

ALPO COMET NEWS

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

November 2021

alpo-astronomy.org

comets@alpo-astronomy.org



Hole in One! Periodic comet 4P/Faye was caught transiting Lower's Nebula (Sh2-261 or Sharpless 261) on 2021 October 4 by Dan Bartlett. The image is a composite of 139x60s exposures taken with a Celestron RASA11 Schmidt telescope and ASI2600mcP camera from June Lake, California, USA.

Table of Contents

SUMMARY	3
COMETS SECTION NEWS	3
APERTURE CORRECTIONS TO MAGNITUDE MEASUREMENTS	4
COMETS CALENDAR FOR NOVEMBER 2021	5
COMETS BRIGHTER THAN MAGNITUDE 6	6
C/2021 A1 (LEONARD)	6
COMETS BRIGHTER THAN MAGNITUDE 10	ERROR! BOOKMARK NOT DEFINED.
8P/TUTTLE	8
67P/CHURYUMOV-GERASIMENKO	9
C/2019 L3 (ATLAS)	12
COMETS BETWEEN MAGNITUDE 10 AND 13	14
C/2020 T2 (PALOMAR)	14
4P/FAYE	15
6P/D'ARREST	18
19P/BORRELLY	20
29P/SCHWASSMANN-WACHMANN	22
57P/DU TOIT-NEUJMIN-DELPORTE	24
C/2017 K2 (PANSTARRS)	26
FAINTER COMETS OF INTEREST (FAINTER THAN 13.0)	28
C/2021 O3 (PANSTARRS)	28
NEW DISCOVERIES, RECOVERIES AND OTHER COMETS NEWS	29
RECENT MAGNITUDES CONTRIBUTED TO THE ALPO COMETS SECTION	31

The monthly ALPO Comet News PDF can be found on the ALPO Comets Section website (<http://www.alpo-astronomy.org/cometblog/>). A shorter version of this report is posted on a dedicated Cloudy Nights forum (<https://www.cloudynights.com/topic/797252-alpo-comet-news-for-november-2021/>). All are encouraged to join the discussion over at Cloudy Nights. The ALPO Comet 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 encouraged.

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

To learn more about the ALPO, please visit us @ <http://www.alpo-astronomy.org>.

Summary

After an exciting 2020 for comets, 2021 seemed to be a bit of a letdown. Well, it may have taken most of the year to get going, but 2021 is finally picking up steam. We now have three comets brighter than magnitude 10. C/2021 A1 (Leonard) may brighten to the verge of naked eye visibility (for those under very dark skies) by the end of the month. It should get even brighter next month when it could reach 4th magnitude or perhaps even brighter. C/2019 L3 (PANSTARRS) and 67P/Churyumov-Gerasimenko will be around magnitude 9 this month.

If you've never observed 29P/Schwassmann-Wachmann before, this is a great time to start. The Centaur comet has experienced a succession of outbursts since late September. As a result, it is brighter than it's been in years with visual observers placing it between magnitude 10 and 11.

Two recently discovered comets have the potential to be nice small telescope objects when they arrive at perihelion over the next few years. C/2021 S3 (PANSTARRS) may reach 8th magnitude in 2024 while C/2021 T4 (Lemmon) could be a 9th magnitude object in 2023.

Comets Section News

From October 1 through the first week of November, the ALPO Comets Section received 125 visual and CCD magnitude measurements and 80 images and/or sketches from Dan Bartlett, Michel Besson, Denis Buczynski, Dan Crowson, Michel Deconinck, J. J. Gonzalez, Christian Harder, Carl Hergenrother, Eliot Herman, Gianluca Masi, Martin Mobberley, Mike Olason, Ludovic Prebet, Efrain Morales Rivera, Chris Schur, Tenho Tuomi, Dennis Wilde, and Chris Wyatt of the following comets: C/2021 K1 (ATLAS), C/2021 A1 (Leonard), C/2020 T2 (Palomar), C/2020 F5 (MASTER), C/2019 T4 (ATLAS), C/2019 LD2 (ATLAS), C/2019 L3 (ATLAS), C/2019 F1 (ATLAS-Africano), C/2017 K2 (PANSTARRS), 433P/(248370) 2005 QN173, 429P/LINEAR-Hill, 424P/La Sagra, 284P/McNaught, 246P/NEAT, 230P/LINEAR, 179P/Jedicke, 132P/Helin-Roman-Alu, 119P/Parker-Hartley, 113P/Spitaler, 104P/Kowal, 97P/Metcalf-Brewington, 94P/Russell, 67P/Churyumov-Gerasimenko, 57P/du Toit-Neujmin-Delporte, 29P/Schwassmann-Wachmann, 19P/Borrelly, 8P/Tuttle, 7P/Pons-Winnecke, 6P/d'Arrest, and 4P/Faye.

In addition to observations submitted directly to the ALPO, we occasionally use data from other sources to augment our analysis. We would like to acknowledge with thanks observations submitted directly to the ALPO as well as those originally submitted to the International Comet Quarterly, Minor Planet Center, and COBS Comet Observation Database. We would also like to thank the Jet Propulsion Laboratory for making available their Small-Body Browser and Orbit Visualizer and Seiichi Yoshida for his Comets for Windows programs that is used to produce the lightcurves in these pages. And last but not least, we'd like to thank [Syuichi Nakano](#) and the Minor Planet Center for their comet orbital elements, the asteroid surveys and dedicated comet hunters for their discoveries, and all of the observers who volunteer their time to adding to our knowledge of these amazing objects.

Aperture Corrections to Magnitude Measurements

We try to include up to date lightcurves for most of the objects discussed in this report as well as applying aperture corrections to the visual observations. 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 correction used here only corrects for differences in aperture [C. 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 refractors and 0.066 magnitudes per centimeter for reflectors. As our work develops, we will investigate the determination of personal corrections for each observer for each individual comet as well as for digital observations.

Comets Calendar for November 2021

- Nov 02 – 67P/Churyumov-Gerasimenko at perihelion ($q = 1.21$ au, 6.4-year orbit, $V \sim 9$, much more below)
- Nov 02 – P/2005 L1 (McNaught) at perihelion ($q = 3.14$ au, 7.9-year orbit, $V \sim ???$, Not seen since discovery in 2005, missed at return in 2013 and so far in 2021 so much be much fainter than in 2005 when it peaked at $V \sim 16$)
- Nov 03 – C/2018 U1 (Lemmon) at perihelion ($q = 4.99$ au, long-period, $V \sim 14-15$)
- Nov 03 – 70P/Kojima at perihelion ($q = 2.01$ au, 7.1-year orbit, $V \sim 16-17$)
- Nov 04 – New Moon
- Nov 11 – First Quarter Moon
- Nov 12 – P/2021 N2 (Fuls) at perihelion ($q = 3.80$ au, 18.3-year orbit, $V \sim 16-17$)
- Nov 13 – 132P/Helin-Roman-Alu at perihelion ($q = 1.69$ au, 7.7-year orbit, $V \sim 13$)
- Nov 13 – C/2021 C6 (Lemmon) at perihelion ($q = 3.27$ au, long-period, $V \sim 19$)
- Nov 13/14 – 8P/Tuttle passes 2.5 deg of bright galaxy Centaurus A
- Nov 14 – C/2020 F7 (Lemmon) at perihelion ($q = 5.33$ au, long-period, $V \sim 17$)
- Nov 16 – C/2019 L3 (PANSTARRS) passes ~ 0.1 deg of interacting galaxies NGC 2444-2445
- Nov 16/17 – 8P/Tuttle passes 1.5 deg of bright globular cluster Omega Centauri
- Nov 19 – Full Moon
- Nov 19 – C/2021 A1 (Leonard) passes ~ 0.3 deg of 10th mag galaxy NGC 4395
- Nov 22/23 – 19P/Borrelly passes within the Grus Quarter of galaxies
- Nov 23/24 – C/2021 A1 (Leonard) passes between bright galaxies NGC 4631 (the Whale) and 4656 (the Crowbar)
- Nov 24 – C/2019 L3 (PANSTARRS) passes ~ 1.5 deg of 9th mag globular cluster NGC 2419
- Nov 27 – Last Quarter Moon
- Nov 27 – 8P/Tuttle passes ~ 0.3 deg of open cluster NGC 5460
- Nov 29 – C/2014 OG392 (PANSTARRS) at perihelion ($q = 9.97$ au, 42.8-year period, $V \sim 19-20$, active Centaur)
- Dec 02 – C/2021 A1 (Leonard) passes ~ 0.1 deg of 6th mag globular cluster M3

Comets Brighter Than Magnitude 10

C/2021 A1 (Leonard)

Discovered 2021 January 3 by Greg Leonard of the Catalina Sky Survey with the 1.5-m on Mount Lemmon
Dynamically old long-period comet

Orbit (from Minor Planet Center, MPEC 2021-U109)

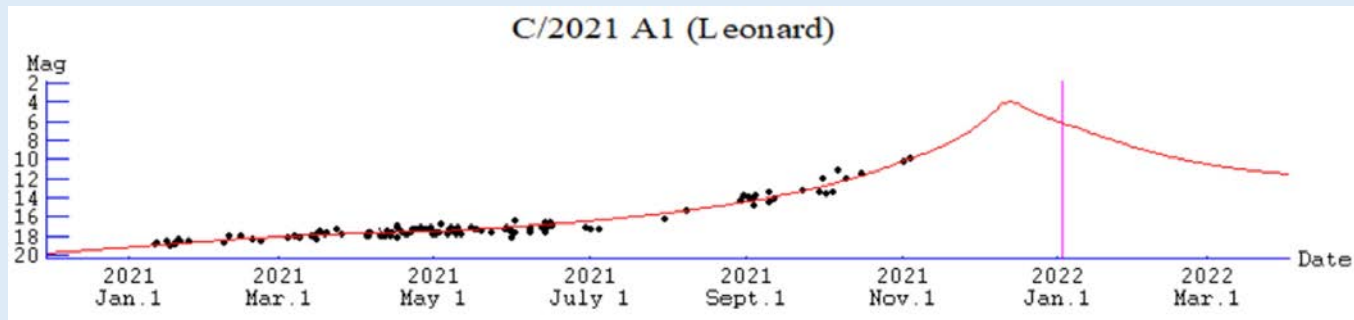
C/2021 A1 (Leonard)
Epoch 2022 Jan. 21.0 TT = JDT 2459600.5
T 2022 Jan. 3.30021 TT Rudenko
q 0.6152629 (2000.0) P Q
z -0.0000348 Peri. 225.09233 +0.63774032 +0.29161232
+/-0.0000011 Node 255.89556 +0.72791449 -0.53080431
e 1.0000214 Incl. 132.68632 -0.25184875 -0.79574433
From 1228 observations 2020 Apr. 11-2021 Oct. 27, mean residual 0".6.

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

C/2021 A1 (Leonard)										Max El (deg)	
Date	R.A.	Decl.	r	d	Elong	Const	Mag	40N	40S		
2021 Nov 01	11 51	+34 53	1.392	1.565	61M	UMa	10.2	41	0		
2021 Nov 06	11 58	+34 30	1.314	1.402	63M	UMa	9.8	44	0		
2021 Nov 11	12 07	+34 06	1.237	1.233	66M	CVn	9.3	47	0		
2021 Nov 16	12 17	+33 38	1.159	1.059	68M	CVn	8.7	49	0		
2021 Nov 21	12 30	+33 02	1.082	0.882	70M	CVn	8.1	51	0		
2021 Nov 26	12 50	+32 02	1.006	0.702	70M	CVn	7.4	51	0		
2021 Dec 01	13 21	+29 59	0.931	0.523	68M	CVn	6.4	49	0		
2021 Dec 06	14 21	+24 28	0.859	0.356	59M	Boo	5.3	38	0		

Comet Magnitude Formula (from ALPO and COBS data)

$m_1 = 7.4 + 5 \log d + 11.7 \log r$ [through T-325 days, where T = date of perihelion]
 $m_1 = 11.4 + 5 \log d + 5.7 \log r$ [T-325 to T-240 days]
 $m_1 = 7.5 + 5 \log d + 12.5 \log r$ [T-240 to T-65 days]
 $m_1 = 8.1 + 5 \log d + 8.0 \log r$ [from T-65 days onward]



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
2021A1	2021 11 04.49	S 10.0	TK	12.5B	30	4 4			ICQ xx	HER02	Carl Hergenrother
2021A1	2021 11 02.15	S 10.3	TI	29.8L	4 79	3 4	6.0m340		ICQ XX	HAR11	Christian Harder
2021A1	2021 10 28.49	V 10.3	U4	10.6R	5A200	6.4	4.9m300		ICQ xx	HER02	Carl Hergenrother
2021A1	2021 10 07.20	S 11.2	TK	20.3T10	100	5 2			ICQ XX	GON05	Juan Jose Gonzalez Suarez

Could this be the best comet of 2021? Perhaps even reaching naked eye brightness (at least for those at a dark site)? As November begins, Leonard is already around magnitude 10.0 as it continues to rapidly brighten as it heads for a close approach to Earth on December 12 at 0.23 au and perihelion on January 3 at 0.62 au. A

conservative $2.5n = 8$ brightening rate results in Leonard reaching magnitude 6.5 or so by the end of the month. Unfortunately for southern observers, C/2021 A1 is only currently visible from the northern hemisphere as it is located in the northern constellations of Ursa Major (Nov 1-10), Canes Venatici (11-18), Coma Berenices (18-19), Canes Venatici (19-28), Coma Berenices (28-30), and Canes Venatici (30).

Catalina Sky Survey astronomer Greg Leonard found C/2021 A1 on 2021 January 3 with the Mount Lemmon 1.5-m reflector when the comet was around magnitude 19 and 5.1 au from the Sun at discovery. Pre-discovery observations from Mount Lemmon and PANSTARRS were found back to April 2020 when the comet was 7.5 au from the Sun. Since then, the comet has alternated between brightening rapidly (through most of 2020), little to no intrinsic brightening (early 2021 through June 2021) and rapidly brightening again (since July 2021).

The conservative $2.5n \sim 8$ brightening rate sees Leonard around magnitude 10 at the start of November and magnitude 6.5 at the end of the month. The $2.5n$ value of 8 results in a peak brightness around magnitude 4.0 when the comet approaches within 0.233 au from Earth on December 12. With a large phase angle reaching 160 degrees at that time, forward scattering of light by cometary dust may increase Leonard's brightness by an additional 1-2 magnitudes. Working against it are very difficult observing circumstance due to a small solar elongation at the time of maximum brightness (minimum elongation of 15 deg) resulting in the possibility that the comet may be too faint to be seen while so close to the Sun.

November provides some nice imaging opportunities for C/2021 A1:

- On Nov 19, it passes ~ 0.3 deg of the 10th magnitude galaxy NGC 4395.
- Perhaps the PhotoOp of the month will see Leonard travel between the bright galaxies NGC 4631 (the Whale) and 4656 (the Crowbar) on Nov 23/24.
- Looking ahead to next month, Leonard will pass ~ 0.1 deg of 6th mag globular cluster M3 on Dec 2.

