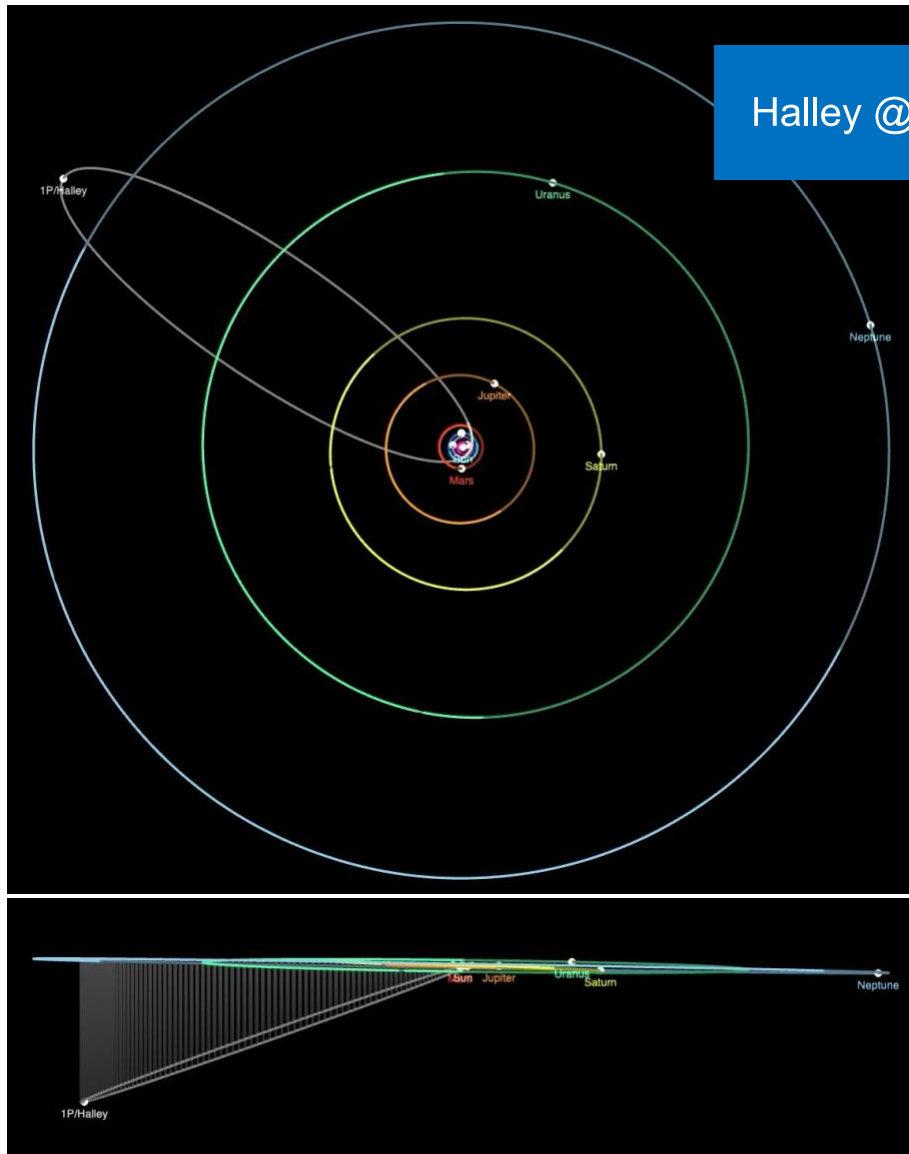


December 2023

# ALPO Comet News

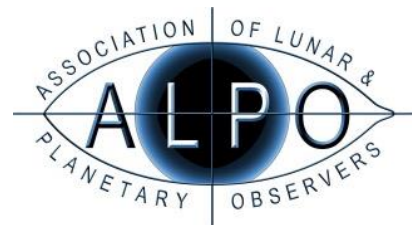
A Publication of the Comets Section of the  
Association of Lunar and Planetary Observers



Halley @ Aphelion



[alpo-astronomy.org](http://alpo-astronomy.org)  
[comets@alpo-astronomy.org](mailto:comets@alpo-astronomy.org)



## Table of Contents

<b>ON THE FRONT COVER:</b> .....	<b>2</b>
<b>SUMMARY</b> .....	<b>3</b>
<b>REQUEST FOR OBSERVATIONS</b> .....	<b>3</b>
<b>PHOTOMETRIC CORRECTIONS TO MAGNITUDE MEASUREMENTS</b> .....	<b>4</b>
<b>ACKNOWLEDGMENTS</b> .....	<b>4</b>
<b>COMETS CALENDAR</b> .....	<b>5</b>
<b>RECENT MAGNITUDES CONTRIBUTED TO THE ALPO COMETS SECTION</b> .....	<b>6</b>
<b>COMETS NEWS</b> .....	<b>8</b>
<b>COMETS BETWEEN MAGNITUDE 6 AND 10</b> .....	<b>10</b>
12P/PONS-BROOKS.....	10
62P/Tsuchinshan .....	13
103P/Hartley.....	15
C/2023 H2 (Lemmon) .....	17
<b>COMETS BETWEEN MAGNITUDE 10 AND 12</b> .....	<b>20</b>
144P/Kushida.....	20
C/2020 V2 (ZTF).....	22
C/2021 S3 (Panstarrs).....	23

### **On the Front Cover:**

The most famous comet of all time, 1P/Halley, is now at its furthest point from the Sun. This means after moving away from the Sun since its last perihelion in 1986, it will now be moving back towards the Sun and its next perihelion in 2061. The two orbit diagrams were produced with the JPL Small-Body Orbit Viewer.

The monthly ALPO Comet News PDF can be found on the ALPO Comets Section website (<http://www.alpo-astronomy.org/cometblog/> and in the [Comets Section Image Gallery](#)). A shorter version of this report is posted on a dedicated Cloudy Nights forum (<https://www.cloudynights.com/topic/902101-alpo-comet-news-for-december-2023/>). All are encouraged to join the discussion over at Cloudy Nights. The ALPO Comets Section welcomes all comet-related articles, observations, images, drawings, magnitude estimates, or spectra. One does not have to be a member of ALPO to submit material, though membership is appreciated.

Please send your observations to the Comets Section at < [comets@alpo-astronomy.org](mailto:comets@alpo-astronomy.org) >, Coordinator Carl Hergenrother < [carl.hergenrother@alpo-astronomy.org](mailto:carl.hergenrother@alpo-astronomy.org) >, and/or Acting Assistant Coordinator Michel Deconinck < [michel.deconinck@alpo-astronomy.org](mailto:michel.deconinck@alpo-astronomy.org) >.

## Summary

---

2023 ends with several comets brighter than magnitude 10. The most newsworthy is inbound Halley-type comet 12P/Pons-Brooks. Though still months from its April perihelion, its major outbursts have brightened it to 8-9<sup>th</sup> magnitude. Northern observers can catch 12P in the evening sky. Southern observers will be able to watch another evening comet as C/2023 H2 (Lemmon) rapidly fades from 9<sup>th</sup> to 12<sup>th</sup> magnitude after its close approach to Earth last month.

In the morning sky, 62P/Tsuchinshan will peak at around 8<sup>th</sup> magnitude while 103P/Hartley will be fading from 9<sup>th</sup> to 11<sup>th</sup> magnitude. Two other comets, 144P/Kushida and C/2021 S3 (PANSTARRS), will be brightening this month, with both around magnitude 10 by New Year's and still brightening into 2024.

On December 9 at 35.14 au, comet 1P/Halley arrives at aphelion. The comet will now start its long trek to its next perihelion in 2061!

Last month, the ALPO Comets Section received 187 observations of comets C/2023 P1 (Nishimura), C/2023 V5 (Leonard), P/2023 S1, C/2023 H2 (Lemmon), C/2022 U3 (Bok), C/2022 QE78 (ATLAS), C/2022 E2 (ATLAS), C/2020 V2 (ZTF), C/2017 K2 (PANSTARRS), 12P/Pons-Brooks, 13P/Olbers, 29P/Schwassmann-Wachmann, 32P/Comas Sola, 62P/Tsuchinshan, 103P/Hartley, 143P/Kowal-Mrkos, 144P/Kushida, 170P/Christensen, 195P/Hill, 209P/LINEAR, 227P/Catalina-LINEAR, 246P/NEAT, 310P/Hill, 404P/Bressi, and 465P/Hill.

A big thanks to our recent contributors: Dan Bartlett, Denis Buczynski, Jose Guilherme de Souza Aguiar, Jef de Wit, Michel Deconinck, J. J. Gonzalez Suarez, Christian Harder, Carl Hergenrother, Eliot Herman, Michael Jäger, John Maikner, Martin Mobberley, Efrain Morales Rivera, Mike Olason, Uwe Pilz, Michael Rosolina, Greg Ruppel, Chris Schur, Willian Souza, Tenho Tuomi, and Chris Wyatt.

## Request for Observations

---

As always, the Comet Section is happy to receive all comet observations, whether textual descriptions, images, drawings, magnitude estimates, or spectra. Please send your observations via email to the Comets Section < [comets@alpo-astronomy.org](mailto:comets@alpo-astronomy.org) >, Comets Section Coordinator Carl Hergenrother < [carl.hergenrother@alpo-astronomy.org](mailto:carl.hergenrother@alpo-astronomy.org) >.

## **Photometric Corrections to Magnitude Measurements**

---

We include lightcurves for the comets discussed in these reports and apply aperture and personal corrections to the visual observations and only personal corrections to digital observations. Though we try to keep these lightcurves up to date, observations submitted a few days before publication may not be included. All magnitude estimates are affected by many factors, including instrumental (aperture, focal length, magnification, type of optics), environmental (sky brightness due to moonlight, light pollution, twilight, aurora activity, zodiacal light, etc.), cometary (degree of condensation, coma color, strength and type of gas emission lines, coma-tail interface) and personal (sensitivity to different wavelengths, personal technique, observational biases). The first correction used here corrects for differences in aperture [Charles S. Morris, On Aperture Corrections for Comet Magnitude Estimates. Publ Astron Soc Pac 85, 470, 1973]. Visual observations are corrected to a standard aperture of 6.78 cm by 0.019 magnitudes per centimeter for reflectors and 0.066 magnitudes per centimeter for refractors. After applying the aperture correction and if a sufficient number of visual observations are submitted for a particular comet, we also determine personal corrections for each observer for each comet; for digital observations, only a personal correction is applied. A single observer submitting both visual and digital magnitude measurements may also have separate corrections for each observing method. If the magnitudes shown in the text don't match those plotted in the lightcurves, it is because of the application of these corrections.

## **Acknowledgments**

---

In addition to observations submitted directly to the ALPO, we occasionally use data from other sources to augment our analysis. Therefore, we acknowledge with thanks observations submitted directly to the ALPO and those submitted initially to the International Comet Quarterly, Minor Planet Center, and COBS Comet Observation Database. In particular, we have been using observations submitted to the COBS site by Thomas Lehmann for our analysis and would like to thank Thomas for his COBS observations. We would also like to thank the Jet Propulsion Laboratory for making their Small-Body Browser and Orbit Visualizer available and Seiichi Yoshida for his Comets for Windows programs that produced the lightcurves and orbit diagrams in these pages. Last but not least, we'd like to thank [Syuichi Nakano](#) and the Minor Planet Center for their comet orbit elements, the asteroid surveys and dedicated comet hunters for their discoveries, and all of the observers who volunteer their time to add to our knowledge of these fantastic objects.

