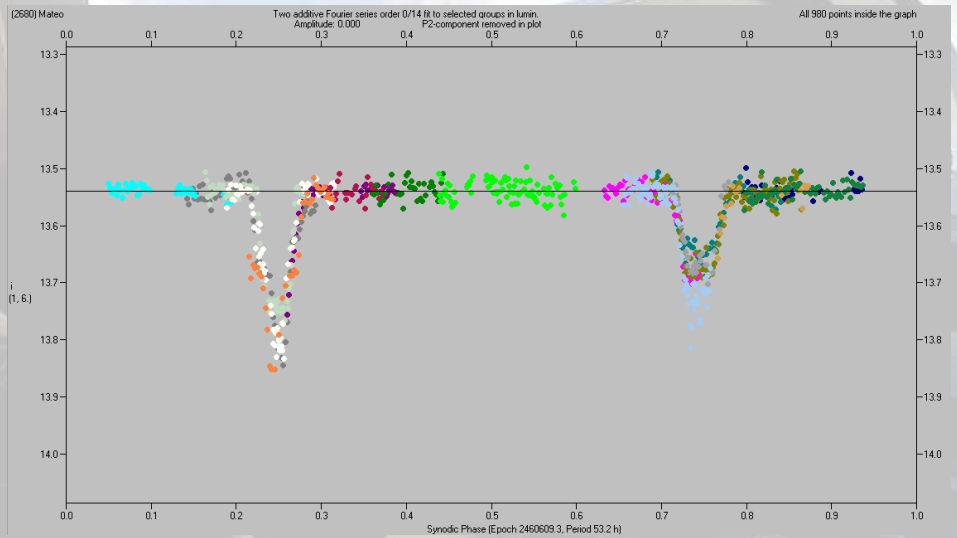
Asteroid (3433) Fehrenbach
CBET 4201, 2015 November 24

24 asteroidi binari scoperti



Asteroid (2680) Mateo

CBET 5490, 2025 January 8

The International Astronomical Union
Minor Planet Center
IAU Central Bureau for Astronomical Telegrams

Electronic Telegram No. 5490

Central Bureau for Astronomical Telegrams
Mailing address: Hoffman Lab 209; Harvard University;
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e-mail: cbatiau@eps.harvard.edu (alternate cbat@iau.org)
URL http://www.cbat.eps.harvard.edu/index.html
Prepared using the Tamkin Foundation Computer Network

(2680) MATEO

R. Durkee, Shed of Science South Observatory, Pontotoc, TX, U.S.A.; P. Pravec, Ondrejov Observatory; V. Benishek, Belgrade Astronomical Observatory; A. Marchini and R. Papini, Dipartimento di Scienze Fisiche, Della Terra e Dell'Ambiente, University of Siena; D. Pray, Sugarloaf Mountain Observatory, South Deerfield, MA, U.S.A.; and J. Oey, Blue Mountains Observatory, Leura, NSW, Australia, report that photometric observations taken with a 0.50-m telescope at the Shed of Science South Observatory, a 0.35-m telescope at the Sopot Observatory in Serbia, a 0.30-m telescope at the Astronomical Observatory of the University of Siena, a 0.63-m telescope at the Sugarloaf Mountain Observatory, and a 0.35-m telescope at the Blue Mountains Observatory during 2024 Oct. 22-Nov. 24 reveal that minor planet (2680) is a binary system with an orbital period of 53.20 +/- 0.02 hr. The primary shows a period of 3.31306 +/- 0.00008 hr and has a lightcurve amplitude of 0.11 magnitude at solar phases 2-10 degrees, suggesting a nearly spheroidal shape. Mutual eclipse/occultation events that are 0.14 magnitude deep indicate a lower limit on the secondary-to-primary mean-diameter ratio of 0.37.

NOTE: These 'Central Bureau Electronic Telegrams' are sometimes superseded by text appearing later in the printed IAU Circulars.

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2025 January 8 **(CBET 5490)** **Daniel W. E. Green**

Un asteroide binario tutto italiano

Vincenzo Silvano Casulli (Putignano, 25 agosto 1944[1] – Fonte Nuova, 24 luglio 2018[2]) è stato un astronomo amatoriale italiano.

Carriera [modifica | modifica wikitesto]

È stato responsabile dell'osservatorio di Colleverde prima e dell'osservatorio astronomico di Vallemare di Borbona poi.[3]

L'osservatorio di Ginevra gli accredita di aver contribuito a determinare tra il 2005 e il 2015 il periodo di rotazione di duecentotre asteroidi.[4]

Nel 1985 ha fatto parte del team del *Transition Comets -- UV Search for OH Emissions in Asteroids*, uno studio svolto col Telescopio spaziale Hubble che intendeva verificare l'esistenza di asteroidi che in passato erano comete.

È stato il primo astronomo amatoriale a ottenere precise misurazioni astrometriche dei corpi minori usando una camera CCD.