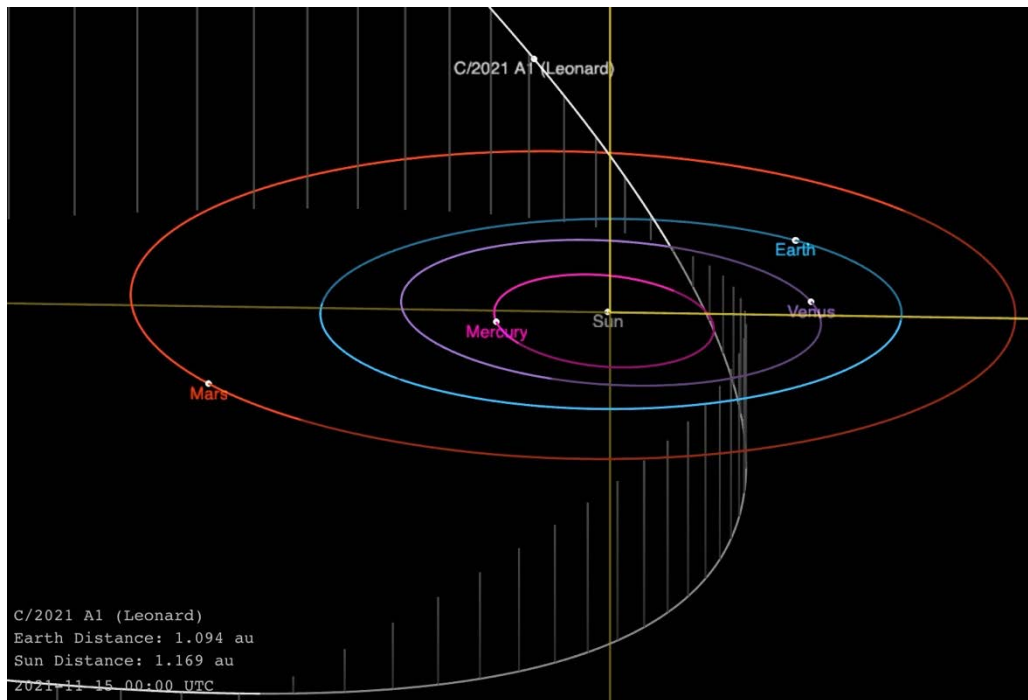


Figure 1 - Orbit of C/2021 A1 (Leonard) from the JPL Small-Body Browser.

8P/Tuttle

Discovered on 1790 January 9 by Pierre F. A. Mechain
 Rediscovered on 1858 January 5 by Horace Tuttle

Orbit (from Minor Planet Center, MPEC 2021-U109)

8P/Tuttle
 Epoch 2021 July 5.0 TT = JDT 2459400.5
 T 2021 Aug. 27.73783 TT Rudenko
 q 1.0260059 (2000.0) P Q
 n 0.07228476 Peri. 207.48940 -0.26849547 -0.50829562
 a 5.7073986 Node 270.20397 +0.96326252 -0.13642070
 e 0.8202323 Incl. 54.91128 +0.00595798 -0.85030874
 P 13.6
 From 253 observations 2008 Feb. 12–2021 Oct. 20, mean residual 0".6.
 Nongravitational parameters A1 = +0.08, A2 = +0.0579.

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

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El (deg)	
								40N	40S
2021 Nov 01	12 29	-40 01	1.408	2.086	35M	Cen	9.8	0	18
2021 Nov 06	12 48	-42 06	1.456	2.134	36M	Cen	10.2	0	18
2021 Nov 11	13 07	-43 58	1.505	2.184	36M	Cen	10.5	0	18
2021 Nov 16	13 25	-45 36	1.555	2.234	36M	Cen	10.8	0	19
2021 Nov 21	13 44	-47 02	1.605	2.284	36M	Cen	11.2	0	19
2021 Nov 26	14 02	-48 17	1.656	2.333	37M	Cen	11.5	0	19
2021 Dec 01	14 19	-49 21	1.707	2.381	37M	Cen	11.8	0	19
2021 Dec 06	14 37	-50 17	1.759	2.427	38M	Cen	12.2	0	20

Comet Magnitude Formula

$m_1 = 7.0 + 5 \log d + 20 \log r(t-25)$ [Ref: Seiichi Yoshida]

Magnitude Measurements 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
8	2021 10 09.72 xM	9.2	TK	40.0L	4	59	2.9 5		ICQ XX WYA	Christopher Wyatt

8P/Tuttle has been poorly observed this apparition. While the comet peaked at around magnitude 8.5-9.0 in September, it has been poorly placed low in the morning sky. Making matter worse, its placement close to the Sun and deep in the southern sky means it has been unobservable from the northern hemisphere. Only a single observation was sent to the ALPO in October. Chris Wyatt found 8P on October 9th to be magnitude 9.2 (8.6 after correcting for the aperture) with a 2.9' coma and degree of condensation of 5.

November sees Tuttle fade from around magnitude 10 to 12 as it moves through Centaurus (Nov 1-30) and Lupus (Nov 30). Like previous months, it will only be visible to southern hemisphere observers. There are a few nice photo ops for 8P this month: Nov 13/14 - 2.5 deg from bright galaxy Centaurus A, Nov 16/17 - 1.5 deg from bright globular cluster Omega Centauri, and Nov 27 - ~0.3 deg from open cluster NGC 5460.

Its best observed apparitions were in 1980/1981 when it reached 6th magnitude and its previous return in 2007/2008 when it passed 0.25 au from Earth and reached 5th magnitude. Two returns from now will be much better when it will pass within 0.18 au of Earth on 2048 December 28 and brighten to 4th magnitude.

67P/Churyumov-Gerasimenko

Discovered 1969 September 11 by the Klim Ivanovic Churyumov and Svetlana Ivanovna Gerasimenko

Orbit (from Minor Planet Center, MPEC 2021-U109)

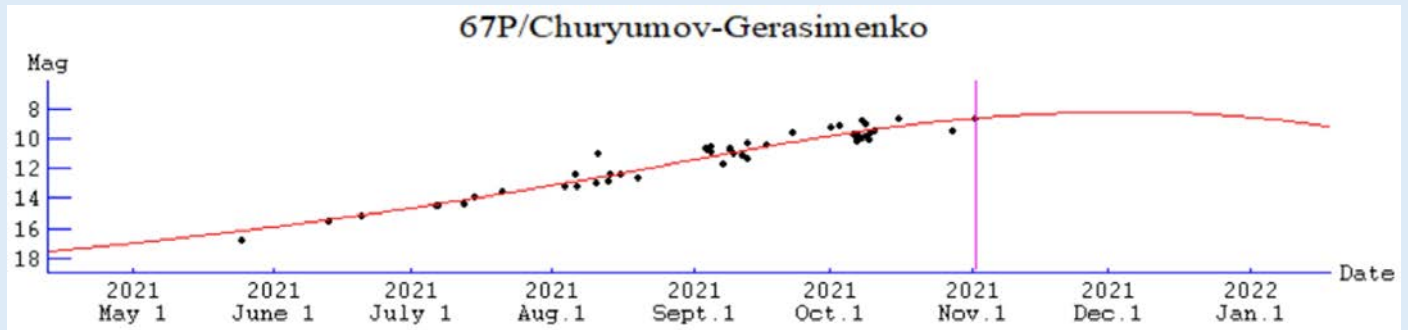
67P/Churyumov-Gerasimenko
 Epoch 2021 July 5.0 TT = JDT 2459400.5
 T 2021 Nov. 2.05160 TT Rudenko
 q 1.2106402 (2000.0) P Q
 n 0.15333189 Peri. 22.12208 +0.52361425 -0.85101563
 a 3.4571194 Node 36.33716 +0.77119189 +0.45349743
 e 0.6498124 Incl. 3.87140 +0.36206516 +0.26478762
 P 6.43
 From 8004 observations 1995 July 3-2021 Oct. 26, mean residual 0".7.
 Nongravitational parameters A1 = +0.08, A2 = +0.0111.

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

67P/Churyumov-Gerasimenko										Max El (deg)	
Date	R.A.	Decl.	r	d	Elong	Const	Mag	40N	40S		
2021 Nov 01	07 19	+26 15	1.210	0.423	110M	Gem	8.7	76	20		
2021 Nov 06	07 38	+26 29	1.211	0.421	111M	Gem	8.6	76	20		
2021 Nov 11	07 56	+26 37	1.215	0.420	112M	Gem	8.5	77	19		
2021 Nov 16	08 12	+26 42	1.223	0.420	114M	Cnc	8.4	77	19		
2021 Nov 21	08 25	+26 45	1.233	0.422	116M	Cnc	8.3	77	19		
2021 Nov 26	08 37	+26 49	1.247	0.425	118M	Cnc	8.3	77	19		
2021 Dec 01	08 47	+26 55	1.263	0.428	121M	Cnc	8.3	77	19		
2021 Dec 06	08 54	+27 03	1.283	0.433	124M	Cnc	8.3	77	20		

Comet Magnitude Formula (modified from Seiichi Yoshida, H value brighter by 0.6 mag) & Lightcurve

$$m_1 = 8.9 + 5 \log d + 14.0 \log r(t-40)$$



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		
67	2021	11	05.35	S 9.0	TK	12.5B	30	4	6/			ICQ xx	HER02 Carl Hergenrother
67	2021	11	05.21	S 9.9	TK	20.3T10	77	4	5	0.15	280	ICQ XX	GON05 Juan Jose Gonzalez Suarez
67	2021	11	02.11	S 9.2	TI	29.8L	4 79	2.3	4/	11.0m	280	ICQ XX	HAR11 Christian Harder
67	2021	10	27.91	S 9.9	TK	20.3T10	100	4	4/			ICQ XX	GON05 Juan Jose Gonzalez Suarez
67	2021	10	10.95	S 10.5	TI	53.1L	139	1	5	5.0m	280	ICQ XX	HAR11 Christian Harder
67	2021	10	10.01	S 10.6	TI	53.1L	139	1.4	5	4.5m	273	ICQ XX	HAR11 Christian Harder
67	2021	10	09.68	xM 10.7	AQ	40.0L	4 59	2.1	6	11.0m	265	ICQ XX	WYA Christopher Wyatt
67	2021	10	08.71	xM 10.5	AQ	40.0L	4 59	2.6	6	7.5m	265	ICQ XX	WYA Christopher Wyatt
67	2021	10	08.00	S 10.9	TI	53.1L	139	0.9	4	9.0m	275	ICQ XX	HAR11 Christian Harder
67	2021	10	07.14	S 10.5	TK	32.0L	5 80	1.9	7	0.07	255	ICQ XX	PIL01 Uwe Pilz
67	2021	10	07.13	xE 10.6	TK	25.0C10	62	1	4			ICQ XX	DECaa Michel Deconinck
67	2021	10	07.13	xI 10.5	TK	25.0C10	195	0.5	4	2.0m	270	ICQ XX	DECaa Michel Deconinck
67	2021	10	07.00	S 10.1	TK	20.3T10	77	4	4/	0.2	260	ICQ XX	GON05 Juan Jose Gonzalez Suarez
67	2021	10	06.06	S 10.7	TI	53.1L	111	1.3	5	9.0m	270	ICQ XX	HAR11 Christian Harder

67P was discovered on photographic plates taken on 1969 September 11 by Kiev University Astronomical Observatory astronomers Klim Ivanovic Churyumov and Svetlana Ivanovna Gerasimenko working with a 50-cm Maksutov astrograph at the Alma-Ata Astrophysical Institute in current day Kazakhstan. The current apparition is 67P's 9th observed return with perihelion occurring on 2021 November 2 at 1.21 au. A close approach to Earth at 0.42 au on November 12 makes this the comet's best return since 1982 when it came marginally closer to Earth at 0.39 au. At that return, a peak brightness of 9th magnitude was reached. 67P was famously the target of the ESA Rosetta/Philae mission, the only spacecraft to have orbited and landed on a comet. This will be 67P's first return since Rosetta ended its mission by soft landing onto the comet's surface.

As November begins, visual observers are finding 67P to be between magnitude 9.0 and 9.9 (aperture corrected to 8.6 to 9.6). As is seen in images and sketches, 67P also possesses a long tail. Chris Wyatt followed 67P's tail out to a distance of 11' in his 0.4-m reflector on October 9 and November 2. While probably too faint for visual observers, imagers such as Michael Jager have also imaged a dust trail in the opposite direction of the dust tail [image]. This feature is visible due to the Earth passing through the comet's orbital plane in late October.

November sees 67P/Churyumov-Gerasimenko remaining well placed for all observers in the late evening through morning sky as it moves through Gemini (Nov 1-12) and Cancer (12-30). The comet should continue to brighten by a few more tenths of a magnitude by the end of the month.

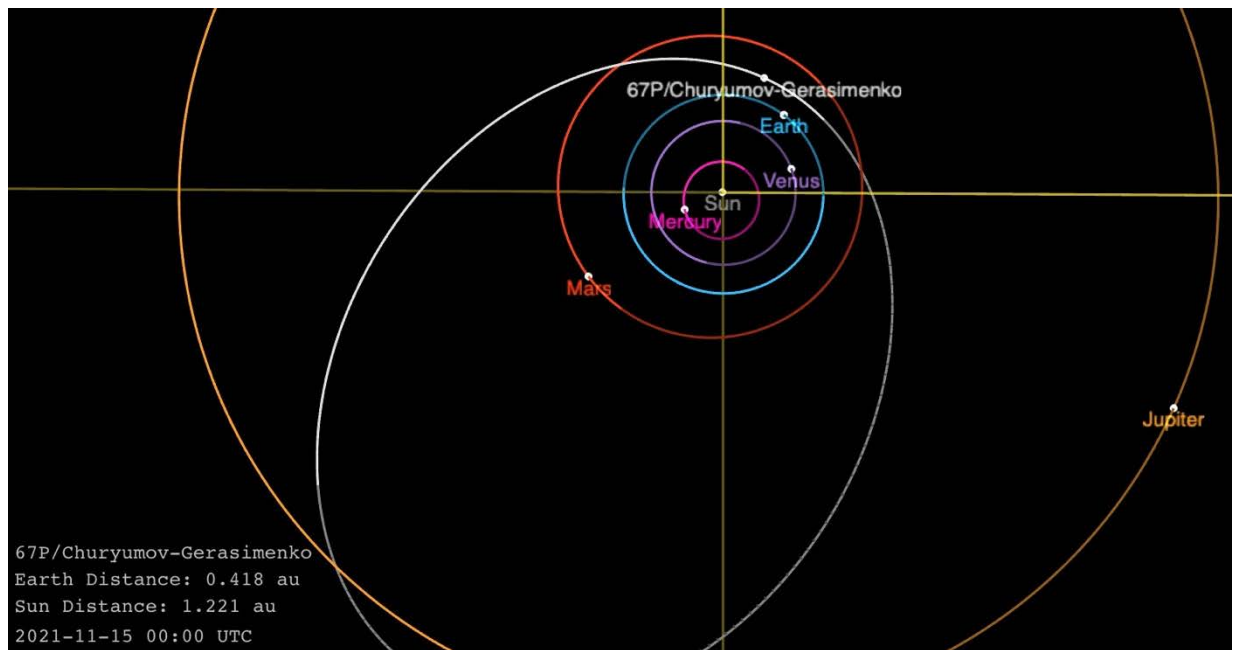


Figure 2 – Orbit of 67P/C-G from the JPL Small-Body-Browser.

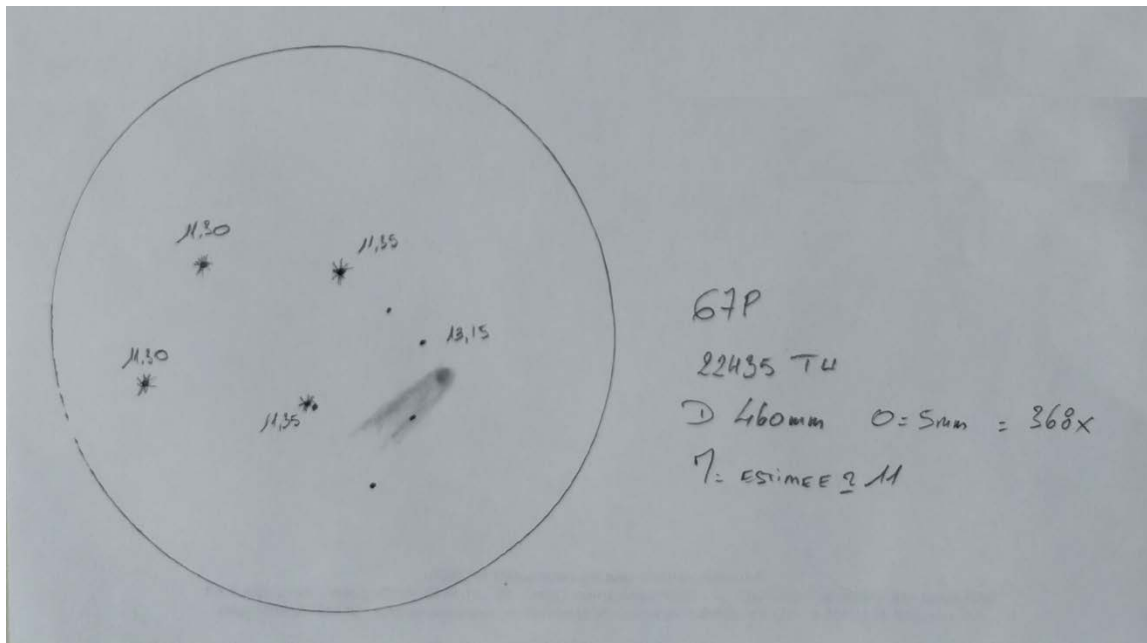


Figure 3 - Sketch of 67P made on 2021 October 8 by Michel Besson and Ludovic Prebet.