Thank you to everyone who contributed to the ALPO Comets Section!

Clear skies!

- Carl Hergenrother

# Comets Calendar

---

## Lunar Phases

- Dec 04 - Last Quarter Moon
- Dec 12 - New Moon
- Dec 19 - First Quarter Moon
- Dec 26 - Full Moon

## Comets at Perihelion

- Dec 01 - C/2021 A9 (PANSTARRS) [q = 7.76 au, V ~ 17-18]
- Dec 07 - 147P/Kushida-Muramatsu [q = 3.16 au, 7.4-yr period, V ~ 19-20, found in 1993, also seen at 2001 and 2008 returns, missed at last return in 2016]
- Dec 13 - C/2023 V5 (Leonard) [q = 0.85 au, V ~ 19, small, faint long-period comet, will it disintegrate?]
- Dec 14 - P/2023 M1 (PANSTARRS) [q = 2.83 au, 18.0-yr period, V ~ 19, 2023 is discovery apparition]
- Dec 17 - P/2015 T3 (PANSTARRS) [q = 2.12 au, 8.2-yr period, V ~ 18-19, found in 2015, awaiting recovery]
- Dec 18 - 470P/PANSTARRS [q = 2.66 au, 9.3-yr period, V ~ 20, found in 2014, this is its 2<sup>nd</sup> observed return]
- Dec 18 - A/2023 R3 [q = 1.36 au, V ~ 20, currently an inactive long-period object]
- Dec 20 - 471P/2010 YK3 [q = 2.12 au, 13.6-yr period, V ~ 15, discovered during 2010 return, this is the 2<sup>nd</sup> observed return]
- Dec 22 - C/2023 T2 (Borisov) [q = 2.01 au, V ~ 17]
- Dec 25 - 62P/Tsuchinshan [q = 1.26 au, 6.2-yr period, V ~ 7, more below]
- Dec 25 - 26P/Grigg-Skjellerup [q = 1.08 au, 5.2-yr period, V ~ 12-13, visual discovery in 1902, visual rediscovery in 1922, discovered by Pons back in 1808, has been seen at all returns except one since 1922, 22<sup>nd</sup> observed return]
- Dec 26 - P/2018 P3 (PANSTARRS) [q = 1.76 au, 5.2-yr period, V ~ 18, small aphelion of 4.3 au, possible Main Belt comet, seen at 2 returns]
- Dec 27 - 226P/Pigott-LINEAR-Kowalski [q = 1.78 au, 7.3-yr period, V ~ 16, visual discovery in 1783, rediscovered twice in 1995 and 2003]
- Dec 30 - 326P/Hill [q = 2.77 au, 8.2-yr period, V ~ 19-20, discovered in 2007, seen at 1991 and 2015 returns]

## Photo Opportunities

- Dec 11-16 - C/2020 V2 (ZTF) moving slowly through the Grus Quartet of 10-13<sup>th</sup> mag galaxies
- Dec 16-17 - C/2021 S3 (PANSTARRS) within 0.5 deg of reflection nebula NGC 5367
- Dec 19-24 - C/2023 H2 (Lemmon) within 1 deg of 10<sup>th</sup> mag face-on spiral NGC 7424
- Dec 21 - 62P/Tsuchinshan passes over 12<sup>th</sup> mag galaxy NGC 3485
- Dec 25 - 12P/Pons-Brooks passes over 9<sup>th</sup> mag OC NGC 6791
- Dec 27-28 - 62P/Tsuchinshan passes just to the north of the Leo Triplet of bright galaxies
- Dec 31 - C/2020 V2 (ZTF) and C/2023 H2 (Lemmon) within 2 degrees of each other, closest around Jan 4-5 at 1.7 deg; both are also still close to the Grus Quartet of galaxies

# Recent Magnitudes Contributed to the ALPO Comets Section

Comet Des	YYYY MM DD.DD (UT)	Mag	SC	APER	FL	POW	COMA		TAIL		ICQ CODE	Observer Name
							Dia	DC	LENG	PA		
C/2023 P1 (Nishimura)	2023 11 05.30	M 11.6	AQ	30	L	5 100	1	6/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
C/2023 H2 (Lemmon)	2023 11 23.10	Z 8.1			5.0R	4					ICQ XX OLAXX	Mike Olason
2023H2	2023 11 20.08	S 7.5	TK	12.5B		30	6	1			ICQ xx HER02	Carl Hergenrother
2023H2	2023 11 17.73	S 8.1	TI	29.8L	4	79	7	3			ICQ XX HAR11	Christian Harder
2023H2	2023 11 16.80	I 8.0	S	25.0D	10	60	& 5	4			ICQ XX DEC	Michel Deconinck
2023H2	2023 11 16.77	S 6.3	TK	5.0B		10	18	3			ICQ XX GON05	Juan Jose Gonzalez Suarez
2023H2	2023 11 15.75	E 7.4	S	15.0R	8	30	10	3/			ICQ XX DEC	Michel Deconinck
2023H2	2023 11 14.92	M 6.8	TK	10	B	25	8	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023H2	2023 11 14.74	E 6.8	S	15.2R	8	30	10	3/			ICQ XX DEC	Michel Deconinck
2023H2	2023 11 14.40	xM 6.5	TK	5.0R		10	12	3/			ICQ XX WYA	Christopher Wyatt
2023H2	2023 11 13.93	M 6.6	TK	10	B	25	8	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023H2	2023 11 13.81	S 7.0	TI	25.2L	4	68	12	3			ICQ XX HAR11	Christian Harder
2023H2	2023 11 13.19	Z 6.9		2.5R	4		10				ICQ XX OLAXX	Mike Olason
2023H2	2023 11 13.06	S 6.4	TK	5.0B		10	14	3			ICQ xx HER02	Carl Hergenrother
2023H2	2023 11 12.95	S 6.4	TK	8.0B		20	10	2			ICQ XX SOU01	Willian Souza
2023H2	2023 11 12.93	M 6.5	TK	10	B	25	12	4			ICQ XX DES01	Jose Guilherme de Souza Aguiar
2023H2	2023 11 12.92	S 5.9	TK	5.0B		10	23	3			ICQ XX GON05	Juan Jose Gonzalez Suarez
2023H2	2023 11 12.76	S 7.0	TI	19.8L	4	44	11	3			ICQ XX HAR11	Christian Harder
2023H2	2023 11 11.76	E 6.3	S	15.2R	8	30	10	3			ICQ XX DEC	Michel Deconinck
2023H2	2023 11 11.07	S 6.1	TK	5.0B		10	15	4			ICQ xx HER02	Carl Hergenrother
2023H2	2023 11 09.79	B 6.2	S	7.0B		5	8	3			ICQ XX DEC	Michel Deconinck
2023H2	2023 11 09.77	I 6.2	S	25.0C	15	95	8	3	15	m 90	ICQ XX DEC	Michel Deconinck
2023H2	2023 11 08.72	S 6.9	TK	7.0B	6	16	14	2			PIL01	Uwe Pilz
2023H2	2023 11 08.09	S 6.3	TK	5.0B		10	12	3			ICQ xx HER02	Carl Hergenrother
2023H2	2023 11 07.79	S 6.6	TI	4.4B		8	18	2/			ICQ XX HAR11	Christian Harder
2023H2	2023 11 07.75	S 7.2	TI	29.8L	4	66	13	3			ICQ XX HAR11	Christian Harder
2023H2	2023 11 06.83	S 6.6	TK	20.3T	10	77	18	4	1.6	20	ICQ XX GON05	Juan Jose Gonzalez Suarez
2023H2	2023 11 06.82	S 6.3	TK	5.0B		10	22	3	1.4	20	ICQ XX GON05	Juan Jose Gonzalez Suarez
2023H2	2023 11 06.10	S 6.9	TK	5.0B		10	11	3			ICQ xx HER02	Carl Hergenrother
2023H2	2023 11 04.08	S 7.6	TK	12.5B		30	7	2			ICQ xx HER02	Carl Hergenrother
C/2020 V2 (ZTF)	2020V2 2023 11 23.13	Z 11.1		5.0R	4		4				ICQ XX OLAXX	Mike Olason
2020V2	2023 11 04.98	M 11.9	AQ	30	L	5 88	1	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
C/2017 K2 (PANSTARRS)	2017K2 2023 11 23.31	Z 12.2		5.0R	4		3				ICQ XX OLAXX	Mike Olason
2017K2	2023 11 22.06	S 12.4	TI	29.8L	4	108	1	4			ICQ XX HAR11	Christian Harder
465P/Hill	2023 11 14.18	C 19.3	BG	30.5H	4A680						ICQ XX MAI01	John Maikner
246P/NEAT	2023 11 14.14	C 18.3	BG	30.5H	4C600	2	D	9.5 m 65			ICQ XX MAI01	John Maikner
227P/Catalina-LINEAR	2023 11 13.25	C 19.5	BG	30.5H	4A740						ICQ XX MAI01	John Maikner
209P/LINEAR	2023 11 17.21	C 20.0	BG	30.5H	4D800						ICQ XX MAI01	John Maikner
158P/Kowal-LINEAR	2023 11 14.10	C 19.9	BG	30.5H	4A800						ICQ XX MAI01	John Maikner
143P/Kowal-Mrkos	2023 11 14.05	C 21.3	BG	30.5H	4E940						ICQ XX MAI01	John Maikner
103P/Hartley	2023 11 23.35	Z 10.7		5.0R	4		4				ICQ XX OLAXX	Mike Olason
103	2023 11 22.51	S 9.9	TK	12.5B	30	3	2				ICQ xx HER02	Carl Hergenrother
103	2023 11 15.22	E 9.8	S	25.0C	10	60	2	7/			ICQ XX DEC	Michel Deconinck
103	2023 11 14.21	M 10.6	AQ	30	L	5 88	2	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 10.21	M 10.5	TK	30	L	5 88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 09.51	S 9.6	TK	12.5B	30	4	2				ICQ xx HER02	Carl Hergenrother
103	2023 11 09.20	M 10.4	TK	30	L	5 88	2	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 08.20	M 10.4	TK	30	L	5 88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 07.21	M 10.3	TK	30	L	5 88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 06.20	M 10.3	TK	30	L	5 88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 05.20	M 10.2	TK	30	L	5 88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
62P/Tsuchinshan	2023 11 23.33	Z 9.1		5.0R	4		9.5				ICQ XX OLAXX	Mike Olason
62	2023 11 22.52	S 9.8	TK	12.5B	30	5	3				ICQ xx HER02	Carl Hergenrother
62	2023 11 22.04	S 10.0	TI	29.8L	4	79	4	3			ICQ XX HAR11	Christian Harder
62	2023 11 18.00	S 9.5	TI	25.2L	4	68	4.5	2			ICQ XX HAR11	Christian Harder