Scoperte [modifica | modifica wikitesto]

Ha scoperto cinquanta stelle variabili, a breve periodo, in cinque ammassi globulari.[5]

Il Minor Planet Center gli accredita la scoperta di duecento asteroidi, effettuate tra il 1993 e il 2011.[6]

Asteroid (7132) Casulli

ATel #13590, 2020 March 25

The Astronomer's Telegram

The asteroid (7132) Casulli is a binary system

ATel #13590; *Lorenzo Franco (A81 - Balzaretto Observatory, Rome - Italy), Alessandro Marchini, Giacomo Bonnoli (K54 - Astronomical Observatory, Department of Physical Sciences, Earth and Environment, University of Siena - Italy), Riccardo Papini (K49 - WBRO Carpione Observatory, San Casciano Val di Pesa, Florence - Italy), Paolo Bacci, Martina Maestripieri (104 - San Marcello Pistoiese Observatory, Pistoia - Italy), Nello Ruocco (C82 - Osservatorio Astronomico Nastro Verde, Sorrento - Italy), Nico Montigiani, Massimiliano Mannucci (A57 - Margherita Hack Observatory, Florence - Italy), Giulio Scarfi (K78 - iota Scorpii Observatory, La Spezia - Italy)*
on 25 Mar 2020; 16:28 UT
Credential Certification: Giacomo Bonnoli (giacomo.bonnoli@unisi.it)

Subjects: Optical, Asteroid, Binary, Planet (minor), Solar System Object, Asteroid (Binary)

(7132) Casulli is a main belt asteroid discovered on 1993 Sept. 17 by A. Vagnozzi at Stroncone (Italy) and is named in honor of Silvano Casulli (1944 - 2018), who was the first amateur astronomer in the world to obtain precise astrometric positions of minor planets using a CCD camera (*Minor Planet Circular 30800*). It orbits with a semi-major axis of about 2.309 AU, eccentricity 0.209, and a period of 3.51 years; it has an absolute magnitude H = 13.6 , a diameter D = 9.015 +/- 0.064 km and a geometric albedo of 0.089 +/- 0.003 (*JPL Small-Body Database Browser - ssd.jpl.nasa.gov/sbdb.cgi, 2020; Masiero et al., Main-belt Asteroids with WISE/NEOWISE: Near-infrared Albedos, Astrophys. J., 791, 2014*).

Collaborative photometric observations carried out from 2020 February 20 to 2020 March 20 within the Asteroid Research Section of the UAI (Italian Amateur Astronomers Union) reveal that the minor planet (7132) Casulli is a binary system with an orbital period of 36.54 +/- 0.02 h.
The rotational light curve of the primary has a period of 3.5238 +/- 0.0002 h with an amplitude of 0.14 mag, suggesting a nearly spheroidal shape. Mutual eclipse/occultation events that are 0.11 to 0.16 mag deep indicate a secondary-to-primary mean-diameter ratio of 0.21 +/- 0.04.

Differential photometry measurements and dual-period search were performed using MPO Canopus. The phase plots for the primary (rotational) and secondary (orbital) periods of the system are available at this page: https://www.dsfta.unisi.it/it/notizie/il-telescopio-delluniversita-di-siena-scopre-che-lasteroide-7132-casulli-e-un-sistema

Instrumentation used for this campaign is listed below:
- K54 - Astronomical Observatory, DSFTA - University of Siena: 0.30 m f/5.6 MCT, SBIG STL-6303e CCD
- K49 - WBRO Carpione Observatory: 0.23 m SCT f/10 SBIG ST8-XME CCD
- 104 - San Marcello Pistoiese Observatory: 0.60 m f/4 NRT, apogee U6 CCD
- C82 - Osservatorio Astronomico Nastro Verde: 0.35 m f/10 SCT, ST10 CCD
- A57 - Margherita Hack Observatory: SCT 0.35 m, ST10XME CCD
- K78 - iota Scorpii Observatory : 0.40 m f/8 RCT, SBIG STXL-6303E CCD
(*Telescopes MCT: Maksutov-Cassegrain, NRT: Newtonian Reflector, RCT: Ritchey-Chretien, SCT: Schmidt-Cassegrain*).

Any enquiry on these observations may be sent to Lorenzo Franco (*lor_franco -at- libero.it*).

Rotational and orbital phase plots for (7132) Casulli

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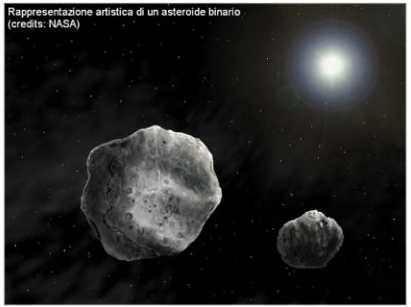

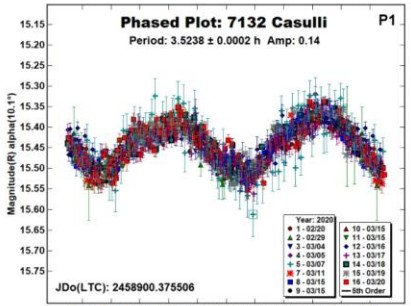

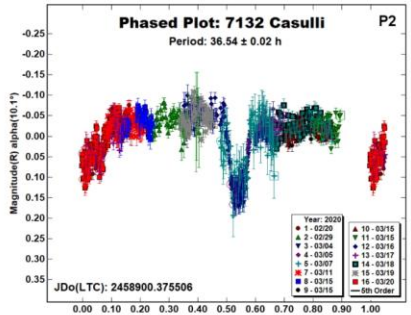

2022: Elisa discute la sua tesi di dottorato

MAI ARRENDERSI!

GRAZIE

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