Figure 4 - 67P gliding past M35 in Gemini on 2021 October 16. Image taken by Chris Schur with a 0.25-m f/3.9 Orion astrograph and SBIG 10XME camera from near Payson, Arizona.

C/2019 L3 (ATLAS)

Discovered 2019 June 10 by the ATLAS survey with one of their 0.5-m f/2 Schmidt
Dynamically old long-period comet

Orbit (from MPEC 2021-U109)

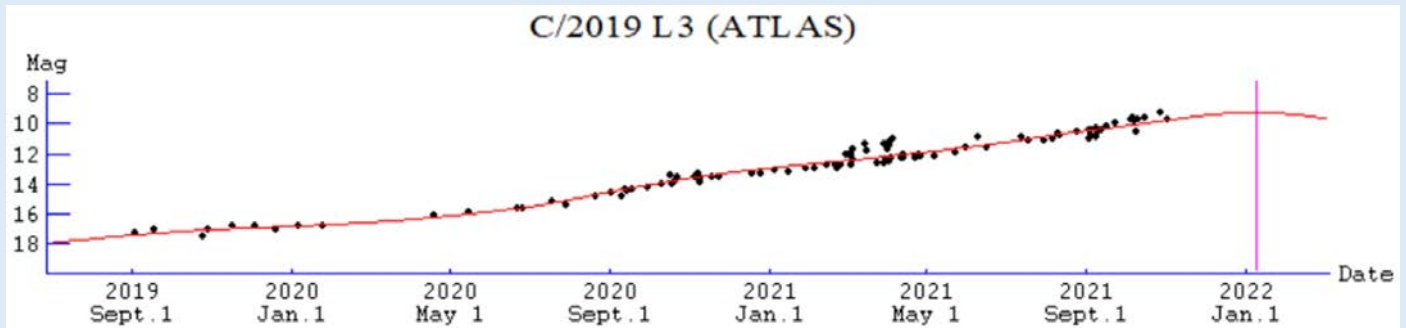
C/2019 L3 (ATLAS)
Epoch 2022 Jan. 21.0 TT = JDT 2459600.5
T 2022 Jan. 9.61968 TT Rudenko
q 3.5545009 (2000.0) P Q
z -0.0004526 Peri. 171.61077 -0.26052266 -0.66630774
+/-0.0000003 Node 290.79022 +0.83676024 +0.20517686
e 1.0016089 Incl. 48.36121 +0.48162252 -0.71689361
From 2630 observations 2019 June 10–2021 Oct. 27, mean residual 0".4.

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

C/2019 L3 (ATLAS)										Max El (deg)	
Date	R.A.	Decl.	r	d	Elong	Const	Mag	40N	40S	40N	40S
2021 Nov 01	07 47	+40 30	3.611	3.203	106M	Lyn	9.4	89	5		
2021 Nov 06	07 47	+40 03	3.603	3.127	110M	Lyn	9.3	90	6		
2021 Nov 11	07 47	+39 36	3.596	3.054	115M	Lyn	9.3	89	8		
2021 Nov 16	07 46	+39 07	3.589	2.984	120M	Lyn	9.2	89	9		
2021 Nov 21	07 45	+38 37	3.583	2.918	125M	Lyn	9.2	89	10		
2021 Nov 26	07 43	+38 05	3.577	2.855	130M	Lyn	9.1	88	11		
2021 Dec 01	07 40	+37 31	3.573	2.798	135M	Lyn	9.1	87	12		
2021 Dec 06	07 37	+36 55	3.568	2.746	141M	Lyn	9.0	87	13		

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

$m_1 = 2.0 + 5 \log d + 12.3 \log r$ [through T-550 days; T = date of perihelion]
 $m_1 = -4.6 + 5 \log d + 20.8 \log r$ [T-550 to T-150 days]
 $m_1 = 2.8 + 5 \log d + 8.0 \log r$ [T-150 days and onwards]



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
2019L3	2021 11 05.35	S 9.7	TK	12.5B	30	3 4			ICQ xx	HER02 Carl Hergenrother
2019L3	2021 11 05.13	S 9.5	TK	20.3T10	77	5 4/			ICQ XX	GON05 Juan Jose Gonzalez Suarez
2019L3	2021 11 02.12	S 10.2	TI	29.8L	4 79	1.8 4	6.0m275		ICQ XX	HAR11 Christian Harder
2019L3	2021 10 27.90	S 9.6	TK	20.3T10	77	6 3/			ICQ XX	GON05 Juan Jose Gonzalez Suarez
2019L3	2021 10 10.96	S 10.6	TI	53.1L	139	1.4 4	4.0m300		ICQ XX	HAR11 Christian Harder
2019L3	2021 10 10.03	S 10.6	TI	53.1L	139	1.5 4	3.0m300		ICQ XX	HAR11 Christian Harder
2019L3	2021 10 09.74	xM 11.1	AQ	40.0L	4 59	4 6	3.7m280		ICQ XX	WYA Christopher Wyatt
2019L3	2021 10 08.02	S 10.7	TI	53.1L	139	1.6 5	2.0m260		ICQ XX	HAR11 Christian Harder
2019L3	2021 10 07.13	S 10.1	TK	32.0L	5 80	1 8	0.03 199		ICQ XX	PIL01 Uwe Pilz
2019L3	2021 10 07.02	S 9.9	TK	20.3T10	100	4 4			ICQ XX	GON05 Juan Jose Gonzalez Suarez

C/2019 L3 is still inwards bound to a 2022 January 9 perihelion at a relatively distant 3.57 au. With the comet already being reported to be between magnitude 9.5 and 10.0, the large perihelion distance means C/2019 L3

could remain a visual small telescope object well into 2022. The comet has been brightening at rapid rate since discovery. If we assume a slow down to a more conservative $2.5^n = 8$ brightening rate till perihelion, it will brighten to around between magnitude 9.0 and 9.5 between November and March.

Ten magnitude measurements were submitted to the ALPO since the start of October from J. J. Gonzalez, Christian Harder, Carl Hergenrother, Uwe Pilz, and Chris Wyatt. Reports submitted since the last week of October found C/2019 L3 between magnitude 9.5 and 10.2, aperture corrected to 9.2 to 9.8.

C/2019 L3 (ATLAS) spends all month in Lynx (Nov 1-30) in the morning sky. While it has been well placed for northern observers over the past few months, L3 is now moving far enough south to allow southern observations. The comet is in the same part of the sky as comets 4P/Faye and 67P/Churyumov-Gerasimenko. Perhaps because of its proximity to these long-tailed photogenic comets, there hasn't been as much time spent imaging C/2019 L3. We haven't received any images or sketches of C/2019 L3 since September.

PhotoOps Alerts:

On Nov 16, C/2019 L3 (PANSTARRS) passes within ~ 0.1 deg of interacting galaxies NGC 2444-2445.

On Nov 24, the comet passes ~ 1.5 deg from 9th mag globular cluster NGC 2419.

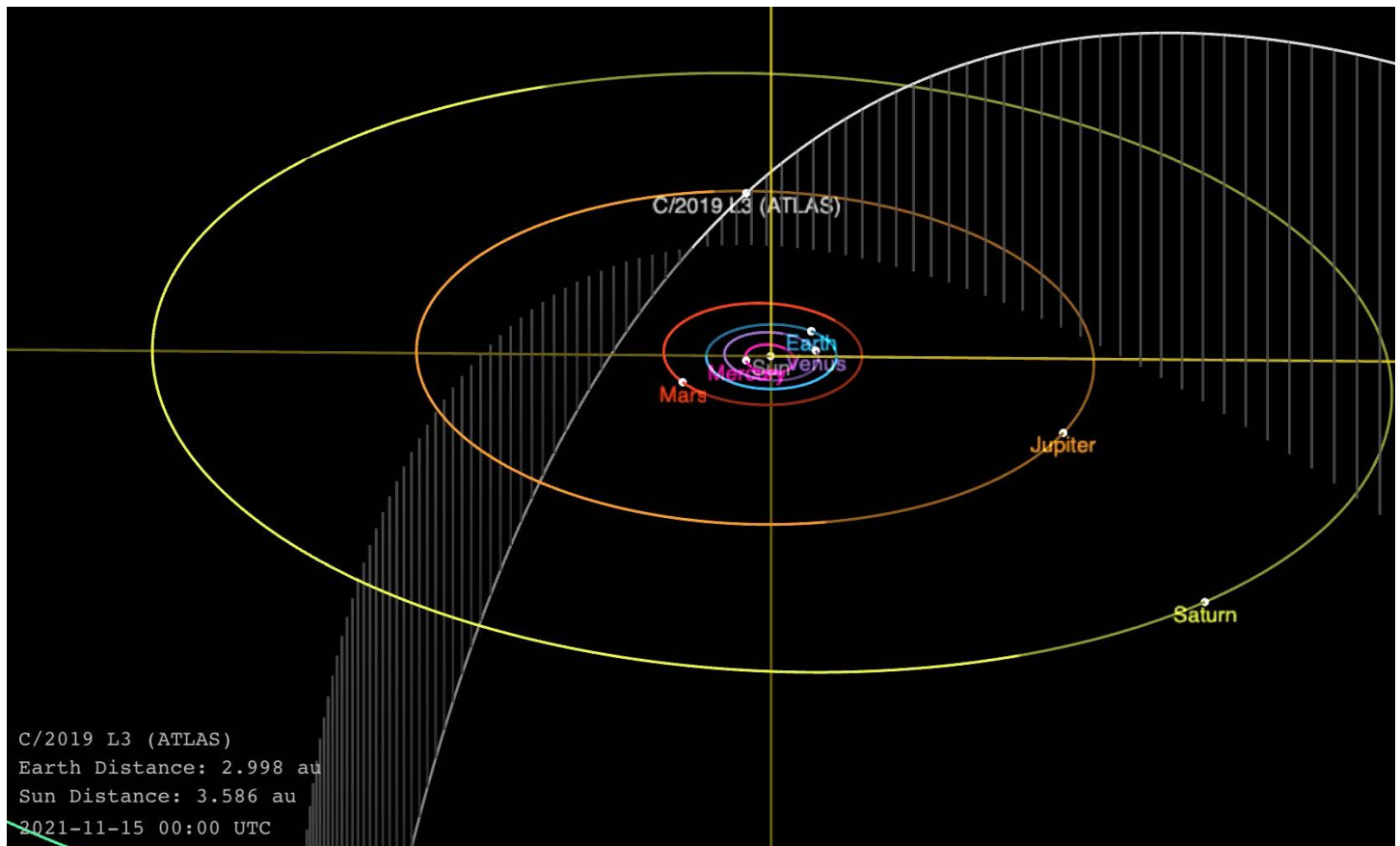


Figure 5 - Orbit of C/2019 L3 (ATLAS) from the JPL Small Body Browser.

Comets Between Magnitude 10 and 13

C/2020 T2 (Palomar)

Discovered 2020 October 7 at 19th magnitude by the Zwicky Transient Facility (ZTF)

Discovery Telescope: 1.2-m Samuel Oschin Schmidt on Mount Palomar

Dynamically old long-period comet with orbital period of 5560 years

Orbit (from MPEC 2021-U109)

C/2020 T2 (Palomar)

Epoch 2021 July 5.0 TT = JDT 2459400.5

T 2021 July 11.14866 TT

Rudenko

q	2.0546861	(2000.0)	P	Q
z	+0.0032106	Peri.	150.38351	-0.53886950
	+/-0.0000008	Node	83.04814	-0.83514250
e	0.9934032	Incl.	27.87302	-0.11025729
				-0.60502851

From 2430 observations 2019 Dec. 11-2021 Oct. 4, mean residual 0".4.

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

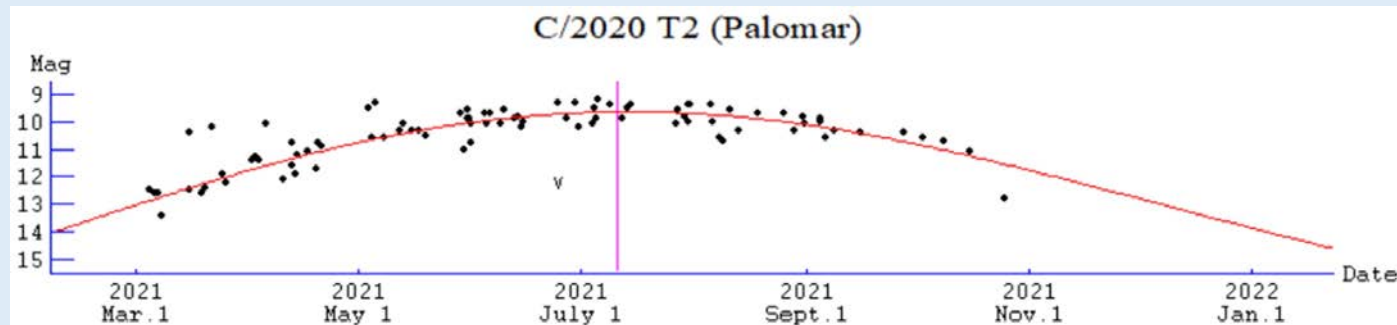
C/2020 T2 (Palomar)

Max El
(deg)

Date	R.A.	Decl.	r	d	Elong	Const	Mag	40N	40S
2021 Nov 01	17 25	-29 43	2.447	3.059	44E	Oph	11.8	3	23
2021 Nov 06	17 36	-30 21	2.478	3.128	41E	Sco	11.9	2	21
2021 Nov 11	17 47	-30 56	2.510	3.197	39E	Sco	12.1	1	18
2021 Nov 16	17 58	-31 26	2.543	3.264	36E	Sgr	12.3	0	15
2021 Nov 21	18 10	-31 52	2.577	3.331	34E	Sgr	12.4	0	13
2021 Nov 26	18 21	-32 15	2.611	3.396	31E	Sgr	12.6	0	10
2021 Dec 01	18 32	-32 34	2.646	3.459	29E	Sgr	12.8	0	8
2021 Dec 06	18 43	-32 49	2.682	3.521	27E	Sgr	13.0	0	6

Comet Magnitude Formula (from fit to ALPO and COBS data)

$$m1 = 0.6 + 5 \log d + 24.7 \log r(t-34)$$



Magnitude Measurements 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	TAIL DC	ICQ CODE	Observer Name
2020T2	2021 10 25.41 xM	13.4	AQ	40.0L	4	182	0.6	5	ICQ XX WYA	Christopher Wyatt

This is probably the last month to observe C/2020 T2 (PANSTARRS) before it sinks into the glow of twilight. Even then, that's only for southern observers as the comet is already lost to northern observers. The comet should fade from 12th to 13th magnitude during November as it moves through Ophiuchus (Nov 1-3), Scorpius (3-15), Sagittarius (15-30). By the time C/2020 T2 is once again visible next March, it will be a much fainter object at 15-16th magnitude.