62	2023	11	15.19	I	10.0	S	25.0C10	60	6	2	ICQ	XX	DEC	Michel Deconinck
62	2023	11	14.20	M	10.3	TK	30 L 5	88	2	3/	ICQ	XX	DES01	Jose Guilherme de Souza Aguiar
62	2023	11	13.09	S	10.1	TI	29.8L 4	108	3	3	ICQ	XX	HAR11	Christian Harder
62	2023	11	10.21	M	10.6	AQ	30 L 5	88	2	3/	ICQ	XX	DES01	Jose Guilherme de Souza Aguiar
62	2023	11	09.51	S	10.2	TK	12.5B	30	3	2	ICQ	xx	HER02	Carl Hergenrother
62	2023	11	09.21	M	10.8	AQ	30 L 5	88	2	3/	ICQ	XX	DES01	Jose Guilherme de Souza Aguiar
62	2023	11	08.20	M	10.8	AQ	30 L 5	88	2	3/	ICQ	XX	DES01	Jose Guilherme de Souza Aguiar
62	2023	11	07.20	M	10.9	AQ	30 L 5	88	1	3	ICQ	XX	DES01	Jose Guilherme de Souza Aguiar
62	2023	11	06.21	M	10.9	AQ	30 L 5	88	1	3/	ICQ	XX	DES01	Jose Guilherme de Souza Aguiar
62	2023	11	05.21	M	11.0	AQ	30 L 5	100	1	3	ICQ	XX	DES01	Jose Guilherme de Souza Aguiar
12P/Pons-Brooks														
12	2023	11	23.15	Z	8.9		5.0R 4		5		ICQ	XX	OLAx	Mike Olason
12	2023	11	21.80	S	8.8	TI	29.8L 4	92	3.5	3	ICQ	XX	HAR11	Christian Harder
12	2023	11	21.07	M	9.0	TK	12.5B	30	3	6	ICQ	xx	HER02	Carl Hergenrother
12	2023	11	20.74	S	9.7	TK	7.0B 6	16		S9			PIL01	Uwe Pilz
12	2023	11	20.07	M	8.9	TK	12.5B	30	3.5	6	ICQ	xx	HER02	Carl Hergenrother
12	2023	11	19.06	M	8.8	TK	12.5B	30	2.5	7	ICQ	xx	HER02	Carl Hergenrother
12	2023	11	18.74	E	9.2	S	25.0C15	144	3	4	ICQ	XX	DEC	Michel Deconinck
12	2023	11	17.74	S	9.3	TI	29.8L 4	79	3	5	ICQ	XX	HAR11	Christian Harder
12	2023	11	16.80	S	9.2	TK	20.3T10	77	1.5	7	ICQ	XX	GON05	Juan Jose Gonzalez Suarez
12	2023	11	16.77	B	8.9	S	25.0C10	60	3	4	ICQ	XX	DEC	Michel Deconinck
12	2023	11	12.77	S	10.1	TI	29.8L 4	79	3.5	2	ICQ	XX	HAR11	Christian Harder
12	2023	11	07.76	S	10.3	TI	29.8L 4	79	2.8	2	ICQ	XX	HAR11	Christian Harder
12	2023	11	06.86	S	10.4	TK	20.3T10	77	1.8	5	ICQ	XX	GON05	Juan Jose Gonzalez Suarez
12	2023	11	06.09	S	10.5	TK	12.5B	30	2	2	ICQ	xx	HER02	Carl Hergenrother
12	2023	11	04.07	S	10.5	TK	12.5B	30	2	2	ICQ	xx	HER02	Carl Hergenrother

## Comets News

---

### Latest Periodic Comet Numberings

471P/2023 KF3 = P/2010 YK3	MPC 164694
470P/2014 W1 = P/2023 O2 (PANSTARRS)	MPC 164694
469P/2015 XG422 (PANSTARRS)	MPC 164694
468P/2004 V3 = P/2023 O1 (Siding Spring)	MPC 164694
467P/2010 TO20 = P/2023 H6 (LINEAR-Grauer)	MPC 164694

### 1P/Halley at Aphelion

Comet 1P/Halley is now at its furthest point from the Sun and halfway between its last perihelion in February 1986 (37.8 years ago) and its next perihelion in July 2061 (37.6 years from now). Its farthest point depends on how you define the center of the solar system. In distance from the center of the Sun, Halley arrives at perihelion on December 9 at 35.143 au. If we use the barycenter of the solar system, then perihelion was on November 2 at 35.146 au. Either way, the comet is likely a faint 29<sup>th</sup> magnitude object not too far from the head of Hydra.

### New Discoveries and Recoveries

*P/2023 V6 (PANSTARRS)* – P/2023 V6 (PANSTARRS) was found on 2023 November 8 at 21<sup>st</sup> magnitude with the Pan-STARRS1 1.8-m Ritchey-Chretien reflector at Haleakala. Pre-discovery observations were found in Pan-STARRS data on four nights back to 2023 October 16. At discovery, the comet was almost a year past its 2022 December 29 perihelion at 4.40 au. With a low eccentricity of 0.18, its orbit straddled the orbit of Jupiter with a semi-major axis of 5.34 au, aphelion of 6.28 au, and orbital period of 12.3 years. CBET 5317 reports that S. Nakano finds the possibility of a recent close approach to Jupiter in December 2020 at 0.32 au. [CBET 5317, MPEC 2023-V262]

*C/2023 V5 (Leonard)* – Gregory J. Leonard of the University of Arizona's Catalina Sky Survey used the Catalina 0.68-m Schmidt telescope to find C/2023 V5 on 2023 November 6 at 17<sup>th</sup> magnitude. The comet was already close to the Sun and Earth, at 1.075 and 0.247 au, respectively, at discovery. Hence, V5 is an intrinsically faint object. Perihelion is on 2023 December 14 at 0.84 au, though with a larger Earth-comet distance, it may be fainter at perihelion than at discovery. V5's orbital elements are similar to those of C/1988 A1 (Liller), making it the 5<sup>th</sup> member of the Liller family [other Liller members are C/1996 Q1 (Tabur), C/2015 F3 (SWAN), and C/2019 Y1 (ATLAS)]. [CBET 5316, MPEC 2023-V193]

*C/2023 V4 (Camarasa-Duszanowicz)* - Jordi Camarasa of Barcelona, Spain, and Grzegorz Duszanowicz of Akersberga, Sweden, discovered C/2023 V4 on CMOS images taken on 2023 November 5 using two 0.28-m f/1.9 Schmidt-Cassegrain (Celestron C11) telescopes located at Duszanowicz's "Moonbase South Observatory" at the Hakos "Astro Farm" in Namibia. Camarasa-Duszanowicz was 18<sup>th</sup> magnitude at discovery at a southern declination of -48 degrees. Though the comet will come to a small perihelion distance of 1.12 au (T = 2024 May 30), it will be located on the far side of the Sun at a small elongation (~20-30 degrees) and may not become brighter than 12-13<sup>th</sup> magnitude. [CBET 5315, MPEC 2023-V192]

*C/2023 V3 (PANSTARRS)* - The Pan-STARRS1 1.8-m Ritchey-Chretien reflector at Haleakala was used to find C/2023 V2 on 2023 November 3 at 20<sup>th</sup> magnitude. It is a periodic comet with an orbital period of 48.2 years. Perihelion was back on 2023 August 6 at 4.47 au, so it has likely already peaked in brightness. [CBET 5313, MPEC 2023-V109]



*P/2023 V2 (PANSTARRS)* – The first of Pan-STARRS’ 3 November comet discoveries was found with both the Pan-STARRS1 and Pan-STARRS2 1.8-m Ritchey-Chretien reflector, both at Haleakala, on 2023 November 4 at 20<sup>th</sup> magnitude. V2 is periodic, with an orbital period of 19.6 years. Perihelion will be on 2024 February 4 at 3.10 au. With the comet at opposition in November, it will now slowly fade as it moves away from the Earth, even as its heliocentric distance decreases.

Seiichi Nakano reports that P/2023 V2 passed 0.0042 AU from Saturn on 2018 Feb. 6 UT. Before this the comet was on a much larger orbit with a perihelion near the orbit of Saturn at 9.79 au and an orbital period of 267 years. As a result, the current return may be this comet’s first visit to the inner Solar System. [CBET 5312, MPEC 2023-V108]

*C/2023 V1 (Lemmon)* - J. B. Fizekas of the University of Arizona’s Catalina Sky Survey used the University of Arizona’s Catalina Sky Survey used the Catalina 0.68-m Schmidt reflector to find C/2023 V1 on 2023 November 2 at 20<sup>th</sup> magnitude. The comet should peak around 18<sup>th</sup> magnitude when at perihelion in July 2025 at 5.09 au. [CBET 5311, MPEC 2023-V23]

# Comets Between Magnitude 6 and 10

## 12P/Pons-Brooks

Discovered visually on 1812 July 12 by Jean-Louis Pons and rediscovered visually on 1883 September 2 by William R. Brooks Halley-type comet

### Orbit (from Minor Planet Center, MPEC 2023-W26)

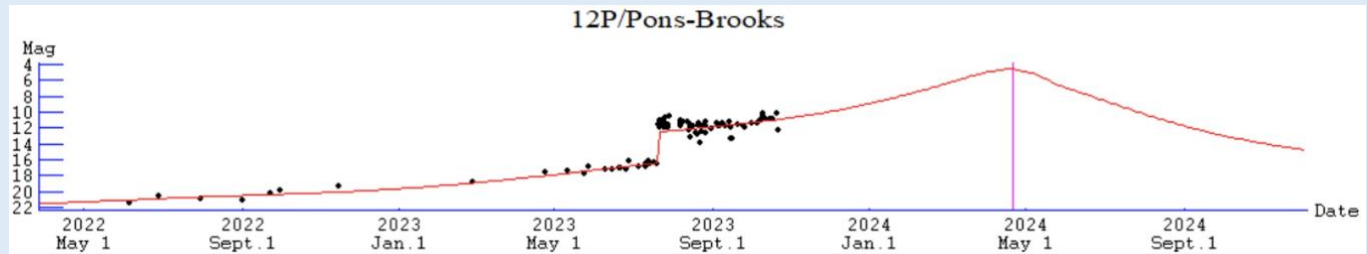
12P/Pons-Brooks  
 Epoch 2023 Sept. 13.0 TT = JDT 2460200.5  
 T 2024 Apr. 21.12726 TT Rudenko  
 q 0.7808693 (2000.0) P Q  
 n 0.01382699 Peri. 198.98683 +0.14513713 -0.32931314  
 a 17.1916547 Node 255.85463 +0.98565513 +0.13021656  
 e 0.9545786 Incl. 74.19070 +0.08613470 -0.93519864  
 P 71.3  
 From 4875 observations 2023 Feb. 27-Nov. 18, mean residual 0".6.

### Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El (deg)	
								40N	40S
2023-Dec-01	18 26	+38 40	2.390	2.603	66E	Lyr	9.4	41	0
2023-Dec-06	18 35	+38 21	2.328	2.550	65E	Lyr	9.3	39	0
2023-Dec-11	18 45	+38 06	2.266	2.497	65E	Lyr	9.1	37	0
2023-Dec-16	18 56	+37 55	2.203	2.441	64E	Lyr	9.0	35	0
2023-Dec-21	19 08	+37 48	2.140	2.385	63E	Lyr	8.8	34	0
2023-Dec-26	19 20	+37 44	2.076	2.328	63E	Lyr	8.7	32	0
2023-Dec-31	19 34	+37 44	2.012	2.271	62E	Cyg	8.5	30	0
2024-Jan-05	19 48	+37 47	1.948	2.213	61E	Cyg	8.3	29	0

### Comet Magnitude Formula (from ALPO and COBS data for the 1954 and 2023 returns)

$m_1 = 6.8 + 5 \log d + 11.6 \log r$  [between T-684 and T-275 days]  
 $m_1 = 4.0 + 5 \log d + 8.9 \log r$  [between T-275 days and perihelion]  
 $m_1 = 4.9 + 5 \log d + 15.5 \log r$  [between perihelion and T+30 days]  
 $m_1 = 5.1 + 5 \log d + 11/4 \log r$  [after T+30 days]  
 where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au



### Recent Magnitude Measurements Contributed to the ALPO Comets Section

Recent Magnitude Measurements in ICQ format:

Comet Des	YYYY MM DD.DD (UT)	Mag	SC	APER	FL	POW	COMA Dia	TAIL DC	ICQ CODE	Observer Name
12	2023 11 23.15	Z 8.9		5.0R	4		5		ICQ XX OLAXx	Mike Olason
12	2023 11 21.80	S 8.8	TI	29.8L	4	92	3.5	3	ICQ XX HAR11	Christian Harder
12	2023 11 21.07	M 9.0	TK	12.5B		30	3	6	ICQ xx HER02	Carl Hergenrother
12	2023 11 20.74	S 9.7	TK	7.0B	6	16		S9		PIL01 Uwe Pilz
12	2023 11 20.07	M 8.9	TK	12.5B		30	3.5	6	ICQ xx HER02	Carl Hergenrother
12	2023 11 19.06	M 8.8	TK	12.5B		30	2.5	7	ICQ xx HER02	Carl Hergenrother
12	2023 11 18.74	E 9.2	S	25.0C15		144	3	4	ICQ XX DEC	Michel Deconinck
12	2023 11 17.74	S 9.3	TI	29.8L	4	79	3	5	ICQ XX HAR11	Christian Harder
12	2023 11 16.80	S 9.2	TK	20.3T10		77	1.5	7	ICQ XX GON05	Juan Jose Gonzalez Suarez
12	2023 11 16.77	B 8.9	S	25.0C10		60	3	4	ICQ XX DEC	Michel Deconinck
12	2023 11 12.77	S 10.1	TI	29.8L	4	79	3.5	2	ICQ XX HAR11	Christian Harder
12	2023 11 07.76	S 10.3	TI	29.8L	4	79	2.8	2	ICQ XX HAR11	Christian Harder
12	2023 11 06.86	S 10.4	TK	20.3T10		77	1.8	5	ICQ XX GON05	Juan Jose Gonzalez Suarez
12	2023 11 06.09	S 10.5	TK	12.5B		30	2	2	ICQ xx HER02	Carl Hergenrother
12	2023 11 04.07	S 10.5	TK	12.5B		30	2	2	ICQ xx HER02	Carl Hergenrother

12P/Pons-Brooks is making its first return since 1954 and 6<sup>th</sup> or 7<sup>th</sup> observed return in total. It was discovered on 1812 July 21 by Jean-Louis Pons and reached 4<sup>th</sup> magnitude with a 3-degree long tail during that return. William R. Brooks at Phelps, New York, re-discovered 12P on 1883 September 2. During that return, it approached within 0.63 au of Earth and brightened to 3<sup>rd</sup> magnitude with a tail up to 20 degrees long. The most recent return in 1954 saw the comet reach 5<sup>th</sup> magnitude. 12P was also seen in 1457 and 1385 and may have been seen in 245 AD.

This return isn't a particularly good one, with the comet never getting closer to Earth than 1.55 au. That, combined with perihelion at 0.78 au (T = 2024 April 21), means it will be located at very low solar elongations when at its brightest (peak at 4-5<sup>th</sup> magnitude). Still, 12P will be an interesting object to observe, with many large outbursts and a coma with lots of dynamic features (shells, jets, etc.).

The 1954 lightcurve has 12P starting December around magnitude 9.9 and ending the month at magnitude 8.5. However, a major outburst on November 14 increased the total magnitude to 8.8, well within the visual range of small apertures. The comet's small, condensed coma held up well, even against a brightening Moon. As a result of the comet being brighter than predicted, I made the above ephemeris brightness 0.5 magnitude brighter. If another major outburst occurs, it could make 12P even brighter than the prediction. Alternately, if no new outbursts occur, the coma from the November 14 outburst will expand and fade, resulting in a fainter and more diffuse object.

The November 14 outburst did not re-produce the so-called "devil horns" seen following the major outbursts in July and October. Rather, a single curved jet and an adjacent dark region were observed within the rapidly expanding coma. Strongly defined jets were observed during past returns, so we should expect more near-coma morphology as 12P approaches perihelion.

A recent post to comets-ml by Richard Miles lists 7 observed outbursts during the current return (see <https://groups.io/g/comets-ml/message/31802>). This list is augmented with results posted by the BAA Comets Section (see [https://britastro.org/section\\_news\\_item/comet-12p-pons-brooks-outburst-continue](https://britastro.org/section_news_item/comet-12p-pons-brooks-outburst-continue)). Note that the outburst amplitude is for a small aperture centered on the nucleus and not for the entire coma (not the total magnitude), which is why some of the outbursts aren't obvious in the above lightcurve.

2023 07 20	Amplitude = 5.1 mag
2023 09 04	Amplitude = 0.4 mag
2023 09 23	Amplitude = 0.9 mag
2023 10 05	Amplitude = 3.9 mag
2023 10 22	Amplitude = 0.4 mag
2023 10 31	Amplitude = 3.7 mag
2023 11 01	Amplitude = 2.5 mag
2023 11 14	Amplitude = 5.1 mag
2023 11 30	Amplitude = 1.0 mag

Pons-Brooks is still a far northern evening object, with observations limited to northern observers and telescopes. December sees it moving to the east and deeper into the Milky Way as it crosses Lyra (Dec 1-28) and Cygnus (28-31).

December Photo Op:

Dec 25 - 12P/Pons-Brooks passes over 9<sup>th</sup> mag OC NGC 6791



Figure 1 - Monochrome image of 12P/Pons-Brooks showing a bright inner coma, large outer coma, and tail. Image from December 3 by Martin Mobberley with an iTelescope 0.51-m f/6.5 + FLI PL09000 camera. Image consists of 20 x 60-sec exposures.



Figure 2 - A color image of 12P/Pons-Brooks by Michael Jager on November 18 with a 14" f/4.2 reflector and QHY600 camera.

## 62P/Tsuchinshan

Discovered photographically on 1965 January 1 at the Purple Mountain (Tsuchinshan) Observatory  
Short-period comet

### Orbit (from Minor Planet Center, MPEC 2023-W26)

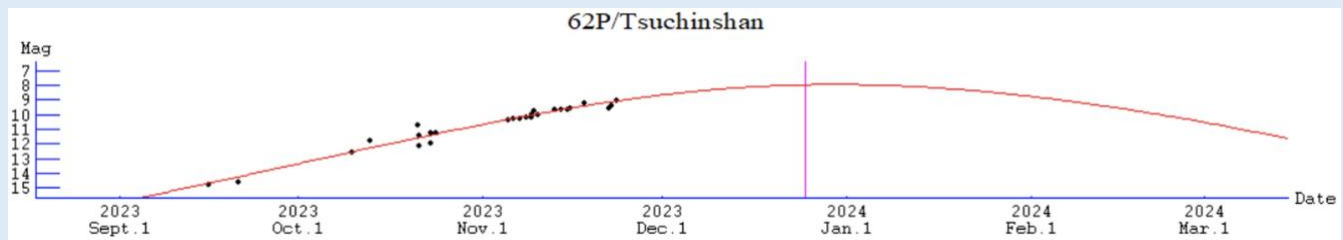
62P/Tsuchinshan  
Epoch 2023 Sept. 13.0 TT = JDT 2460200.5  
T 2023 Dec. 25.07668 TT Rudenko  
q 1.2651425 (2000.0) P Q  
n 0.15895266 Peri. 47.27042 -0.43515815 -0.89705954  
a 3.3751326 Node 68.67386 +0.80004285 -0.42446599  
e 0.6251577 Incl. 4.73851 +0.41299978 -0.12293419  
P 6.20  
From 345 observations 2023 Aug. 29-Nov. 18, mean residual 0".6.  
Nongravitational parameters A1 = -0.76, A2 = -8.8843.

### Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

62P/Tsuchinshan									Max El (deg)	
Date	R.A.	Decl.	r	d	Elong	Const	Mag	40N	40S	
2023-Dec-01	09 42	+18 28	1.298	0.611	106M	Leo	8.7	68	21	
2023-Dec-06	10 02	+17 39	1.286	0.590	106M	Leo	8.4	67	21	
2023-Dec-11	10 21	+16 47	1.276	0.571	107M	Leo	8.3	67	22	
2023-Dec-16	10 39	+15 53	1.270	0.555	107M	Leo	8.1	66	23	
2023-Dec-21	10 56	+15 00	1.266	0.542	108M	Leo	8.0	65	24	
2023-Dec-26	11 13	+14 08	1.265	0.532	109M	Leo	8.0	64	26	
2023-Dec-31	11 28	+13 18	1.267	0.523	110M	Leo	8.0	63	28	
2024-Jan-05	11 43	+12 32	1.272	0.516	112M	Leo	8.0	62	30	

### Comet Magnitude Formula (from 2023 ALPO observations)

$m_1 = 5.7 + 5 \log d + 35.6 \log r$   
where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au



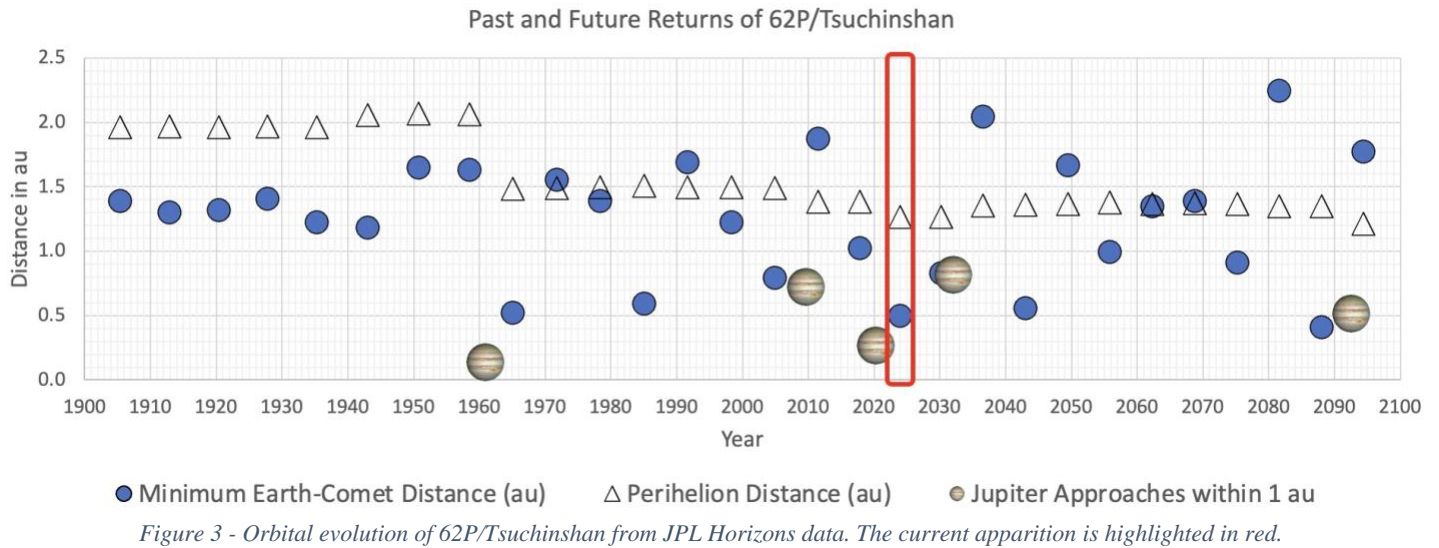
### Recent Magnitude Measurements Contributed to the ALPO Comets Section