4P/Faye

Discovered visually on 1843 November 23 by the Herve Faye

Orbit (from MPEC 2021-U109)

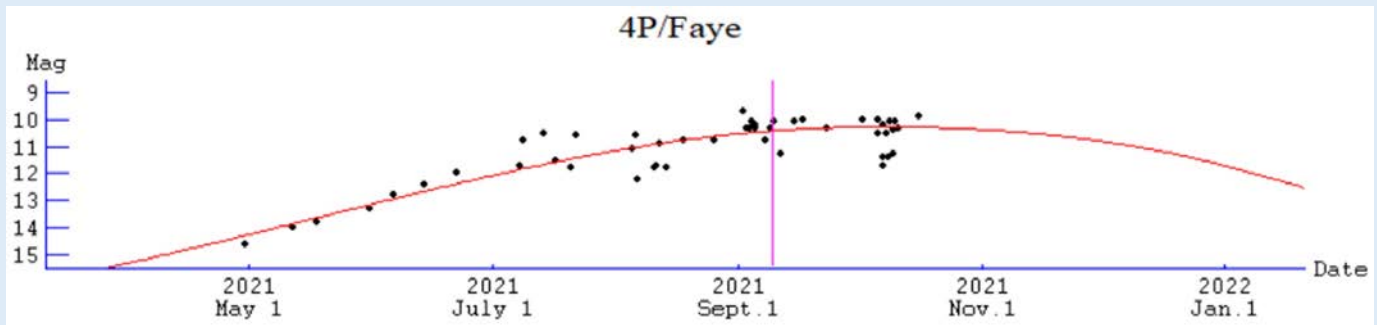
4P/Faye
 Epoch 2021 July 5.0 TT = JDT 2459400.5
 T 2021 Sept. 8.82685 TT Rudenko
 q 1.6188622 (2000.0) P Q
 n 0.13180468 Peri. 206.99424 +0.76786766 -0.63984943
 a 3.8239790 Node 192.93149 +0.61002971 +0.74520437
 e 0.5766550 Incl. 8.00815 +0.19555821 +0.18778486
 P 7.48
 From 5518 observations 1998 May 24–2021 Oct. 27, mean residual 0".9.
 Nongravitational parameters A1 = +0.48, A2 = -0.0304.

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

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El (deg)	
								40N	40S
2021 Nov 01	06 46	+11 35	1.705	1.016	116M	Mon	10.4	61	37
2021 Nov 06	06 50	+10 49	1.722	0.997	119M	Mon	10.4	61	38
2021 Nov 11	06 53	+10 06	1.739	0.980	123M	Mon	10.5	60	39
2021 Nov 16	06 55	+09 25	1.758	0.965	128M	Mon	10.5	59	40
2021 Nov 21	06 56	+08 48	1.778	0.953	132M	Mon	10.6	59	41
2021 Nov 26	06 55	+08 16	1.798	0.944	137M	Mon	10.7	58	42
2021 Dec 01	06 54	+07 49	1.820	0.938	142M	Mon	10.8	58	42
2021 Dec 06	06 51	+07 28	1.843	0.937	146M	Mon	10.9	57	43

Comet Magnitude Formula (from fit to ALPO and COBS data)

$$m1 = 5.4 + 5 \log d + 21.3 \log r$$



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
4	2021 11 05.36	S 10.6	TK	12.5B		30	2 4		ICQ xx	HER02 Carl Hergenrother
4	2021 11 05.09	S 11.2	TK	20.3T10		100	3 2/		ICQ XX	GON05 J J Gonzalez Suarez
4	2021 10 10.97	S 11.2	TI	53.1L		139	1.7 3/	2.5m270	ICQ XX	HAR11 Christian Harder
4	2021 10 10.02	S 11.3	TI	53.1L		139	1.8 4		ICQ XX	HAR11 Christian Harder
4	2021 10 09.67	xM 11.9	AQ	40.0L	4	59	1.6 5/	7.5m274	ICQ XX	WYA Christopher Wyatt
4	2021 10 08.72	xM 12.0	AQ	40.0L	4	108	1 6	4.7m272	ICQ XX	WYA Christopher Wyatt
4	2021 10 08.01	S 11.4	TI	53.1L		139	1.3 4		ICQ XX	HAR11 Christian Harder
4	2021 10 07.18	S 10.5	TK	20.3T10		100	3 2/		ICQ XX	GON05 J J Gonzalez Suarez
4	2021 10 07.15	S 11.9	TK	32.0L	5	80	1.5 3		ICQ XX	PIL01 Uwe Pilz
4	2021 10 07.15	xI 12.0	TK	25.0C10		62	0.75 2/		ICQ XX	DECaa Michel Deconinck
4	2021 10 07.14	xI 12.0	TK	25.0C10		195	0.75 2/		ICQ XX	DECaa Michel Deconinck
4	2021 10 06.07	S 11.4	TI	53.1L		139	1.3 4		ICQ XX	HAR11 Christian Harder

4P/Faye was a visual discovery by Herve Faye (Royal Observatory, Paris, France) on 1843 November 23. The comet was abnormally bright and reported to be visible to the naked eye only days after discovery. At its best subsequent apparitions, it only peaked at 9th magnitude (as in 1991 and 2006).

This year's apparition is Faye's 22nd observed return with the comet having been missed at its 1903 and 1918 returns. 2021 is a moderately good, but not great, apparition with perihelion on 2021 September 8 at 1.62 au. Even though perihelion was a month ago, the comet will continue to move closer to the Earth until December 5 (0.94 au). As a result, it will stay close to maximum brightness through November. It is a morning object observable from both hemispheres as it moves through Monoceros.

Faye was well observed in October with no less than a dozen visual observations submitted to the ALPO. The most recent observations from November 5th placed the comet around magnitude 10.6-11.2 (aperture corrected to 10.2 to 10.9). While the tail has been a striking feature in images, visual observers have also caught glimpses of the tail. Chris Wyatt reported a 7.5' long tail with a 0.4-m reflector on October 9.

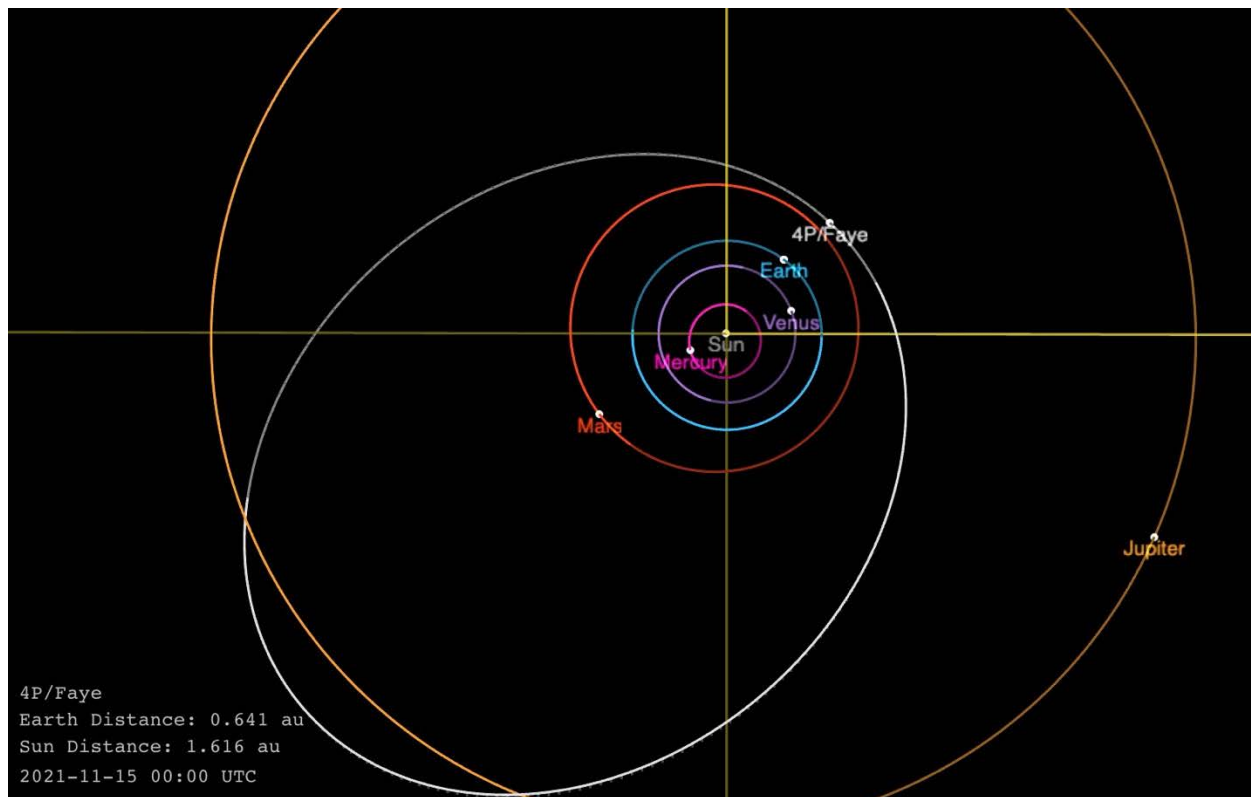


Figure 6 - Orbit of 4P/Faye from the JPL Small-Body Browser.

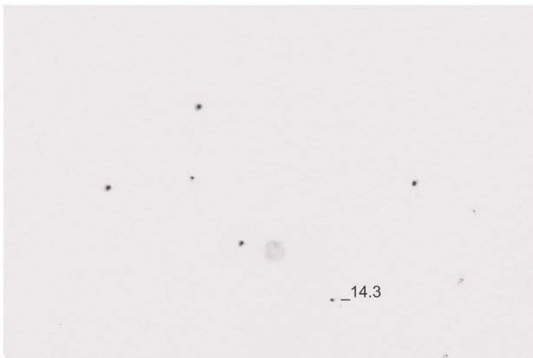
Comet 4P (Faye)

2021/10/07 - 3h25 UTC



Takahashi Mewlon 10" f10 62x

F.O.S.: 0.8°



Takahashi Mewlon 10" f10 - 195x

F.O.S.: 20'

ICQ: 4 2021 10 07.15 xl 12.0 TK 25.0C10 62 0.75 2/

Aquarellia Observatory

Figure 7 – Sketch of 4P/Faye by Michel Deconinck on 2021 October 7 with a Takahashi Mewlon 0.25-m f/10 at 62x and 195x.

6P/d'Arrest

Discovered on 1851 June 28 by the Heinrich Ludwig d'Arrest

Orbit (from MPEC 2021-U109)

6P/d'Arrest
 Epoch 2021 July 5.0 TT = JDT 2459400.5
 T 2021 Sept. 17.78506 TT

q	1.3545948	(2000.0)	P	Rudenko	Q
n	0.15067526	Peri. 178.10556	+0.73308836		+0.64376842
a	3.4976371	Node 138.93541	-0.62832017		+0.76453460
e	0.6127115	Incl. 19.51257	-0.26037516		-0.03238932
P	6.54				

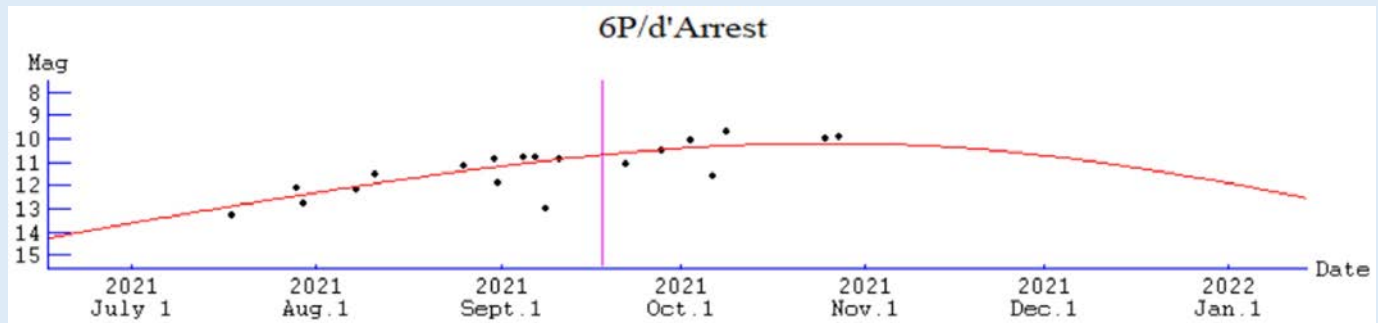
From 3114 observations 1987 Mar. 31–2021 Oct. 26, mean residual 1".0.
 Nongravitational parameters A1 = +0.53, A2 = +0.0991.

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

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El	
								40N	40S
2021 Nov 01	20 44	-31 46	1.446	1.112	86E	Mic	10.2	18	62
2021 Nov 06	21 03	-31 31	1.467	1.157	85E	Mic	10.2	18	60
2021 Nov 11	21 22	-31 03	1.489	1.206	84E	Mic	10.3	19	58
2021 Nov 16	21 40	-30 24	1.513	1.256	83E	PsA	10.4	20	56
2021 Nov 21	21 57	-29 35	1.538	1.309	82E	PsA	10.5	20	53
2021 Nov 26	22 14	-28 37	1.565	1.365	81E	PsA	10.6	21	51
2021 Dec 01	22 30	-27 33	1.593	1.423	80E	PsA	10.7	22	48
2021 Dec 06	22 45	-26 23	1.622	1.483	79E	PsA	10.9	24	45

Comet Magnitude Formula (from fit to ALPO and COBS data, seasonal offset fixed at T+60 days)

$$m_1 = 6.6 + 5 \log d + 24.8 \log r(t-60)$$



Recent Magnitude Measurements Contributed to the ALPO Comets Section

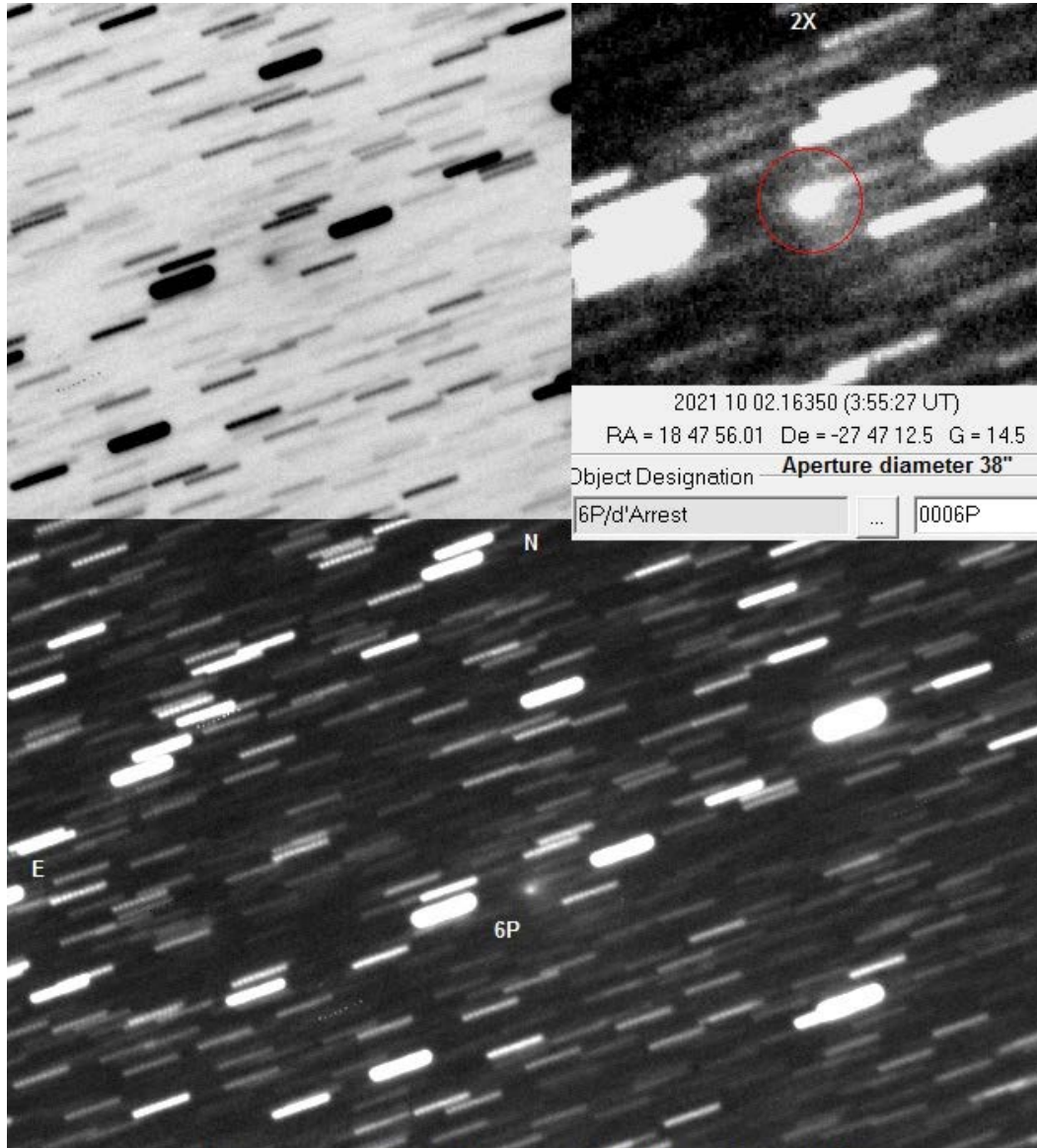
Recent Magnitude Measurements in ICQ format:

Comet Des	YYYY MM DD.DD (UT)	Mag	SC	APER	FL	POW	T	COMA		TAIL		ICQ CODE	Observer Name
								Dia	DC	LENG	PA		
6	2021 10 27.80	S 10.2	TK	20.3	T10	100		5	1/			ICQ XX GON05	J J Gonzalez
6	2021 10 25.45	xM 10.6	AQ	40.0	L	4	59	4.5	3/4			ICQ XX WYA	Christopher Wyatt
6	2021 10 06.43	xM 12.2	AQ	40.0	L	4	108	1.9	4			ICQ XX WYA	Christopher Wyatt

Heinrich Louis d'Arrest discovered 6P visually in June 1851. We now know that it had also been observed by Phillipe la Hire in 1678. Long-time comet watchers may remember this comet's excellent apparition in 1976 when it passed 0.15 au from Earth and reached 5th magnitude. d'Arrest's perihelion distance is larger now (1.35 au) so such close approaches are no longer possible. This year, closest approach to Earth was on August 2 at 0.75 au and perihelion on September 17.

d'Arrest usually possesses an asymmetrical lightcurve with respect to perihelion. In d'Arrest's case, it means the comet is at its brightest nearly a month after perihelion. If this is true this return, it should fade this month after peaking in brightness at around magnitude 10.2. In late October we received magnitude estimates from Chris Wyatt, original mag 10.6, aperture corrected mag 10.2, on the 25th and J. J. Gonzalez, original mag 10.2, aperture corrected mag on 9.9, on the 27th. Both observers measured a coma on the order of 4-5'.

d'Arrest remains an evening object as it moves through Microscopium (Nov 1-11), Pisces Austrinus (Nov 11-30).



6P/d'Arrest, Coma >26", 2021 Oct 2 0345-0405UT, 10x120s, FOV 13'x8'
 11" SCT f/6.4 STF-8300M 1.24"/pixel Mike Olason, Tucson Arizona
 Figure 8 – Image of 6P/d'Arrest by Michael Olason on 2021 October 2 with a C11 at f/6.4.

19P/Borrelly

Discovered 1904 December 28 by the Alphonse Borrelly
Short-period comet with orbital period of ~6.85 years

Orbit (from Minor Planet Center, MPEC 2021-U109)

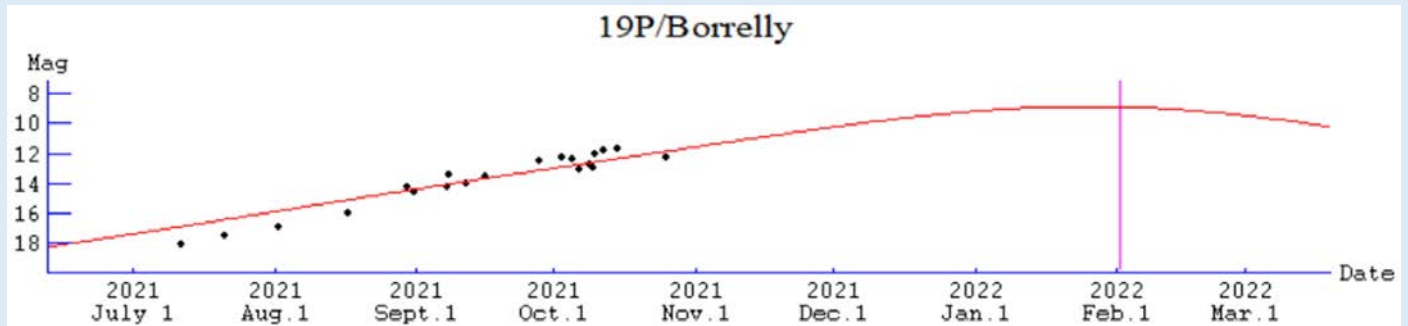
19P/Borrelly
Epoch 2021 July 5.0 TT = JDT 2459400.5
T 2022 Feb. 1.80438 TT Rudenko
q 1.3063303 (2000.0) P Q
n 0.14391022 Peri. 351.89099 +0.38690377 -0.79268559
a 3.6064089 Node 74.26303 +0.87111749 +0.14663878
e 0.6377753 Incl. 29.30561 +0.30242319 +0.59173188
P 6.85
From 419 observations 2015 Jan. 11–2021 Oct. 25, mean residual 0".7.
Nongravitational parameters A1 = -0.73, A2 = -0.5606.

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

Date	R.A.	Decl.	r	d	Elong	Const	Mag	Max El (deg)	
								40N	40S
2021 Nov 01	23 04	-52 04	1.689	1.193	100E	Gru	11.6	0	78
2021 Nov 06	23 05	-50 11	1.655	1.189	98E	Gru	11.3	0	79
2021 Nov 11	23 07	-48 06	1.622	1.186	95E	Gru	11.1	2	78
2021 Nov 16	23 11	-45 50	1.590	1.183	93E	Gru	10.9	4	76
2021 Nov 21	23 15	-43 25	1.559	1.180	91E	Gru	10.7	7	72
2021 Nov 26	23 20	-40 50	1.529	1.177	89E	Gru	10.5	9	67
2021 Dec 01	23 26	-38 07	1.500	1.175	87E	Gru	10.3	12	63
2021 Dec 06	23 33	-35 14	1.473	1.174	85E	Scl	10.1	15	58

Comet Magnitude Formula (from Seiichi Yoshida)

$$m_1 = 5.5 + 5 \log d + 25.0 \log r$$



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
19	2021 10 25.44	xM 12.9	AQ	40.0L	4	108	1.2 6		ICQ XX WYA		Christopher Wyatt
19	2021 10 09.64	xM 13.6	AQ	40.0L	4	108	1 6		ICQ XX WYA		Christopher Wyatt
19	2021 10 08.69	xM 13.4	AQ	40.0L	4	108	1.3 6		ICQ XX WYA		Christopher Wyatt
19	2021 10 06.45	xM 13.7	AQ	40.0L	4	108	1 6		ICQ XX WYA		Christopher Wyatt

19P/Borrelly will be one of the better comets of 2022 when it should reach 9th magnitude around the time of its 2022 February 1 perihelion (at 1.31 au). Till now, the comet has only been observable from the southern hemisphere. Chris Wyatt was able to observe it from his home in Australia on 4 nights in October. His last observation on October 25th found 19P to be magnitude 12.9 (aperture corrected to 12.3) with a moderately

condensed 1.2' coma. By mid-month, northern observers will be able to visually observe Borrelly as it moves northward through Grus in the evening sky. It should reach a brightness around magnitude 10.5 by the end of November.

19P/Borrelly is one of 10 comets and 18 Main Belt asteroids discovered by Alphonse Borrelly from the Marseille Observatory. In addition to his discovery of 19P in 1904, Borrelly also discovered C/1873 Q1 (Borrelly), C/1874 O1 (Borrelly), C/1874 X1 (Borrelly), C/1877 C1 (Borrelly), C/1889 X1 (Borrelly), C/1900 O1 (Borrelly-Brooks), C/1903 M1 (Borrelly), C/1909 L1 (Borrelly-Daniel), C/1912 V1 (Borrelly).

The current apparition marks the comet's 16th observed return. 19P's orbit has been stable since discovery with perihelion staying between 1.30 and 1.46 au (this year it is at 1.31 au so nearly as close as it's been since discovery). The comet approached within 1 au of Earth during its first 4 observed returns (1904, 1911, 1918 and 1925) and peaked between 8th and 10th magnitude. There was a stretch of 6 perihelion passages between 1938 and 1974 when the comet arrived at perihelion almost directly behind the Sun at ~2.3 to 2.5 au from Earth. Returns in 1987 and 1994 were much better with approaches to 0.48 and 0.62 au of Earth and peaks at magnitude 7 and 7.5, respectively. 2022 starts a new cycle of good apparitions. Though still a distant 1.18 au from Earth at its closest this time around, it will come closer in 2028 (0.41 au) and 2035 (0.62 au). The 2028 will be Borrelly's best observed return.

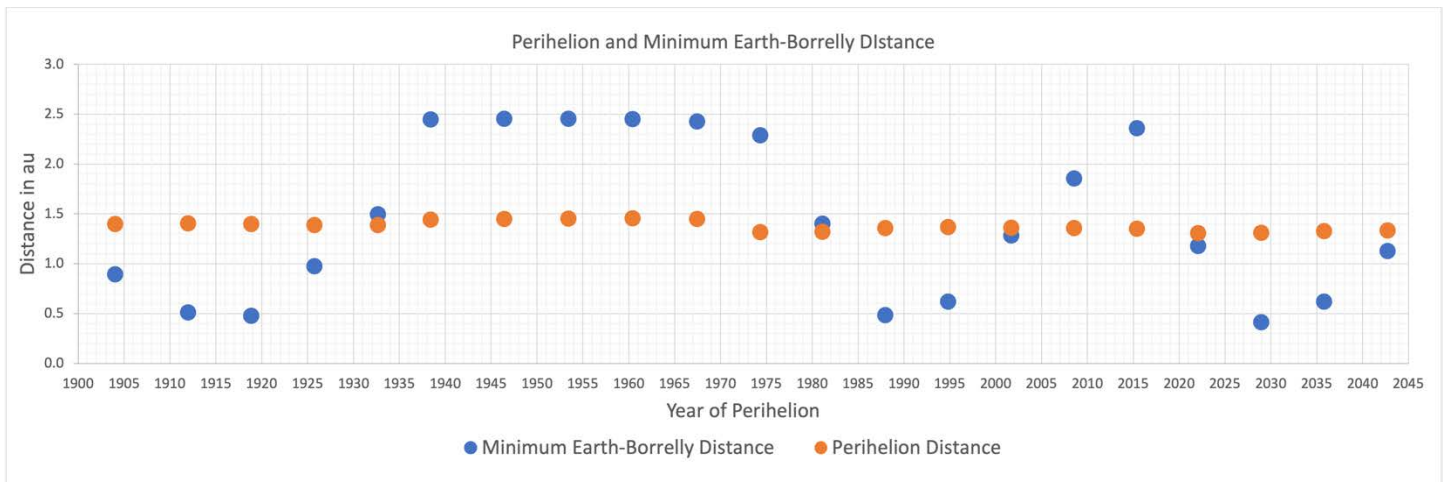


Figure 9 - Perihelion and minimum Earth-comet distances for 19P/Borrelly between 1904 and 2042.

29P/Schwassmann-Wachmann

Discovered 1927 November 15 by the Arnold Schwassmann and Arno Arthur Wachmann at the Hamburg Observatory in Bergedorf, Germany

Centaur comet with orbital period of ~14.8 years

Orbit (from Minor Planet Center, MPEC 2021-U109)

29P/Schwassmann-Wachmann
 Epoch 2021 July 5.0 TT = JDT 2459400.5
 T 2019 Mar. 26.65803 TT Rudenko
 q 5.7691442 (2000.0) P Q
 n 0.06642076 Peri. 49.15092 +0.99219432 -0.03308064
 a 6.0385613 Node 312.37551 -0.03076826 +0.86941941
 e 0.0446161 Incl. 9.36679 +0.12084592 +0.49296608
 P 14.8
 From 9993 observations 2018 June 18–2021 Aug. 10, mean residual 0".6.

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

29P/Schwassmann-Wachmann									Max El (deg)	
Date	R.A.	Decl.	r	d	Elong	Const	Mag		40N	40S
2021 Nov 01	04 52	+32 16	5.927	5.113	141M	Aur	var		82	18
2021 Nov 06	04 50	+32 16	5.928	5.071	147M	Aur	var		82	18
2021 Nov 11	04 48	+32 15	5.930	5.035	152M	Aur	var		82	18
2021 Nov 16	04 45	+32 13	5.931	5.006	157M	Aur	var		82	18
2021 Nov 21	04 43	+32 10	5.932	4.984	162M	Aur	var		82	18
2021 Nov 26	04 40	+32 05	5.934	4.970	166M	Aur	var		82	18
2021 Dec 01	04 37	+31 59	5.935	4.963	169M	Per	var		82	18
2021 Dec 06	04 35	+31 52	5.937	4.964	170E	Per	var		82	18

Comet Magnitude Formula

None, due to frequent outbursts.

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
29	2021 11 05.11	S 10.0	TK	20.3	T10	77	4 3		ICQ XX	GON05	Juan Jose Gonzalez Suarez
29	2021 11 04.50	S 10.7	TK	12.5	B	30	3 2		ICQ xx	HER02	Carl Hergenrother
29	2021 11 02.13	S 10.6	TI	29.8	L 4	92	2.9 2		ICQ XX	HAR11	Christian Harder
29	2021 11 01.85	S 11.4	TI	53.1	L	139	1.8 3		ICQ XX	HAR11	Christian Harder
29	2021 10 27.87	S 10.1	TK	20.3	T10	77	4 3		ICQ XX	GON05	Juan Jose Gonzalez Suarez
29	2021 10 07.94	S 10.9	TI	53.1	L	139	1.8 3/		ICQ XX	HAR11	Christian Harder
29	2021 10 07.13	S 10.7	TK	32.0	L 5	80	1.6 6/		ICQ XX	PIL01	Uwe Pilz
29	2021 10 07.11	xE 10.5	TK	25.0	C10	62	1.3 6		ICQ XX	DECa	Michel Deconinck
29	2021 10 07.11	xI 10.5	TK	25.0	C10	195	1.2 6		ICQ XX	DECa	Michel Deconinck
29	2021 10 07.01	S 10.4	TK	20.3	T10	77	2.5 6		ICQ XX	GON05	Juan Jose Gonzalez Suarez
29	2021 10 06.04	S 10.9	TI	53.1	L	139	1.5 4/		ICQ XX	HAR11	Christian Harder

29P/Schwassmann-Wachmann was discovered photographically on 1927 November 15 by German observing team Arnold Schwassmann and Arno Arthur Wachmann. The duo discovered 4 comets together, three short-period comets (29P/Schwassmann-Wachmann, 31P/Schwassmann-Wachmann, and 73P/Schwassmann-Wachmann) and a long-period comet shared with Leslie Peltier [C/1930 D1 (Peltier-Schwassmann-Wachmann)].

29P is one of the more enigmatic comets. It is always active and rarely fainter than 17th-18th magnitude. Multiple times per year outbursts occur resulting in a peak brightness that can reach 10th magnitude though most peaks fall in the 11th to 14th magnitude range. This is especially odd since the comet's orbit is nearly circular (e=0.04), so the comet does not experience large variations in solar heating like most comets. Richard Miles

(Director of the British Astronomical Society's Asteroids and Remote Planets Section) has published a series of papers on 29P and its outbursts. He found that as many as 6 active areas are producing outbursts on a nucleus with a rotation period of ~57-58 days.

29P is also considered a member of the Centaur population. Different organizations have different definitions for what constitutes a member of the Centaurs. The two most common definitions are from the Minor Planet Center (perihelion beyond the orbit of Jupiter and semi-major axis within the orbit of Neptune) and the Jet Propulsion Laboratory (semi-major axis between the orbits of Jupiter and Neptune). Both definitions would classify 29P as a Centaur.

Currently the comet is in the midst of a series of major outbursts. Outbursts were observed on September 25, 26, two on 27, October 16, 23, and November 3. As a result, the comet is about as bright as it ever gets with many visual observers reporting the comet to be between magnitude 10 and 11 with a coma diameter between 1.2' and 4'. Imagers and some visual sketchers are reporting jet-like features in the inner coma.

The comet is approaching opposition this month in Auriga and observable from both hemispheres. If you observe 29P, please consider contributing to two pro-am efforts to better understand this object: the British Astronomical Society's (BAA) Mission 29P monitoring program coordinated by Richard Miles. (<https://britastro.org/node/18562> & <https://britastro.org/node/25120>) and the University of Maryland's 29P Observation campaign (https://wirtanen.astro.umd.edu/29P/29P_obs.shtml).

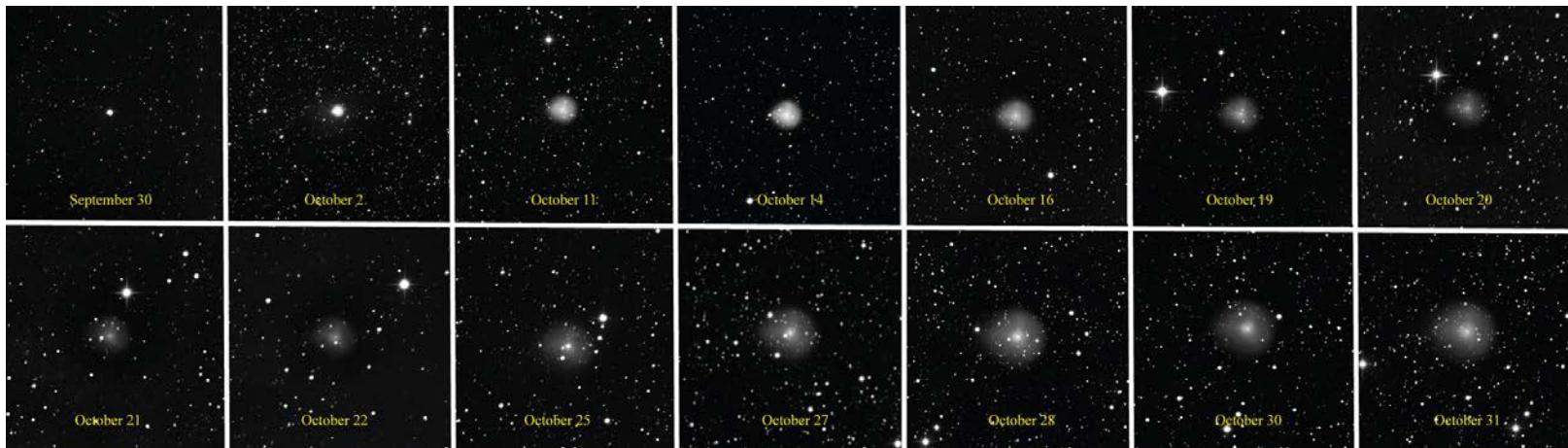


Figure 10 - Eliot Herman caught this sequence of images of 29P's evolving outbursts with the iTelescope T11 0.5-m Planewave.

57P/du Toit-Neujmin-Delporte

Discovered on 1941 July 18 by Daniel du Toit at the Harvard College Observatory's Boyden Station in South Africa, on 1941 July 25 by Grigory N. Neujmin at the Simeis Observatory in Russia, and on 1941 August 19 by Eugène Joseph Delporte of the Royal Observatory in Uccle, Belgium
 Jupiter-family comet with orbital period of 6.4 years

Orbit (from Minor Planet Center, MPEC 2021-U109)

57P/du Toit-Neujmin-Delporte
 Epoch 2021 July 5.0 TT = JDT 2459400.5
 T 2021 Oct. 17.42636 TT Rudenko
 q 1.7201104 (2000.0) P Q
 n 0.15406554 Peri. 115.26138 +0.55958663 +0.82873711
 a 3.4461357 Node 188.77764 -0.77715503 +0.52153147
 e 0.5008582 Incl. 2.85093 -0.28791121 +0.20297715
 P 6.40
 From 1000 observations 2015 Feb. 18–2021 Oct. 26, mean residual 0".6.

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

57P/du Toit-Neujmin-Delporte									Max El	
Date	R.A.	Decl.	r	d	Elong	Const	Mag		40N	40S
(deg)										
2021 Nov 01	18 47	-20 51	1.726	1.940	62E	Sgr	var		21	34
2021 Nov 06	19 02	-20 39	1.730	1.979	60E	Sgr	var		21	31
2021 Nov 11	19 16	-20 21	1.735	2.019	59E	Sgr	var		21	28
2021 Nov 16	19 30	-19 59	1.742	2.059	57E	Sgr	var		21	25
2021 Nov 21	19 44	-19 32	1.750	2.101	55E	Sgr	var		21	22
2021 Nov 26	19 58	-19 00	1.759	2.143	54E	Sgr	var		21	19
2021 Dec 01	20 12	-18 24	1.769	2.187	52E	Cap	var		21	17
2021 Dec 06	20 26	-17 44	1.780	2.231	50E	Cap	var		21	14

Comet Magnitude Formula

Currently in outburst

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
57	2021 10 27.78	S 11.3	TK	20.3	T10	100	2.0 4		ICQ XX	GON05	Juan Jose Gonzalez Suarez
57	2021 10 25.42	xM 12.7	AQ	40.0	L 4	108	0.9 6	2.6m 84	ICQ XX	WAY	Christopher Wyatt
57	2021 10 24.73	S 11.7	TI	53.1	L	155	1 4		ICQ XX	HAR11	Christian Harder

Discovered in 1941, 57P/du Toit-Neujmin-Delporte is making its 9th observed return and was not expected to become much brighter than 16th magnitude. That was the case until October 17, its perihelion date, when comet imager Francois Kugel captured the comet at magnitude 11.9 [[image](#)].

Daniel du Toit was the first person to discover 57P on 1941 July 18 from the Harvard College Observatory's Boyden Station in South Africa only a few days after a close approach to Earth of 0.30 au. Due to World War II, communications were slow and two other observers, Grigory N. Neujmin at Simeis Observatory in Russia and Eugène Joseph Delporte of the Royal Observatory in Uccle, Belgium also found the comet over the next month or so. All three observers reported the comet to be around 9-10th magnitude. For du Toit, 57P was one of five discoveries including 66P/du Toit, 79P/du Toit-Hartley, C/1945 L1 (du Toit), and the sungrazer C/1945 X1 (du Toit). Neujmin found six comets including 25D/Neujmin, 28P/Neujmin, 42P/Neujmin, 58P/Jackson-Neujmin, and C/1914 M1 (Neujmin). 57P is the only discovery by Delporte.

At its discovery apparition in 1941, 57P had a perihelion distance of 1.31 au. A close approach to Jupiter in 1954 of 0.69 au moved its perihelion out to around 1.48 au. Another Jupiter approach in 1966 of 0.64 au moved

perihelion out once again this time to around 1.67 au. Since then, its perihelion has marginally increased to the current value of 1.72 au. The comet's increasing perihelion distance, the possibility that it was in outburst and abnormally bright in 1941, and in some cases poor placement led to missed returns in 1947, 1952, 1958, and 1964. The 1964 return, while not as good as the 1941 return, did see 57P come within 0.50 au of Earth but due to presumed faintness was not seen.

Brian Marsden (Minor Planet Center) was able to accurately predict the comet's 1970 return allowing a photographic recovery by Charles Kowal at 19th magnitude [IAUC 2222,2264]. 1977 would be another missed apparition but the comet would be observed at every subsequent return starting in 1983.

The abnormal brightness in 1941 was suggestive of an outburst. The comet's behavior in 1996 confirmed that 57P was indeed outburst prone when it brightened by ~6 magnitude to 12th magnitude 3-4 months after perihelion [IAUC 6441]. The 2002 return saw the comet accompanied by 19 secondary nuclei [IAUC 7934,7935], the result of a series of splitting events that could have started during the previous return in 1996 [IAUC 7946,7957].

At the end of October, visual observers J. J. Gonzalez, Christian Harder, and Chris Wyatt observed 57P to be between magnitude 11.3 and 12.7 (corrected to 10.8 to 12.1) with a coma diameter between 0.9 and 2.0'. Wyatt also noted a 2.6' long tail. November sees 57P as an evening object in Sagittarius (Nov 1-29) and Capricornus (29-30). Unless another outburst occurs, 57P should rapidly fade over the coming weeks.



Figure 11 - 57P/du Toit-Neujmin-Delporte as imaged by Tenho Tuomi on 2021 October 31 with a 0.30-m f/5 newtonian. Image is a composite of 20x60s exposures.

C/2017 K2 (PANSTARRS)

Discovered 2017 May 21 by the Pan-STARRS survey with the Pan-STARRS1 1.8-m on Haleakala
Dynamically old long-period comet

Orbit (from MPEC 2021-U109)

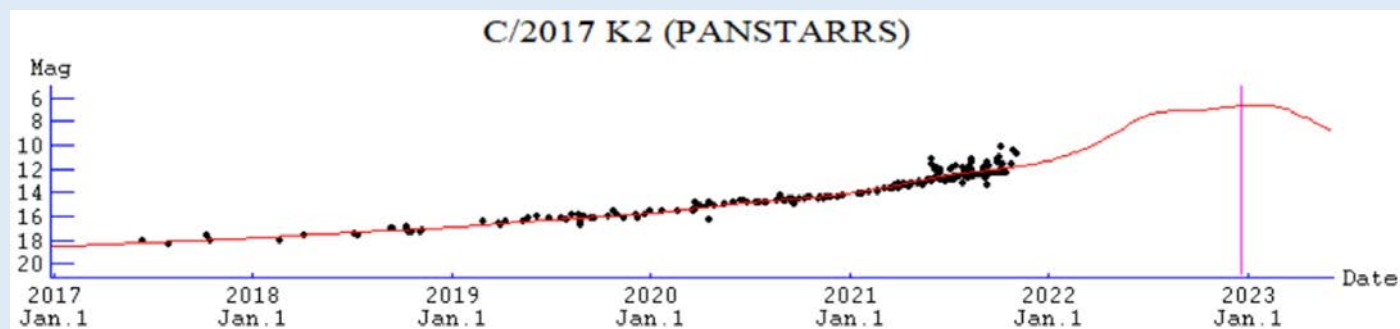
C/2017 K2 (PANSTARRS)
Epoch 2022 Dec. 7.0 TT = JDT 2459920.5
T 2022 Dec. 19.67922 TT Rudenko
q 1.7969357 (2000.0) P Q
z -0.0004685 Peri. 236.19780 +0.01818629 +0.04922985
+/-0.0000003 Node 88.23555 -0.18093746 +0.98245825
e 1.0008419 Incl. 87.56304 -0.98332644 -0.17986721
From 6796 observations 2013 May 12–2021 Oct. 26, mean residual 0".5.

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

C/2017 K2 (PANSTARRS)										Max El (deg)	
Date	R.A.	Decl.	r	d	Elong	Const	Mag	40N	40S		
2021 Nov 01	17 13	+20 41	4.934	5.448	54E	Her	11.8	37	0		
2021 Nov 06	17 16	+19 52	4.891	5.443	51E	Her	11.8	34	0		
2021 Nov 11	17 19	+19 05	4.847	5.435	49E	Her	11.8	31	0		
2021 Nov 16	17 23	+18 20	4.803	5.423	46E	Her	11.7	28	0		
2021 Nov 21	17 26	+17 38	4.759	5.408	44E	Her	11.7	25	0		
2021 Nov 26	17 30	+16 58	4.715	5.389	42E	Her	11.6	22	0		
2021 Dec 01	17 33	+16 20	4.671	5.366	41E	Her	11.6	19	0		
2021 Dec 06	17 37	+15 44	4.627	5.339	39E	Her	11.6	16	0		

Comet Magnitude Formula (from ALPO and COBS data)

$$m_1 = 2.6 + 5 \log d + 8.0 \log r$$



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
2017K2	2021 11 01.79	S 11.6	TI	53.1L		155	1.3 3		ICQ XX	HAR11	Christian Harder
2017K2	2021 10 27.81	S 10.8	TK	20.3T10		77	3 4		ICQ XX	GON05	Juan Jose Gonzalez Suarez
2017K2	2021 10 24.74	S 12.5	TI	53.1L		107	1.4 3/		ICQ XX	HAR11	Christian Harder
2017K2	2021 10 07.77	S 12.5	TI	53.1L		155	1 3		ICQ XX	HAR11	Christian Harder
2017K2	2021 10 06.93	S 10.4	TK	20.3T10		100	3 3		ICQ XX	GON05	Juan Jose Gonzalez Suarez
2017K2	2021 10 06.40	xM 12.7	AQ	40.0L	4	108	1.2 4/		ICQ XX	WYA	Christopher Wyatt
2017K2	2021 10 01.83	S 11.2	TK	10.5R	6	37	2 4		ICQ XX	PIL01	Uwe Pilz

C/2017 K2 (PANSTARRS) was discovered on 2017 May 21 by the Pan-STARRS1 1.8-m telescope at Haleakala on the Hawaiian island of Maui. At discovery the comet was around 21st magnitude and located at 16.1 au from the Sun. Pre-discovery observations were found back to May of 2013 when the comet was 23.7 au

from the Sun which is further than the distance of Uranus. Even though it was discovered over 2.5 years ago, perihelion is still over a year away on 2022 December 19 at 1.80 au.

Multiple visual observations were submitted in October by J. J. Gonzalez, Christian Harder, Uwe Pilz, and Chris Wyatt. The visual magnitudes ranged between 10.4 and 12.7 with coma diameters between 1' and 3'. The comet seems to be following a steady brightening rate of $2.5m \sim 8$ going back to 2017. The prediction above shows the comet brightening from around magnitude 11.8 to 11.6 this month. Note, that since the comet has brightened into visual range, a few observers have routinely estimated the comet to be a magnitude or more brighter than the prediction. It will be interesting if more observers using smaller apertures start picking up the comet in the coming weeks at a brighter magnitude than predicted.

C/2017 K2 is an evening object in Hercules and only visible from the northern hemisphere. Though closing in on solar conjunction, the comet will pass far enough north of the Sun to be followed through conjunction. Southern hemisphere observers won't see the comet again till February 2022 when it should be magnitude 10.5. Northern observers will be able to follow the comet continuously till late September when it will travel too far south (around magnitude 7.0 at that time). C/2017 K2 should peak in January 2023 around magnitude 6.5 and at a far southern declination of -70 deg. Northern observers will see the comet again till August 2023 when it will have faded to around magnitude 10.0.