Recent Magnitude Measurements in ICQ format:

Comet Des	YYYY MM DD.DD (UT)	Mag	SC	APER	FL	POW	COMA Dia DC	TAIL LENG PA	ICQ CODE	Observer Name
62	2023 11 23.33	Z 9.1		5.0R	4		9.5		ICQ XX OLAXx	Mike Olason
62	2023 11 22.52	S 9.8	TK	12.5B	30		5 3		ICQ xx HER02	Carl Hergenrother
62	2023 11 22.04	S 10.0	TI	29.8L	4 79		4 3		ICQ XX HAR11	Christian Harder
62	2023 11 18.00	S 9.5	TI	25.2L	4 68		4.5 2		ICQ XX HAR11	Christian Harder
62	2023 11 15.19	I 10.0	S	25.0C10	60		6 2		ICQ XX DEC	Michel Deconinck
62	2023 11 14.20	M 10.3	TK	30 L 5	88		2 3/		ICQ XX DES01	Jose Guilherme de Souza Aguiar
62	2023 11 13.09	S 10.1	TI	29.8L	4 108		3 3		ICQ XX HAR11	Christian Harder
62	2023 11 10.21	M 10.6	AQ	30 L 5	88		2 3/		ICQ XX DES01	Jose Guilherme de Souza Aguiar
62	2023 11 09.51	S 10.2	TK	12.5B	30		3 2		ICQ xx HER02	Carl Hergenrother
62	2023 11 09.21	M 10.8	AQ	30 L 5	88		2 3/		ICQ XX DES01	Jose Guilherme de Souza Aguiar
62	2023 11 08.20	M 10.8	AQ	30 L 5	88		2 3/		ICQ XX DES01	Jose Guilherme de Souza Aguiar
62	2023 11 07.20	M 10.9	AQ	30 L 5	88		1 3		ICQ XX DES01	Jose Guilherme de Souza Aguiar
62	2023 11 06.21	M 10.9	AQ	30 L 5	88		1 3/		ICQ XX DES01	Jose Guilherme de Souza Aguiar
62	2023 11 05.21	M 11.0	AQ	30 L 5	100		1 3		ICQ XX DES01	Jose Guilherme de Souza Aguiar

Short-period comet 62P/Tsuchinshan is in the midst of its best return between 1900 and 2100. A close approach to 0.15 au of Jupiter in 1960 dropped 62P's perihelion from around 2.0 au to 1.5 au. The discovery apparition of 1965 was the first after the close approach with the comet brightening to 15<sup>th</sup> magnitude. Surprisingly, during its 1985 return, which was very similar to the one in 1965, 62P reached a brighter 10<sup>th</sup> magnitude. Additional close approaches to Jupiter in 2009 and 2020 dropped perihelion to 1.38 and 1.26 au, respectively. At its most recent

return in 2017, the comet reached 10<sup>th</sup> magnitude even though it came no closer than 1.02 au from Earth. This year, the comet will arrive at perihelion on 2023 December 25, at 1.26 au, and have its closest approach to Earth on 2024 January 29, at 0.50 au.



November saw 62P not only brighten from around magnitude 11 to 9 but also its coma expanded from around 1' to 9.5'. If this continues to be the case, 62P should peak at magnitude 8.0 during the 2<sup>nd</sup> half of November. The comet is a morning object observable from both hemispheres moving through Leo.

**December Photo Ops:**

- Dec 21 - 62P/Tsuchinshan passes over 12<sup>th</sup> mag galaxy NGC 3485
- Dec 27-28 - 62P/Tsuchinshan passes just to the north of the Leo Triplet of bright galaxies



*Figure 4 - 62P/Tsuchinshan (large green comet) was imaged by Dan Bartlett (June Lake, CA) on 2023 November 14 with a Telescope C6 Hyperstar. Also in the field are the Beehive Cluster (bottom half of the image) and 29P/Schwassmann-Wachmann (close to the center-left edge).*

# 103P/Hartley

Discovered photographically on 1986 March 15 by Malcolm Hartley at Siding Spring Observatory in Australia  
Jupiter-family comet

## Orbit (from Minor Planet Center, MPEC 2023-W26)

103P/Hartley  
Epoch 2023 Sept. 13.0 TT = JDT 2460200.5  
T 2023 Oct. 12.51243 TT Rudenko  
q 1.0640923 (2000.0) P Q  
n 0.15210821 Peri. 181.30126 +0.75453001 -0.63878206  
a 3.4756360 Node 219.75001 +0.60421759 +0.76567032  
e 0.6938424 Incl. 13.61045 +0.25613583 +0.07554102  
P 6.48

From 8274 observations 2004 Sept. 20-2023 Nov. 18, mean residual 0".6.  
Nongravitational parameters A1 = +0.17, A2 = +0.0246.

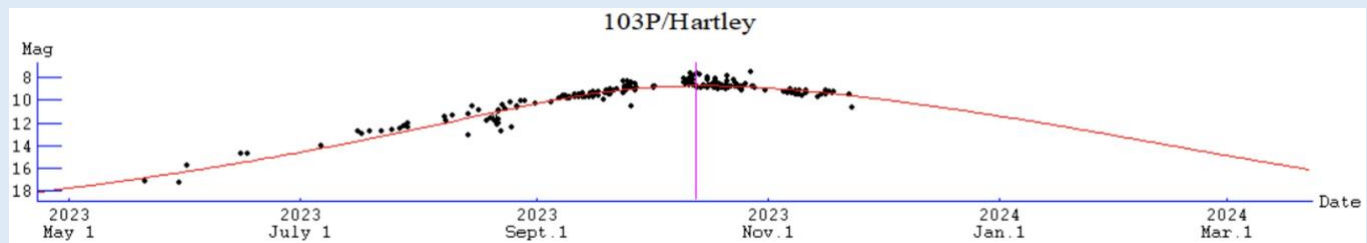
## Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El (deg)	
								40N	40S
2023-Dec-01	09 01	-09 01	1.256	0.554	105M	Hya	9.9	41	50
2023-Dec-06	09 01	-10 38	1.292	0.569	109M	Hya	10.2	39	54
2023-Dec-11	09 00	-11 58	1.329	0.583	113M	Hya	10.4	38	57
2023-Dec-16	08 58	-13 02	1.368	0.597	117M	Hya	10.6	37	60
2023-Dec-21	08 55	-13 49	1.407	0.612	122M	Hya	10.9	36	63
2023-Dec-26	08 50	-14 19	1.448	0.628	126M	Hya	11.1	36	64
2023-Dec-31	08 45	-14 31	1.490	0.646	131M	Hya	11.4	35	65
2024-Jan-05	08 38	-14 26	1.533	0.667	135M	Hya	11.6	35	65

## Comet Magnitude Formula (from 2023 ALPO data)

$$m1 = 10.2 + 5 \log d + 15.5 \log r (T - 15)$$

where "T" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au



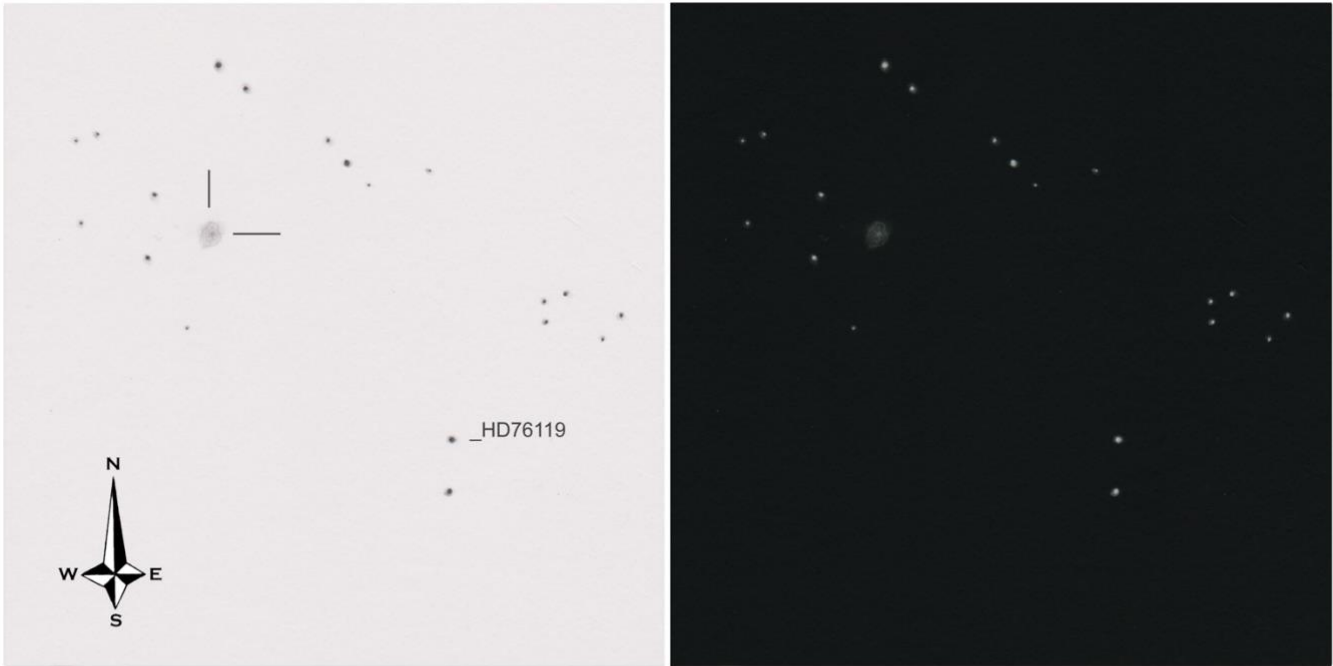
## Recent Magnitude Estimates submitted to the ALPO Comets Section

Recent Magnitude Measurements in ICQ format:

Comet Des	YYYY MM DD.DD (UT)	Mag	SC	APER	FL	POW	COMA Dia	DC	TAIL LENG	PA	ICQ CODE	Observer Name
103	2023 11 23.35	Z 10.7		5.0R	4		4				ICQ XX OLAXx	Mike Olason
103	2023 11 22.51	S 9.9	TK	12.5B	30		3	2			ICQ xx HER02	Carl Hergenrother
103	2023 11 15.22	E 9.8	S	25.0C10	60		2	7/			ICQ XX DEC	Michel Deconinck
103	2023 11 14.21	M 10.6	AQ	30	L 5	88	2	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 10.21	M 10.5	TK	30	L 5	88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 09.51	S 9.6	TK	12.5B	30	4	2				ICQ xx HER02	Carl Hergenrother
103	2023 11 09.20	M 10.4	TK	30	L 5	88	2	3			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 08.20	M 10.4	TK	30	L 5	88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 07.21	M 10.3	TK	30	L 5	88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 06.20	M 10.3	TK	30	L 5	88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar
103	2023 11 05.20	M 10.2	TK	30	L 5	88	2	3/			ICQ XX DES01	Jose Guilherme de Souza Aguiar

103P arrived at perihelion on October 12 at 1.06 au from the Sun with closest approach to Earth occurring even further back on September 26 at 0.38 au. The comet is now fading from its 8<sup>th</sup> magnitude peak in October. This peak was a bit of an underperformance which has been confirmed by the CARA (Cometary Archive for Afrho) project that measures dust production in comets (see <https://cara.uai.it/103phartley-early-results>).

103P should fade from around magnitude 9.9 to 11.4 this month. It remains a morning object and will spend all month in Hydra, being well-placed for observers in both hemispheres.



Comet 103P (Hartley)  
Mewlon 250mm f10 - 60x

2023/11/15 5h10 UTC  
F.O.S.: 60'

103 2023 10 14.15 O 8.1 S 25.0C15 144 3 3 ICQ XX DEC

<https://astro.aquarellia.com>

Figure 5 – Michel Deconinck sketched 103P/Hartley on 2023 November 15 with a Takahashi Mewlon 0.25-m f/10 cassegrain.



Figure 6 - 103P as imaged by Michael Jager on November 18 with a 14" f/4.2 reflector and QHY600 camera. The image is a composite of 13 x 120-sec exposures.



## C/2023 H2 (Lemmon)

Discovered 2023 April 23 by the Catalina Sky Survey with the 1.5-m Mount Lemmon reflector

### Orbit (from Minor Planet Center, MPEC 2023-W26)

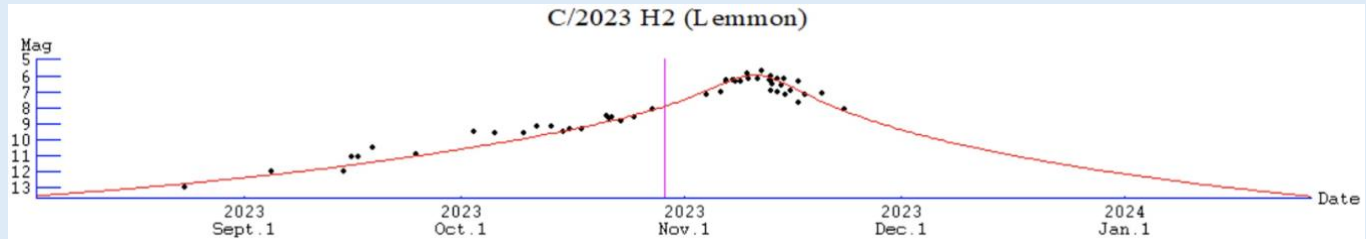
C/2023 H2 (Lemmon)  
 Epoch 2023 Sept. 13.0 TT = JDT 2460200.5  
 T 2023 Oct. 29.19012 TT Rudenko  
 q 0.8944131 (2000.0) P Q  
 z +0.0040925 Peri. 150.64932 +0.57676563 +0.60274287  
 +/-0.0000026 Node 217.04464 +0.44790637 +0.33114904  
 e 0.9963397 Incl. 113.75406 +0.68317003 -0.72597613  
 From 615 observations 2023 Mar. 26-Nov. 17, mean residual 0".8.  
 1/a(orig) = +0.004337 AU\*\*-1, 1/a(fut) = +0.004219 AU\*\*-1.

### Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El	
								40N	40S
2023-Dec-01	22 16	-37 26	1.069	0.736	75E	Gru	9.4	12	50
2023-Dec-06	22 29	-39 13	1.119	0.899	72E	Gru	10.0	10	48
2023-Dec-11	22 39	-40 22	1.172	1.059	69E	Gru	10.5	9	46
2023-Dec-16	22 47	-41 09	1.228	1.214	66E	Gru	10.9	8	43
2023-Dec-21	22 54	-41 42	1.286	1.364	64E	Gru	11.3	7	40
2023-Dec-26	23 01	-42 06	1.345	1.508	61E	Gru	11.7	6	38
2023-Dec-31	23 08	-42 23	1.407	1.646	58E	Gru	12.1	4	36
2024-Jan-05	23 14	-42 37	1.469	1.777	55E	Gru	12.4	3	34

### Comet Magnitude Formula (from ALPO and COBS data)

$m_1 = 9.8 + 5 \log d + 8.0 \log r$   
 where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au



### Recent Magnitude Measurements Contributed to the ALPO Comets Section

Recent Magnitude Measurements in ICQ format:

Comet Des	YYYY MM DD.DD	Mag	SC	APER	FL	POW	COMA	TAIL	ICQ	CODE	Observer Name	
	(UT)			T			Dia	DC	LENG	PA		
2023H2	2023 11 23.10	Z 8.1		5.0R	4		10		ICQ XX	OLAx	Mike Olason	
2023H2	2023 11 20.08	S 7.5	TK	12.5B		30	6	1	ICQ xx	HER02	Carl Hergenrother	
2023H2	2023 11 17.73	S 8.1	TI	29.8L	4	79	7	3	ICQ XX	HAR11	Christian Harder	
2023H2	2023 11 16.80	I 8.0	S	25.0D	10	60 & 5	4	4	ICQ XX	DEC	Michel Deconinck	
2023H2	2023 11 16.77	S 6.3	TK	5.0B		10	18	3	ICQ XX	GON05	Juan Jose Gonzalez Suarez	
2023H2	2023 11 15.75	E 7.4	S	15.0R	8	30	10	3/	ICQ XX	DEC	Michel Deconinck	
2023H2	2023 11 14.92	M 6.8	TK	10	B	25	8	3	ICQ XX	DES01	Jose Guilherme de Souza Aguiar	
2023H2	2023 11 14.74	E 6.8	S	15.2R	8	30	10	3/	ICQ XX	DEC	Michel Deconinck	
2023H2	2023 11 14.40	xM 6.5	TK	5.0R		10	12	3/	ICQ XX	WYA	Christopher Wyatt	
2023H2	2023 11 13.93	M 6.6	TK	10	B	25	8	3/	ICQ XX	DES01	Jose Guilherme de Souza Aguiar	
2023H2	2023 11 13.81	S 7.0	TI	25.2L	4	68	12	3	ICQ XX	HAR11	Christian Harder	
2023H2	2023 11 13.19	Z 6.9		2.5R	4		10		ICQ XX	OLAx	Mike Olason	
2023H2	2023 11 13.06	S 6.4	TK	5.0B		10	14	3	ICQ xx	HER02	Carl Hergenrother	
2023H2	2023 11 12.95	S 6.4	TK	8.0B		20	10	2	ICQ XX	SOU01	Willian Souza	
2023H2	2023 11 12.93	M 6.5	TK	10	B	25	12	4	ICQ XX	DES01	Jose Guilherme de Souza Aguiar	
2023H2	2023 11 12.92	S 5.9	TK	5.0B		10	23	3	ICQ XX	GON05	Juan Jose Gonzalez Suarez	
2023H2	2023 11 12.76	S 7.0	TI	19.8L	4	44	11	3	ICQ XX	HAR11	Christian Harder	
2023H2	2023 11 11.76	E 6.3	S	15.2R	8	30	10	3	ICQ XX	DEC	Michel Deconinck	
2023H2	2023 11 11.07	S 6.1	TK	5.0B		10	15	4	ICQ xx	HER02	Carl Hergenrother	
2023H2	2023 11 09.79	B 6.2	S	7.0B		5	8	3	ICQ XX	DEC	Michel Deconinck	
2023H2	2023 11 09.77	I 6.2	S	25.0C	15	95	8	3	15	m 90	ICQ XX	Michel Deconinck
2023H2	2023 11 08.72	S 6.9	TK	7.0B	6	16	14	2			PIL01	Uwe Pilz

2023H2	2023	11	08.09	S	6.3	TK	5.0B	10	12	3			ICQ	xx	HER02	Carl Hergenrother
2023H2	2023	11	07.79	S	6.6	TI	4.4B	8	18	2/			ICQ	XX	HAR11	Christian Harder
2023H2	2023	11	07.75	S	7.2	TI	29.8L	4	66	13			ICQ	XX	HAR11	Christian Harder
2023H2	2023	11	06.83	S	6.6	TK	20.3T10	77	18	4	1.6	20	ICQ	XX	GON05	Juan Jose Gonzalez Suarez
2023H2	2023	11	06.82	S	6.3	TK	5.0B	10	22	3	1.4	20	ICQ	XX	GON05	Juan Jose Gonzalez Suarez
2023H2	2023	11	06.10	S	6.9	TK	5.0B	10	11	3			ICQ	xx	HER02	Carl Hergenrother
2023H2	2023	11	04.08	S	7.6	TK	12.5B	30	7	2			ICQ	xx	HER02	Carl Hergenrother

C/2023 H2 (Lemmon) put on a nice show last month as it raced past the Earth at a minimum distance of 0.19 au on November 10. At its closest, the comet reached 6<sup>th</sup> magnitude with a coma that visually grew to 18-23' in diameter. A faint, narrow ion tail was imaged and even observed visually by a few observers.

C/2023 H2 (Lemmon) is a dynamically old comet that was last at perihelion about 3,500 years ago and will come to perihelion again in ~3,650 years. The current perihelion was on October 29 at 0.89 au. Since the comet is now moving away from both the Earth and the Sun, it is rapidly fading from around magnitude 9.4 on the 1<sup>st</sup> to 12.1 at the end of the month. The comet is well placed for observers in the southern hemisphere, but it's motion to the south and decreasing solar elongation is making it a progressively more difficult observation for northern observers. It spends the month in the evening sky in the southern constellation of Grus.

#### December Photo Ops:

Dec 19-24 - C/2023 H2 (Lemmon) within 1 deg of 10<sup>th</sup> mag face-on spiral NGC 7424

Dec 31 - C/2023 H2 (Lemmon) & C/2020 V2 (ZTF) within 2 degrees of each other, closest around Jan 4-5 at 1.7 deg; both are also still close to the Grus Quartet of galaxies



Figure 7 – C/2023 H2 (Lemmon) as imaged by Eliot Herman with the iTelescope T2 telescope on November 16 (Takahashi TOA-150 0.15-m f/7.3 + QHY268C OSC camera, located in Utah, USA). The image is a co-add of 6 x 10-sec exposures.