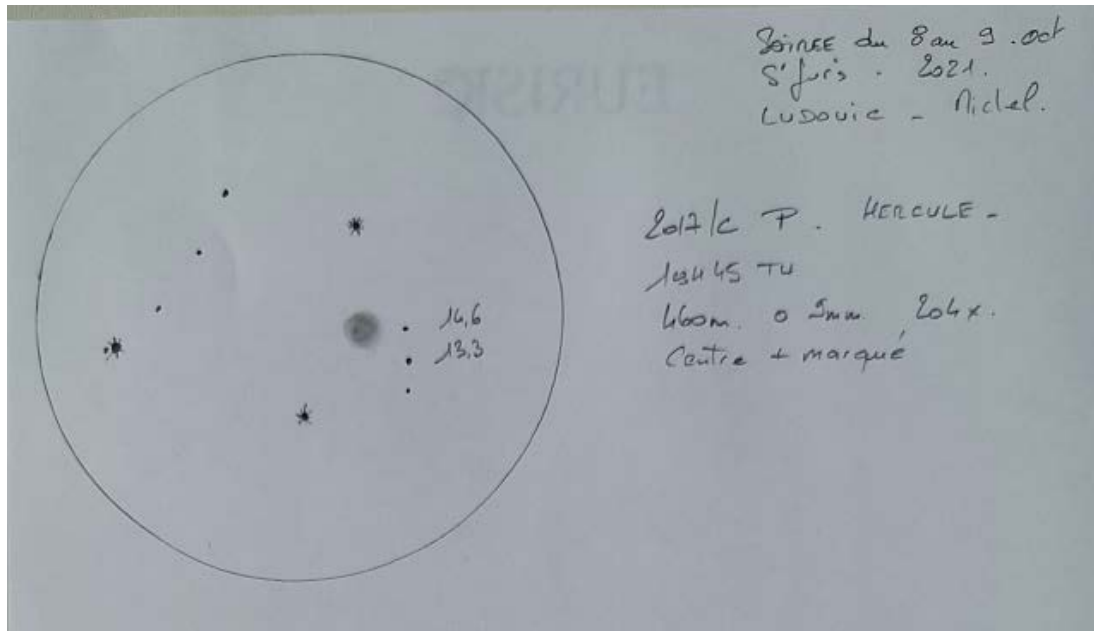


Figure 12 – Michel Besson and Ludovic Prebet sketched C/2017 K2 (PANSTARRS) on 2021 October 8.

Fainter Comets of Interest (Fainter than 13.0)

C/2021 O3 (PANSTARRS)

Discovered 2021 July 26 by Pan-STARRS with the 1.8-m Pan-STARRS1 1.8-m on Haleakala

Orbit (from Minor Planet Center, MPEC 2021-U109)

C/2021 O3 (PANSTARRS)
 Epoch 2021 July 5.0 TT = JDT 2459400.5
 T 2022 Apr. 21.05266 TT Rudenko
 q 0.2872445 (2000.0) P Q
 z -0.0004002 Peri. 299.97411 -0.56820943 -0.81228783
 +/-0.0000104 Node 189.05865 +0.64653726 -0.53964602
 e 1.0001150 Incl. 56.72398 -0.50904579 +0.22129314
 From 458 observations 2021 July 26-Oct. 26, mean residual 0".4.

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

C/2021 O3 (PANSTARRS)									Max El (deg)	
Date	R.A.	Decl.	r	d	Elong	Const	Mag		40N	40S
2021 Nov 01	22 00	+14 49	3.132	2.565	116E	Peg	17.5		65	33
2021 Nov 06	21 58	+13 33	3.066	2.568	110E	Peg	17.4		64	33
2021 Nov 11	21 56	+12 19	2.999	2.574	105E	Peg	17.4		62	31
2021 Nov 16	21 55	+11 07	2.932	2.583	100E	Peg	17.3		61	28
2021 Nov 21	21 55	+09 59	2.865	2.594	95E	Peg	17.2		60	25
2021 Nov 26	21 55	+08 55	2.796	2.605	90E	Peg	17.2		58	22
2021 Dec 01	21 57	+07 54	2.727	2.617	85E	Peg	17.1		56	19
2021 Dec 06	21 58	+06 58	2.657	2.628	80E	Peg	17.0		54	15

Comet Magnitude Formula (based on data submitted to the COBS and the MPC)

$$m_1 = 11.5 + 5 \log d + 8 \log r$$

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 O3 (PANSTARRS) was first seen on July 26 at 19th magnitude by the Pan-STARRS1 1.8-m Ritchey-Chretien on Haleakala. Perihelion will occur on 2022 April 21 at a close distance of 0.29 au from the Sun. C/2021 O3 will experience some of the same observational issues as C/2021 A1 (Leonard). On the plus side, PANSTARRS will reach a relatively large phase angle though not as large as Leonard (only ~136 vs 160 deg). But PANSTARRS will also be located at very small solar elongations near perihelion which will make it a VERY difficult object to observe until a few weeks after perihelion and then only for northern observers. Not helping matters is C/2020 O3's faintness.

Since discovery, C/2021 O3 has been brightening very slowly and remains a 17th magnitude object. While there is still hope it could become a nice small aperture object next April and May, the slow rate of brightening is a cause for concern. Its intrinsic faintness and small perihelion distance suggest an object that may not survive perihelion or even reach perihelion. Then again, the comet is a dynamically old long-period comet with a ~7200-year period so it has survived at least one, and possible multiple, perihelion passage(s).

November sees C/2021 O3 as an evening object in Pegasus in the evening sky for observers in both hemispheres. Southern hemisphere observers should be able to follow PANSTARRS till the end of the year when the comet could be around 15-16th magnitude. Northern hemisphere observers will be able to follow it for

another month or two till mid-February when it could be as bright as 13-14th magnitude. The comet will then spend the next two and a half months within 20 deg of the Sun.

The following paragraph hasn't changed from last month's issue:

The comet's orbit is aligned in such a way that the comet will be mainly a northern hemisphere object except for a week or so centered on perihelion. On the date of perihelion C/2021 O3 will be an evening object located only 16 deg from the Sun. Northern hemisphere observers (for +40N) will not be able to observe it at that time as it will still be 7 deg below the horizon at the start of nautical twilight. It will be observable from the southern hemisphere (-40S) when it will be at an elevation of 5 deg at the start of nautical twilight and only 1 deg below the horizon at the start of astronomical twilight. If its rate of brightening is $2.5^n \sim 8$, it will be at 6-7th magnitude. The combination of faintness and poor placement near the Sun will make observing this comet very difficult. The comet becomes observable in a dark sky (after the end of astronomical twilight) by the first few nights of May. This is around the time of maximum phase angle (135 deg) which may provide a 1-2 magnitude boost in brightness. Still, we are talking about an object that may only be around 4th-6th magnitude and still located ~20 deg from the Sun. Though it will be fading fast, the comet will quickly move north and become circumpolar by mid-May. Note, that this all assumes this apparently intrinsically faint comet survives its close brush with the Sun. Time will tell.

Imagers and photometrists are highly encouraged to observe PANSTARRS over the coming months.

New Discoveries, Recoveries and Other Comets News

Two recently discovered comets have the potential to be nice small telescope objects when they arrive at perihelion over the next few years. C/2021 S3 (PANSTARRS) may reach 8th magnitude in 2024 while C/2021 T4 (Lemmon) could be a 9th magnitude object in 2023.

C/2021 U4 (Leonard) – The 13th comet to be discovered by Greg Leonard of the Catalina Sky Survey was found on October 31 at 19th magnitude with the Mt Lemmon 1.5-m. C/2021 U4 appears to have a >300-year orbital period. Perihelion is next month on December 21 at 1.79 au meaning the comet is not likely to get much brighter. [CBET 5065, MPEC 2021-V22]

P/2021 U3 (Attard-Maury) – The MAP project team of Alain Maury, Georges Attard, and Daniel Parrott have found their 2nd comet, the first being C/2021 J1 (Maury-Attard). Alain was also the discoverer of comets C/1988 C1 (Maury-Phinney), 115P/1985 Q1 (Maury), and 198P/1998 X1 (ODAS). P/2021 U3 was found on October 24 at 19th magnitude with a 0.4-m reflector at San Pedro de Atacama in Chile. The comet has an 8.7-year period and perihelion on 2021 October 25 at 1.89 au. It should brighten to 17th magnitude when it arrives at opposition this December. [CBET 5064, MPEC 2021-V21]

P/2021 U1 (Wierzos) - Kacper W. Wierzos discovered a new 19th magnitude short-period comet on October 18 with the Mount Lemmon 1.5-m. This is the 3rd comet to carry Kacper's name and second from this year. Perihelion occurred back on 2021 September 30 at 2.45 au so the comet is likely passed maximum brightness. It will return in ~25 years. [CBET 5058, MPEC 2021-U43]

C/2021 T4 (Lemmon) – An apparently asteroidal object was found with the Mt Lemmon 1.5-m on October 7 at 20th magnitude. Pre-discovery observations from Mount Lemmon and Pan-STARRS was found back to August.

With a perihelion not till 2023 July 31 at 1.48 au, C/2021 T4 should have plenty of time to brighten into a nice small aperture object. A conservative $2.5n = 8$ brightening rate results in a peak brightness around magnitude 9.0 in late July 2023. Not only will the comet be at perihelion at that time but also at its closest approach to Earth at 0.54 au. Unfortunately for northern observers, the comet will be located far to the south (up to a declination of -56 deg) at its best. The comet starts November ~ 7 au from the Sun so we have plenty of time to watch this one develop.

P/2021 T3 = P/2015 K6 (PANSTARRS) – A new 20th magnitude short-period comet was found with the Pan-STARRS1 1.8-m on October 2. Additional pre-discovery images were found at its previous return in 2015-2017 in DECam (on the Cerro Tololo 4-m) and Pan-STARRS data. A single night observation was also found in 2002 in Sloan Digital Sky Survey data. Perihelion was this summer on 2021 July 27 at 2.06 au. The comet will be back again in 5.25 years with its next perihelion on 2026 October 26. [CBET 5056, MPEC 2021-T184]

C/2021 T2 (Fuls) – D. Carson Fuls discovered the 6th comet to bear his name on October 2 at 20th magnitude with the Mt Lemmon 1.5-m. Currently around 3 au from the Sun, C/2021 T2 will be much closer on 2022 June 7 when it arrives at perihelion at 1.25 au from the Sun. At that time, the comet will be around 13-14th magnitude but only visible to southern hemisphere observers. [CBET 5054, MPEC 2021-T169]

C/2021 T1 (Lemmon) – An apparently asteroidal object was discovered at 19-20th magnitude with the Mount Lemmon 1.5-m on October 2. C/2021 T1 is just passed its October 14 perihelion at 3.06 au. The comet has likely already peaked in brightness. [CBET 5053, MPEC 2021-168]

C/2021 S4 (Tsuchinshan) - Hai-bin Zhao reported the discovery of a 19th magnitude comet on images taken on September 29 with the 1.04-m f/1.8 Schmidt telescope at the XuYi station of the Purple Mountain (Tsuchinshan) Observatory. At discovery, the object was reported as asteroidal. This is the 5th comet to be named after Tsuchinshan Observatory. C/2021 S4 is a high-q long-period comet with a period of ~ 2700 years. Perihelion isn't till 2023 December 25 at 6.78 au. It should peak at around magnitude 18-19. [CBET 5052, MPEC 2021-T167]

C/2021 S3 (PANSTARRS) – The Pan-STARRS2 1.8-m was used to discover this comet at 19th magnitude on September 24. C/2021 S3 has a chance of becoming a nice 8th magnitude object when it arrives at perihelion though that won't be till early 2024 when it reaches perihelion (1.33 au on 2024 February 19) and closest approach to Earth (1.23 au on 2024 March 18). The comet's orbit suggests that it is a dynamically old long-period comet. Like C/2021 T4 (Lemmon), we've got time to watch this one develop as we await perihelion. As November starts, the comet is located 8.6 au from the Sun. Unlike C/2021 T4, C/2021 S3 will be well placed for observation from both hemispheres in the morning sky.

C/2021 R7 (PANSTARRS) – Both Pan-STARRS 1.8-m telescopes were involved in the discovery of this comet on the night of September 5. C/2021 R7 is a faint distant comet that should not get any brighter than its current brightness (21st mag). Perihelion was back on 2021 April 16 at 5.65 au.

C/2021 G2 (ATLAS) - An apparently asteroidal object was discovered on 2021 April 11 at 19th magnitude with the ATLAS 0.5-m f/2 astrograph on Mauna Loa. Pre-discovery observations have been found back to November 2020. C. Holt, University of Maryland, and M. Micheli found evidence of cometary activity in images taken on September 29 with the 4.1-m SOAR telescope at Cerro Pachon in Chile. This confirms reports of activity by other observers published in CBET 4988. The object is currently 9.0 au from Sun and nearly 3 years from a 2024 September 9 perihelion at 4.98 au. A peak brightness around 14th magnitude is expected in 2024. [Discovery Ref: MPEC 2021-M79, CBET 4988; New Activity ref: CBET 5057]

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 >, Comets Section Coordinator Carl Hergenrother < carl.hergenrother @ alpo-astronomy .org > and/or Comets Section Acting Assistant Coordinator Michel Deconinck < michel.deconinck @ alpo-astronomy .org >.