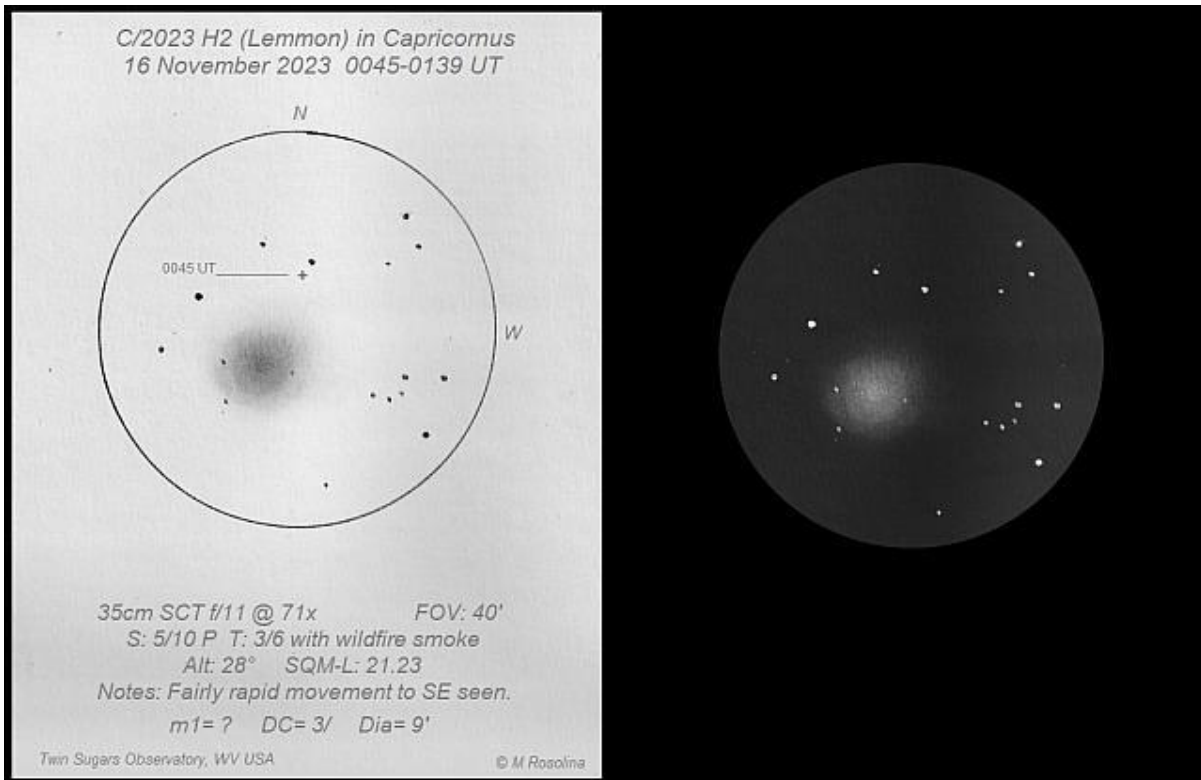


Figure 8 - Sketch of C/2023 H2 (Lemmon) by Michael Rosolina on November 16 (0.35-m f/11 @ 71x, West Virginia, USA)

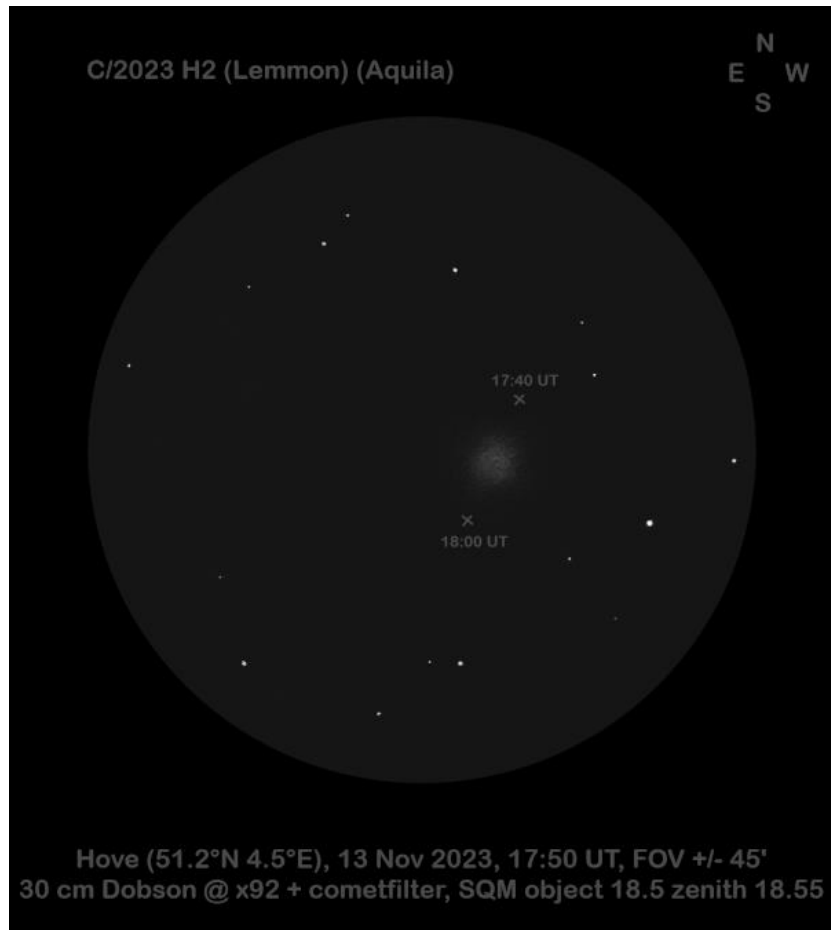


Figure 9 - Sketch of C/2023 H2 (Lemmon) by Jef de Wit with a 0.30-m dobsonian at 92x on November 13.

# Comets Between Magnitude 10 and 12

## 144P/Kushida

Discovered photographically on 1994 January 8 by Yoshio Kushida (Yatsugatake South Base Observatory, Japan)  
Short-period comet

### Orbit (from Minor Planet Center, MPEC 2023-W26)

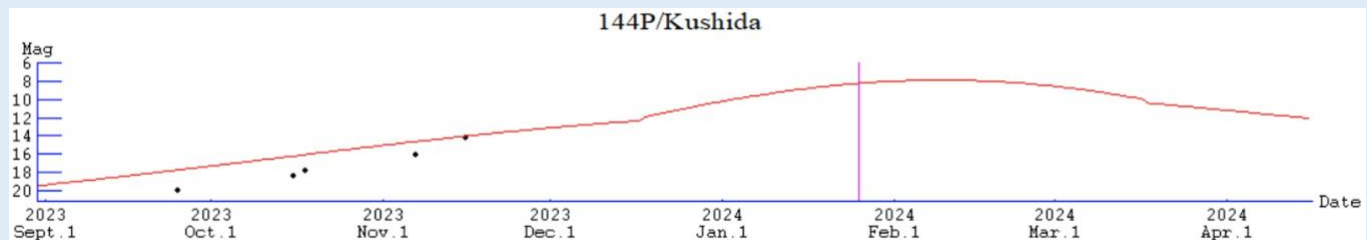
144P/Kushida  
Epoch 2023 Sept. 13.0 TT = JDT 2460200.5  
T 2024 Jan. 25.76845 TT Rudenko  
q 1.3987704 (2000.0) P Q  
n 0.13135643 Peri. 216.32179 -0.15949906 -0.98530853  
a 3.8326735 Node 242.92807 +0.92112389 -0.12629431  
e 0.6350406 Incl. 3.93142 +0.35509272 -0.11496455  
P 7.50  
From 757 observations 2016 July 31-2023 Nov. 18, mean residual 0".6.  
Nongravitational parameters A1 = +0.62, A2 = -0.1055.

### Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El (deg)	
								40N	40S
2023-Dec-01	02 45	+16 47	1.525	0.570	155E	Ari	13.1	67	33
2023-Dec-06	02 45	+16 08	1.502	0.564	150E	Ari	12.9	66	34
2023-Dec-11	02 45	+15 33	1.481	0.560	145E	Ari	12.6	66	34
2023-Dec-16	02 48	+15 04	1.462	0.560	140E	Ari	12.4	65	35
2023-Dec-21	02 51	+14 42	1.444	0.563	136E	Ari	11.6	65	35
2023-Dec-26	02 56	+14 26	1.429	0.569	132E	Ari	10.9	65	34
2023-Dec-31	03 02	+14 18	1.416	0.576	128E	Ari	10.4	64	34
2024-Jan-05	03 09	+14 16	1.405	0.586	125E	Ari	9.8	64	33

### Comet Magnitude Formula (from Seiichi Yoshida)

$m_1 = 7.5 + 5 \log d + 30.0 \log r$  [until T-39 days]  
 $m_1 = -5.5 + 5 \log d + 100.0 \log r$  [between T-20 and T+52 days]  
 $m_1 = 6.0 + 5 \log d + 25.0 \log r$  [after T+52 days]  
 where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au



### Recent Magnitude Measurements Contributed to the ALPO Comets Section

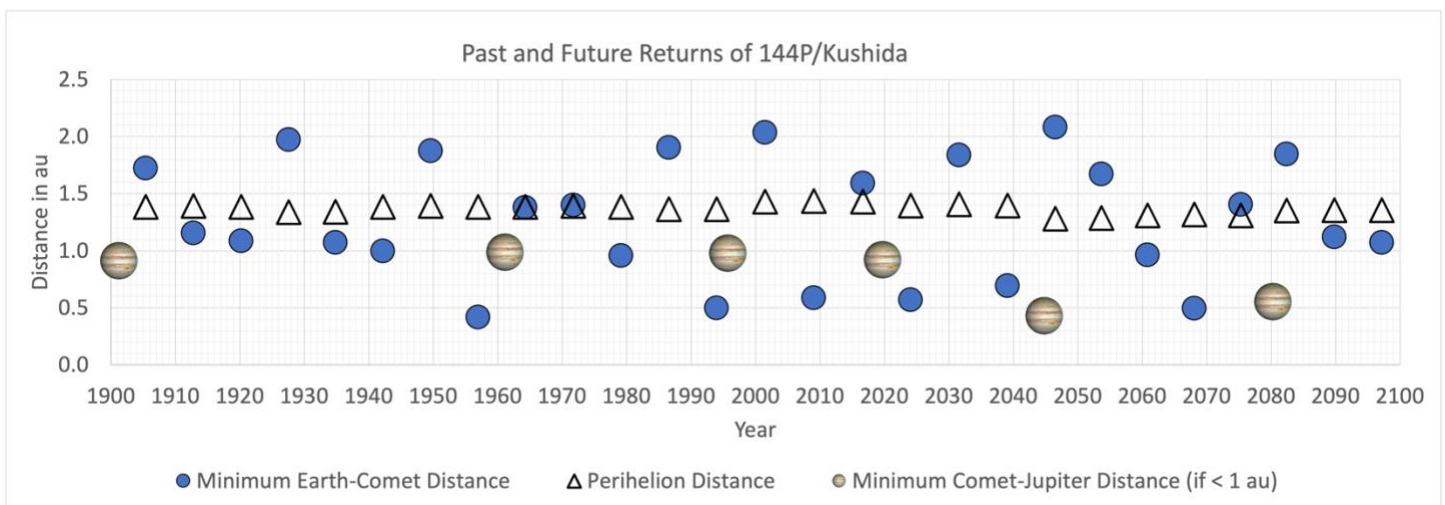
Recent Magnitude Measurements in ICQ format:  
 Comet Des YYYY MM DD.DD Mag SC APER FL POW COMA TAIL ICQ CODE Observer Name  
 (UT) T Dia DC LENG PA  
 None

The Jupiter family comet 144P/Kushida is currently in an orbit with a 7.5-year orbital period. The 2024 return is its 5th observed return, with the comet being seen at every return since its discovery in 1994 by Japanese seismologist and amateur astronomer Yoshio Kushida. 144P is one of two comets that Kushida discovered. Both comets were photographic discoveries, and both were discovered only a month apart, in December 1994 and January 1994. The other discovery is also a short-period comet, 147P/Kushida-Muramatsu. 144P was the second of Kushida's finds, having been discovered on the night of 1994 January 8 with a 0.10-m f/4 patrol telescope.