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

Stay safe and enjoy the sky!
- Carl Hergenrother

Recent Magnitudes Contributed to the ALPO Comets Section

Comet Des	YYYY MM DD.DD (UT)	Mag	SC	APER	FL	POW	COMA Dia DC	TAIL LENG PA	ICQ CODE	Observer Name
C/2021 K1 (ATLAS)	2021 10 02.39	C 15.1	GG	27.9T	6a	900	0.3	> 0.3m339	ICQ XX OLAXx	Mike Olason
C/2021 A1 (Leonard)	2021 11 05.23	S 9.7	TK	20.3T10	77	5	3/	0.3 330	ICQ XX GON05	Juan Jose Gonzalez Suarez
2021A1	2021 11 04.49	S 10.0	TK	12.5B	30	4	4		ICQ xx HER02	Carl Hergenrother
2021A1	2021 11 02.15	S 10.3	TI	29.8L	4	79	3	6.0m340	ICQ XX HAR11	Christian Harder
2021A1	2021 10 28.49	V 10.3	U4	10.6R	5A200	6.4		4.9m300	ICQ xx HER02	Carl Hergenrother
2021A1	2021 10 10.51	C 12.1	GG	27.9T	6a	960	>1	> 2 m350	ICQ XX OLAXx	Mike Olason
2021A1	2021 10 07.20	S 11.2	TK	20.3T10	100	5	2		ICQ XX GON05	Juan Jose Gonzalez Suarez
C/2020 T2 (Palomar)	2021 10 25.41	xM 13.4	AQ	40.0L	4	182	0.6		ICQ XX WAY	Christopher Wyatt
2020T2	2021 10 02.09	C 12.0	GG	27.9T	6a	600	>1.3		ICQ XX OLAXx	Mike Olason
C/2020 F5 (MASTER)	2021 10 25.46	xM 14.9	AQ	40.0L	4	182	0.7		ICQ XX WAY	Christopher Wyatt
2020F5	2021 10 09.63	xM 14.7	AQ	40.0L	4	182	0.7		ICQ XX WAY	Christopher Wyatt
2020F5	2021 10 06.46	xM 14.5	AQ	40.0L	4	108	1		ICQ XX WAY	Christopher Wyatt
C/2019 T4 (ATLAS)	2021 10 09.73	xM 13.8	AQ	40.0L	4	261	0.5		ICQ XX WAY	Christopher Wyatt
C/2019 LD2 (ATLAS)	2021 10 02.37	C 17.8	GG	27.9T	6A	800	0.1	> 4 m257	ICQ XX OLAXx	Mike Olason
C/2019 L3 (ATLAS)	2021 11 05.35	S 9.7	TK	12.5B	30	3	4		ICQ xx HER02	Carl Hergenrother
2019L3	2021 11 05.13	S 9.5	TK	20.3T10	77	5	4/		ICQ XX GON05	Juan Jose Gonzalez Suarez
2019L3	2021 11 02.12	S 10.2	TI	29.8L	4	79	1.8	6.0m275	ICQ XX HAR11	Christian Harder
2019L3	2021 10 28.88	S 10.6	TI	53.1L	139	1.6	4		ICQ XX HAR11	Christian Harder
2019L3	2021 10 27.90	S 9.6	TK	20.3T10	77	6	3/		ICQ XX GON05	Juan Jose Gonzalez Suarez
2019L3	2021 10 10.96	S 10.6	TI	53.1L	139	1.4	4	4.0m300	ICQ XX HAR11	Christian Harder
2019L3	2021 10 10.03	S 10.6	TI	53.1L	139	1.5	4	3.0m300	ICQ XX HAR11	Christian Harder
2019L3	2021 10 09.74	xM 11.1	AQ	40.0L	4	59	4	3.7m280	ICQ XX WAY	Christopher Wyatt
2019L3	2021 10 08.02	S 10.7	TI	53.1L	139	1.6	5	2.0m260	ICQ XX HAR11	Christian Harder
2019L3	2021 10 07.13	S 10.1	TK	32.0L	5	80	1	0.03 199	ICQ XX PIL01	Uwe Pilz
2019L3	2021 10 07.02	S 9.9	TK	20.3T10	100	4	4		ICQ XX GON05	Juan Jose Gonzalez Suarez
C/2019 F1 (ATLAS-Africano)	2021 10 09.64	xM 14.9	AQ	40.0L	4	261	0.5		ICQ XX WAY	Christopher Wyatt
2019F1	2021 10 06.44	xM 14.8	AQ	40.0L	4	261	0.4		ICQ XX WAY	Christopher Wyatt
C/2017 K2 (PANSTARRS)	2021 11 01.79	S 11.6	TI	53.1L	155	1.3	3		ICQ XX HAR11	Christian Harder
2017K2	2021 10 27.81	S 10.8	TK	20.3T10	77	3	4		ICQ XX GON05	Juan Jose Gonzalez Suarez
2017K2	2021 10 24.74	S 12.5	TI	53.1L	107	1.4	3/		ICQ XX HAR11	Christian Harder
2017K2	2021 10 12.78	S 12.3	TI	29.8L	4	170	0.6		ICQ XX HAR11	Christian Harder
2017K2	2021 10 10.78	S 12.7	TI	53.1L	155	1	3		ICQ XX HAR11	Christian Harder
2017K2	2021 10 09.76	S 12.7	TI	53.1B	155	1.1	4		ICQ XX HAR11	Christian Harder
2017K2	2021 10 07.77	S 12.5	TI	53.1L	155	1	3		ICQ XX HAR11	Christian Harder
2017K2	2021 10 06.93	S 10.4	TK	20.3T10	100	3	3		ICQ XX GON05	Juan Jose Gonzalez Suarez
2017K2	2021 10 06.40	xM 12.7	AQ	40.0L	4	108	1.2		ICQ XX WAY	Christopher Wyatt
2017K2	2021 10 01.83	S 11.2	TK	10.5R	6	37	2		ICQ XX PIL01	Uwe Pilz
433P/(248370) 2005 QN173	2021 10 02.33	C 17.5	GG	27.9T	6B	400	0.2	> 3 m246	ICQ XX OLAXx	Mike Olason
433	2021 10 02.33	C 17.5	GG	27.9T	6B	400	0.2	> 3 m246	ICQ XX OLAXx	Mike Olason
429P/LINEAR-Hill										

429	2021 10 10.27	C 19.6 GG 27.9T 6B040	0.1		ICQ XX OLAXx Mike Olason
424P/La Sagra					
424	2021 10 10.16	C 18.2 GG 27.9T 6A500	0.2		ICQ XX OLAXx Mike Olason
284P/McNaught					
284	2021 10 02.31	C 14.4 GG 27.9T 6a540	0.5		ICQ XX OLAXx Mike Olason
246P/NEAT					
246	2021 10 25.43	xM 15.3 AQ 40.0L 4 261	0.5	3/	ICQ XX WAY Christopher Wyatt
246	2021 10 06.41	xS 14.9 AQ 40.0L 4 261	0.3	3	ICQ XX WAY Christopher Wyatt
246	2021 10 02.19	C 14.7 GG 27.9T 6a960	0.3		ICQ XX OLAXx Mike Olason
230P/LINEAR					
230	2021 10 02.26	C 17.3 GG 27.9T 6a900	0.2		ICQ XX OLAXx Mike Olason
179P/Jedicke					
179	2021 10 02.42	C 19.1 GG 27.9T 6C600	0.2		ICQ XX OLAXx Mike Olason
132P/Helin-Roman-Alu					
132	2021 11 01.81	S 14.5 TI 53.1L 215	0.5	4	ICQ XX HAR11 Christian Harder
132	2021 10 28.79	S 14.2 TI 53.1L 215	0.35	4	ICQ XX HAR11 Christian Harder
132	2021 10 28.73	S 11.6 TI 53.1L 155	1.2	4	ICQ XX HAR11 Christian Harder
132	2021 10 25.47	xM 13.7 AQ 40.0L 4 108	1.2	6	ICQ XX WAY Christopher Wyatt
132	2021 10 10.85	S 14.2 TI 53.1L 215	0.4	4/	ICQ XX HAR11 Christian Harder
132	2021 10 09.84	S 14.1 TI 53.1L 215	0.35	4/	ICQ XX HAR11 Christian Harder
132	2021 10 09.65	xM 14.0 AQ 40.0L 4 108	0.8	6	ICQ XX WAY Christopher Wyatt
132	2021 10 08.85	S 14.2 TI 53.1L 242	0.3	4	ICQ XX HAR11 Christian Harder
132	2021 10 07.83	S 14.4 TI 53.1L 215	0.8	4/	ICQ XX HAR11 Christian Harder
132	2021 10 06.86	S 14.2 TI 53.1L 242	0.4	4	ICQ XX HAR11 Christian Harder
132	2021 10 06.48	xM 14.2 AQ 40.0L 4 182	0.5	6	ICQ XX WAY Christopher Wyatt
132	2021 10 06.05	S 14.0 TI 53.1L 215	0.4	5	ICQ XX HAR11 Christian Harder
119P/Parker-Hartley					
119	2021 10 10.24	C 17.2 GG 27.9T 6A800	0.3	0.3m341	ICQ XX OLAXx Mike Olason
113P/Spitaler					
113	2021 10 10.31	C 19.3 GG 27.9T 6B400	0.1		ICQ XX OLAXx Mike Olason
104P/Kowal					
104	2021 10 02.28	C 17.5 GG 27.9T 6a420	0.2		ICQ XX OLAXx Mike Olason
97P/Metcalf-Brewington					
97	2021 10 02.40	C 17.9 GG 27.9T 6A200	0.1		ICQ XX OLAXx Mike Olason
94P/Russell					
94	2021 10 10.34	C 20.8 GG 27.9T 6A800	0.1		ICQ XX OLAXx Mike Olason
67P/Churyumov- Gerasimenko					
67	2021 11 05.35	S 9.0 TK 12.5B 30	4	6/	ICQ xx HER02 Carl Hergenrother
67	2021 11 05.21	S 9.9 TK 20.3T10 77	4	5	0.15 280 ICQ XX GON05 Juan Jose Gonzalez Suarez
67	2021 11 02.11	S 9.2 TI 29.8L 4 79	2.3	4/	11.0m280 ICQ XX HAR11 Christian Harder
67	2021 10 28.87	S 10.0 TI 53.1L 139	2	4	4.0m280 ICQ XX HAR11 Christian Harder
67	2021 10 27.91	S 9.9 TK 20.3T10 100	4	4/	ICQ XX GON05 Juan Jose Gonzalez Suarez
67	2021 10 10.95	S 10.5 TI 53.1L 139	1	5	5.0m280 ICQ XX HAR11 Christian Harder
67	2021 10 10.01	S 10.6 TI 53.1L 139	1.4	5	4.5m273 ICQ XX HAR11 Christian Harder
67	2021 10 09.68	xM 10.7 AQ 40.0L 4 59	2.1	6	11.0m265 ICQ XX WAY Christopher Wyatt
67	2021 10 08.71	xM 10.5 AQ 40.0L 4 59	2.6	6	7.5m265 ICQ XX WAY Christopher Wyatt
67	2021 10 08.00	S 10.9 TI 53.1L 139	0.9	4	9.0m275 ICQ XX HAR11 Christian Harder
67	2021 10 07.14	S 10.5 TK 32.0L 5 80	1.9	7	0.07 255 ICQ XX PIL01 Uwe Pilz
67	2021 10 07.13	xE 10.6 TK 25.0C10 62	1	4	ICQ XX DECaa Michel Deconinck
67	2021 10 07.13	xI 10.5 TK 25.0C10 195	0.5	4	2.0m270 ICQ XX DECaa Michel Deconinck
67	2021 10 07.00	S 10.1 TK 20.3T10 77	4	4/	0.2 260 ICQ XX GON05 Juan Jose Gonzalez Suarez
67	2021 10 06.96	S 11.2 TI 53.1L 139	1	4	6.0m270 ICQ XX HAR11 Christian Harder
67	2021 10 06.06	S 10.7 TI 53.1L 111	1.3	5	9.0m270 ICQ XX HAR11 Christian Harder
57P/du Toit-Neujmin-Delporte					
57	2021 10 27.78	S 11.3 TK 20.3T10 100	2.0	4	ICQ XX GON05 Juan Jose Gonzalez Suarez
57	2021 10 25.42	xM 12.7 AQ 40.0L 4 108	0.9	6	2.6m 84 ICQ XX WAY Christopher Wyatt
57	2021 10 24.73	S 11.7 TI 53.1L 155	1	4	ICQ XX HAR11 Christian Harder
29P/Schwassmann-Wachmann					
29	2021 11 05.11	S 10.0 TK 20.3T10 77	4	3	ICQ XX GON05 Juan Jose Gonzalez Suarez
29	2021 11 04.50	S 10.7 TK 12.5B 30	3	2	ICQ xx HER02 Carl Hergenrother
29	2021 11 02.13	S 10.6 TI 29.8L 4 92	2.9	2	ICQ XX HAR11 Christian Harder
29	2021 11 01.85	S 11.4:TI 53.1L 139	1.8	3	ICQ XX HAR11 Christian Harder
29	2021 10 29.81	S 10.7 TI 29.8L 4 137	1.3	3	ICQ XX HAR11 Christian Harder
29	2021 10 28.82	S 10.5 TI 53.1L 155	1.9	4	ICQ XX HAR11 Christian Harder
29	2021 10 27.87	S 10.1 TK 20.3T10 77	4	3	ICQ XX GON05 Juan Jose Gonzalez Suarez
29	2021 10 26.79	&I 10.5:TK 10.0R 7 46 &	3	2	ICQ XX DECaa Michel Deconinck
29	2021 10 12.86	S 9.8 TI 29.8L 4 92	2.2	2/	ICQ XX HAR11 Christian Harder
29	2021 10 10.91	S 10.8 TI 53.1L 139	1.5	3	ICQ XX HAR11 Christian Harder
29	2021 10 09.89	S 10.7 TI 53.1L 139	1.5	3	ICQ XX HAR11 Christian Harder
29	2021 10 09.69	xM 10.9 AQ 40.0L 4 59	2.3	4	ICQ XX WAY Christopher Wyatt
29	2021 10 09.05	xE 10.5 TK 25.0C15 290	1.5	5	ICQ XX DECaa Michel Deconinck
29	2021 10 08.73	xM 11.0 AQ 40.0L 4 59	1.6	6	ICQ XX WAY Christopher Wyatt
29	2021 10 07.94	S 10.9 TI 53.1L 139	1.8	3/	ICQ XX HAR11 Christian Harder
29	2021 10 07.13	S 10.7 TK 32.0L 5 80	1.6	6/	ICQ XX PIL01 Uwe Pilz
29	2021 10 07.11	xE 10.5 TK 25.0C10 62	1.3	6	ICQ XX DECaa Michel Deconinck
29	2021 10 07.11	xI 10.5 TK 25.0C10 195	1.2	6	ICQ XX DECaa Michel Deconinck

29	2021 10 07.01	S 10.4 TK 20.3T10	77	2.5	6	ICQ XX GON05	Juan Jose Gonzalez Suarez
29	2021 10 06.88	S 10.7 TI 53.1L	139	1.5	4	ICQ XX HAR11	Christian Harder
29	2021 10 06.04	S 10.9 TI 53.1L	139	1.5	4/	ICQ XX HAR11	Christian Harder
19P/Borrelly							
19	2021 10 25.44	xM 12.9 AQ 40.0L	4 108	1.2	6	ICQ XX WAY	Christopher Wyatt
19	2021 10 09.64	xM 13.6 AQ 40.0L	4 108	1	6	ICQ XX WAY	Christopher Wyatt
19	2021 10 08.69	xM 13.4 AQ 40.0L	4 108	1.3	6	ICQ XX WAY	Christopher Wyatt
19	2021 10 06.45	xM 13.7 AQ 40.0L	4 108	1	6	ICQ XX WAY	Christopher Wyatt
8P/Tuttle							
8	2021 10 09.72	xM 9.2 TK 40.0L	4 59	2.9	5	ICQ XX WAY	Christopher Wyatt
7P/Pons-Winnecke							
7	2021 10 02.22	C 14.6 GG 27.9T	6B700	0.3	> 0.7m352	ICQ XX OLAXx	Mike Olason
6P/d'Arrest							
6	2021 10 27.80	S 10.2 TK 20.3T10	100	5	1/	ICQ XX GON05	Juan Jose Gonzalez Suarez
6	2021 10 25.45	xM 10.6 AQ 40.0L	4 59	4.5	3/	ICQ XX WAY	Christopher Wyatt
6	2021 10 06.43	xM 12.2 AQ 40.0L	4 108	1.9	4	ICQ XX WAY	Christopher Wyatt
6	2021 10 02.16	C 14.5 GG 27.9T	6A200	0.6		ICQ XX OLAXx	Mike Olason
4P/Faye							
4	2021 11 05.36	S 10.6 TK 12.5B	30	2	4	ICQ xx HER02	Carl Hergenrother
4	2021 11 05.09	S 11.2 TK 20.3T10	100	3	2/	ICQ XX GON05	Juan Jose Gonzalez Suarez
4	2021 10 10.97	S 11.2 TI 53.1L	139	1.7	3/	2.5m270 ICQ XX HAR11	Christian Harder
4	2021 10 10.02	S 11.3 TI 53.1L	139	1.8	4	ICQ XX HAR11	Christian Harder
4	2021 10 09.67	xM 11.9 AQ 40.0L	4 59	1.6	5/	7.5m274 ICQ XX WYA	Christopher Wyatt
4	2021 10 08.72	xM 12.0 AQ 40.0L	4 108	1	6	4.7m272 ICQ XX WYA	Christopher Wyatt
4	2021 10 08.01	S 11.4 TI 53.1L	139	1.3	4	ICQ XX HAR11	Christian Harder
4	2021 10 07.18	S 10.5 TK 20.3T10	100	3	2/	ICQ XX GON05	Juan Jose Gonzalez Suarez
4	2021 10 07.15	S 11.9 TK 32.0L	5 80	1.5	3	ICQ XX PIL01	Uwe Pilz
4	2021 10 07.15	xI 12.0 TK 25.0C10	62	0.75	2/	ICQ XX DECaa	Michel Deconinck
4	2021 10 07.14	xI 12.0 TK 25.0C10	195	0.75	2/	ICQ XX DECaa	Michel Deconinck
4	2021 10 06.07	S 11.4 TI 53.1L	139	1.3	4	ICQ XX HAR11	Christian Harder