The discovery apparition in 1994 saw the comet brighten to 9th magnitude. The return in 2009 was also a good one, with a peak brightness of 8<sup>th</sup> magnitude.

Kushida has its best returns when its perihelion is in December or January. This year's perihelion is on January 25, which makes this a good return with a perihelion distance of 1.40 au and closest approach to Earth a few weeks earlier on December 12 at 0.57 au. Like many short-period comets, 144P brightens rapidly and usually has peaks in brightness after perihelion.

There is a bit of a mystery surrounding 144P/Kushida. The comet never gets very close to Jupiter, and as a result, its orbit is fairly stable over a 200-year period between 1900 and 2100. Since 1900, its perihelion has only ranged between 1.34 and 1.44 au. So, if this comet routinely gets up to 8th, 9th, or 10th magnitude, why wasn't it discovered prior to 1994? Even at relatively poor returns like the previous one in 2016, the comet still reached 10-11th magnitude. How was the comet not seen before since it could have been bright enough to be a visual discovery multiple times since 1900 and should have been an 8th-magnitude object near opposition in late 1956 and early 1957. Perhaps Kushida was a less active comet pre-1994.



This month finds the comet as an evening object moving through Aries. It should begin the month around magnitude 13.0 and brighten to around 10.4 by the end of the month. It will continue to brighten into the new year with a peak around magnitude 8.0 in February.

## C/2020 V2 (ZTF)

Discovered 2020 November 2 by the ZTF survey  
Dynamically new long-period comet

### Orbit (from Minor Planet Center, MPEC 2023-W26)

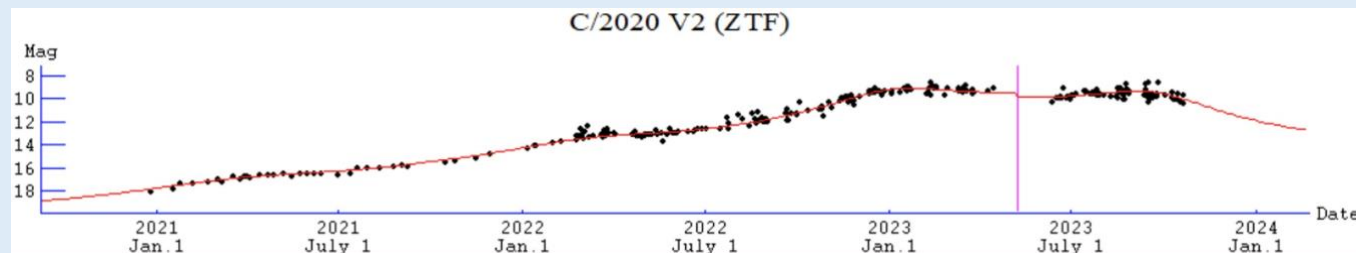
C/2020 V2 (ZTF)  
Epoch 2023 Sept. 13.0 TT = JDT 2460200.5  
T 2023 May 8.50485 TT Rudenko  
q 2.2276718 (2000.0) P Q  
z -0.0005170 Peri. 162.40343 +0.69759280 +0.59424412  
+/-0.0000002 Node 212.37098 +0.53389517 -0.05853044  
e 1.0011518 Incl. 131.61172 +0.47782866 -0.80215217  
From 5121 observations 2020 Apr. 18-2023 Nov. 16, mean residual 0".9.  
1/a(orig) = +0.000022 AU\*\*<sup>-1</sup>, 1/a(fut) = -0.000214 AU\*\*<sup>-1</sup>.

### Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El	
								40N	40S
2023-Dec-01	23 25	-42 53	3.198	3.117	85E	Gru	11.2	7	64
2023-Dec-06	23 22	-42 41	3.235	3.238	81E	Gru	11.3	7	59
2023-Dec-11	23 19	-42 27	3.273	3.358	76E	Gru	11.5	8	53
2023-Dec-16	23 18	-42 11	3.311	3.476	72E	Gru	11.6	8	49
2023-Dec-21	23 17	-41 55	3.350	3.591	68E	Gru	11.7	7	44
2023-Dec-26	23 16	-41 38	3.388	3.702	64E	Gru	11.8	7	40
2023-Dec-31	23 16	-41 21	3.427	3.809	60E	Gru	11.9	6	37
2024-Jan-05	23 17	-41 05	3.466	3.913	56E	Gru	12.0	5	34

### Comet Magnitude Formula (from ALPO and COBS data)

$m_1 = -1.4 + 5 \log d + 15.9 \log r$  [up to T-580 days]  
 $m_1 = 3.2 + 5 \log d + 10.1 \log r$  [between T-580 and T-220 days]  
 $m_1 = 4.0 + 5 \log d + 8.6 \log r$  [T-220 days and onward]  
 where "t" is date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au



### Recent Magnitude Measurements Contributed to the ALPO Comets Section

Recent Magnitude Measurements in ICQ format:

Comet Des	YYYY MM DD.DD	Mag	SC	APER	FL	POW	COMA	TAIL	ICQ	CODE	Observer Name
	(UT)						Dia DC	LENG PA			
2020V2	2023 11 23.13	Z 11.1			5.0R	4	4		ICQ XX	OLAx	Mike Olason
2020V2	2023 11 04.98	M 11.9	AQ	30	L 5	88	1 3/		ICQ XX	DES01	Jose Guilherme de Souza Aguiar

C/2020 V2 (ZTF) is slowly receding back into the cold depths of the outer Solar System. Now over half a year after its May 8 perihelion at 2.23 au, V2 is now 2-3 magnitudes fainter than its 9<sup>th</sup> magnitude peaks in January and September 2023. It should continue to fade in December from around magnitude 11.2 on the 1<sup>st</sup> to 11.9 on January 1. The comet remains well placed for southern hemisphere observers in the evening object as it moves through Grus. For northern observers, it is a difficult observation being located low in the southern sky.

### December Photo Ops:

- Dec 11-16 - C/2020 V2 (ZTF) moving slowly through the Grus Quartet of 10-13<sup>th</sup> mag galaxies
- Dec 31 - C/2020 V2 (ZTF) and C/2023 H2 (Lemmon) within 2 degrees of each other, closest around Jan 4-5 at 1.7 deg; both are also still close to the Grus Quartet of galaxies

## C/2021 S3 (PANSTARRS)

Discovered 2021 September 24 by PANSTARRS with the Pan-STARRS2 1.8-m Ritchey-Chretien reflector at Haleakala Long-period comet

### Orbit (from Minor Planet Center, MPEC 2023-S276)

C/2021 S3 (PANSTARRS)  
 Epoch 2023 Sept. 13.0 TT = JDT 2460200.5  
 T 2024 Feb. 14.72149 TT Rudenko  
 q 1.3201321 (2000.0) P Q  
 z -0.0001367 Peri. 6.86272 -0.77073759 +0.39897715  
 +/-0.0000024 Node 215.62077 -0.61758997 -0.65952513  
 e 1.0001805 Incl. 58.53345 -0.15667223 +0.63705874  
 From 998 observations 2020 Dec. 6-2023 Oct. 21, mean residual 0".4.  
 1/a(orig) = +0.000146 AU\*\*<sup>-1</sup>, 1/a(fut) = +0.000062 AU\*\*<sup>-1</sup>.

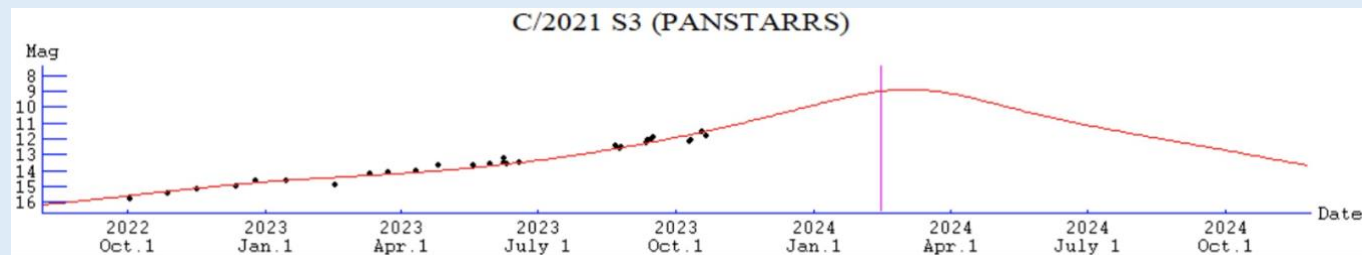
### Ephemerides (produced with Seiichi Yoshida's Comets for Windows program)

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El (deg)	
								40N	40S
2023-Dec-01	13 00	-39 56	1.722	2.236	46M	Cen	10.6	0	25
2023-Dec-06	13 17	-40 01	1.678	2.179	47M	Cen	10.5	1	25
2023-Dec-11	13 35	-39 57	1.635	2.122	47M	Cen	10.4	2	25
2023-Dec-16	13 52	-39 43	1.594	2.064	48M	Cen	10.3	2	25
2023-Dec-21	14 10	-39 18	1.555	2.006	49M	Cen	10.1	3	26
2023-Dec-26	14 28	-38 41	1.518	1.948	50M	Cen	10.0	4	26
2023-Dec-31	14 46	-37 52	1.484	1.890	51M	Cen	9.9	5	27
2024-Jan-05	15 04	-36 48	1.452	1.832	52M	Lup	9.8	6	27

### Comet Magnitude Formula (from ALPO and COBS data)

$$m_1 = 7.6 + 5 \log d + 5.4 \log r$$

Where "t" is the date of perihelion, "d" is Comet-Earth distance in au, and "r" is Comet-Sun distance in au.



### Recent Magnitude Measurements Contributed to the ALPO Comets Section

Recent Magnitude Measurements in ICQ format:

Comet Des	YYYY MM DD.DD	Mag	SC	APER	FL	POW	COMA	TAIL	ICQ	CODE	Observer Name
	(UT)						Dia	DC	LENG	PA	

None.

C/2021 S3 (PANSTARRS) was discovered at 19-20<sup>th</sup> magnitude on 2021 September 24 with the Pan-STARRS2 1.8-m Ritchey-Chretien reflector at Haleakala on Maui. The comet is still 2-3 months from perihelion on 2024 February 14, at 1.32 au, and closest to Earth on 2024 March 14, at 1.30 au. A lightcurve based on visual observations submitted to the ALPO and photometry submitted to COBS by Thomas Lehmann finds C/2021 S3 brightening at a very slow rate (2.5n ~ 5.4). Unfortunately, few observations were made in November so our predictions remain unchanged from last month with a peak around magnitude 8.9 in February and March when it will be observable from both hemispheres in the morning sky. This month, it will be a morning object best observed from the southern hemisphere but just peaking above the southern horizon for northern observers as it moves through Centaurus.

### December Photo Op:

Dec 16-17 - C/2021 S3 (PANSTARRS) within 0.5 deg of reflection nebula NGC 5367