Notable comets of 2022

Visual comets for small instruments

Comets that are expected to reach magnitude 9 or brighter

C/2021 A1 (Leonard)

From the southern hemisphere, C/2021 A1 (Leonard) will still be observable in the southwest after sunset in the first few weeks of 2022. Perihelion will occur on January 3rd. By the end of January its elongation will have become too low for observations from earth, until it reappears in the morning sky by the end of February when it has already faded beyond magnitude 11.

19P/Borrelly

In the second half of 2021, 19P/Borelly has already been extensively observed from the southern hemisphere. In the northern hemisphere, it will become observable low in the southwest, shortly before it reaches perihelion on February 1st. It is expected to reach magnitude 9 or better by that time. From the northern hemisphere it will remain observable low in the west after sunset until May, when it sinks into the evening twilight.

C/2021 O3 (PANSTARRS) [?]

With a perihelion distance (q) of only 0.29 AU, C/2021 O3 (PANSTARRS) could end up quite close to the sun. Its current brightness however seems to indicate that it is a small comet that is below a threshold known as the Bortle limit. This basically means that it is very likely to disintegrate before it reaches perihelion on April 21. Because it will be at low elongation from February until early-May, we may probably not even know whether it has survived until a few weeks after perihelion. In the unlikely case that C/2021 O3 (PANSTARRS) turns out to be one of the lucky few surviving the Bortle-threat, it might become observable around magnitude 7 by early May, low in the northwest from the northern hemisphere. From there it would climb higher every day while fading to magnitude 11 by the end of May.

C/2017 K2 (PANSTARRS)

After more than 5 years of anticipation, C/2017 K2 (PANSTARRS) will finally reach perihelion on December 19, 2022. This comet is exceptional in that it was discovered at a large distance of over 16 AU, while already being very active. Although there have been similar, distant discoveries over the past years, 'K2' allows us to observe how a distantly active comet will change its behaviour once it gets closer to the inner solar system. As the year commences it will already be brighter than magnitude 12, and before the end of April we may be seeing a transition from CO to water as its primary source of activity. How active it will be from there on forward is still unknown, but if all goes well it may reach magnitude 6 by the end of 2022. Because closest approach will already occur on July 14 it is expected to be brighter than magnitude 7.5 throughout the summer, which is good news for northern hemisphere observers who will lose sight of the comet before October. With a perihelion distance of 1.81 AU C/2017 K2 certainly won't put up a show like a sungrazer, but on the upside this geography puts it opposite of the sun in July, making it observable in small instruments for many months in a row.

Visual comets for larger instruments

Comets that are expected to reach magnitude 13 or brighter

67P/Churyumov-Gerasimenko

With the Philae lander and Rosetta spacecraft silently resting on its surface, 67P/Churyumov-Gerasimenko (or 'Chury') reached perihelion on November 2, 2021. As sometimes happens with periodic comets, the brightness peak occurred a few weeks later though, meaning the comet is still brighter than magnitude 11 as the year 2022 commences. The current one is a good apparition of this comet, meaning it is closer to earth than usual, and observable throughout the night from both hemispheres. Chury is expected to fade beyond magnitude 13 around mid-February.

C/2019 L3 (ATLAS)

Having slowly but steadily brightened throughout 2021, C/2019 L3 (ATLAS) will finally reach perihelion on January 9, 2022. Despite its relatively large perihelion distance of 3.56 AU, it is expected to get as bright as magnitude 9.5 or better. This large distance has the advantage of the comet being positioned opposite of the sun around perihelion. It is slowly moving from north to south, crossing the ecliptic on February 19. This means that at the time of perihelion, it is well observable from both hemispheres. After mid-May the comet will become unobservable from the northern hemisphere. Southern hemisphere observers will have an extra month or so due to longer nights before they will also loose the comet to the sun. In September, the comet will resurface as a morning comet for southern hemisphere observers. It is expected to fade beyond magnitude 13 by December of 2022.

104P/Kowal

The 2022 apparition of 104P/Kowal is a favourable one. When this comet was discovered in 1979, its orbit had been relatively stable for several decades. Two encounters with Jupiter in January 1996 and June 2007 then reduced its orbital period from 6.4 to 5.9 years, and its perihelion distance from 1.50 to 1.18 AU. Now after the previous apparition of this comet in 2016, it again approached Jupiter to 0.35 AU in May 2019, further reducing the orbital period to 5.7 years and the perihelion distance to 1.07 AU. In the first month of 2022 the comet will be following us just outside our own orbit. It will reach closest approach at 0.64 AU on January 28, while perihelion already occurs on January 11. The comet may reach magnitude 10.0 by mid-January, while being observable in the evening sky from both hemispheres. Another encounter with Jupiter in July of 2031 will push the comet's perihelion distance down to 0.98 AU, within earth's orbit.

9P/Tempel

9P/Tempel will reach perihelion on March 4 and is expected to reach magnitude 11.5. It will be brighter than magnitude 13 from the beginning of 2022 until the end of June. It is best observed from the southern hemisphere as a morning comet.

C/2019 T4 (ATLAS)

Throughout 2020 and 2021, this distant comet has been observed to be significantly brighter then anticipated at its discovery. Its perihelion distance is large at 4.24 AU, but its absolute brightness is quite high, so it is expected to be brighter than magnitude 13 from at least February to the end of July, reaching magnitude 12.5 or brighter around closest approach in April. It will be observable during this entire period while slowly moving northward through the constellations of Hydra and Crater, making it an easier target for southern hemisphere observers in terms of altitude.

C/2021 E3 (ZTF)

C/2021 E3 (ZTF) will reach perihelion on June 11, shortly after its closest approach on May 31. By this time, it will be only observable low in the south from the southern hemisphere. It is expected to brighten to magnitude 11.5.

73P/Schwassmann-Wachmann

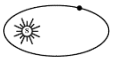
In May of 2006, 73P/Schwassmann-Wachmann approached earth to 0.08 AU, reaching magnitude 6.3. Though not nearly as good as that, the 2022 apparition of this comet won't be a very bad one either, at least not for southern hemisphere observers. Closest approach will occur on September 21 at 0.96 AU from earth, almost a month after perihelion. It is expected to reach magnitude 11.5 or better at the beginning of September, while conveniently located in the western evening sky from the southern hemisphere. It is not observable from the northern hemisphere. While the orbit of 73P/Schwassmann-Wachmann has been relatively stable since its discovery in 1930, the comet itself has been all but stable. In 1995 it fragmented into 3 components. In 2006, additional components were discovered, and the known ones fragmented even further. Images by the Hubble space telescope showed dozens of small fragments. Despite all this, the main component(s) have been observed again in 2011 and 2017. Look out for additional components and new fragmentation events.

81P/Wild

Jupiter-family comet 81P/Wild will reach perihelion on December 15 and is expected to reach magnitude 11 by the end of 2022. It may already be brighter than magnitude 13 by the end of September, being observable from both hemispheres in the eastern morning sky before sunrise.

C/2020 V2 (ZTF)

Moving slowly on a slightly hyperbolic orbit, C/2020 V2 (ZTF) will not reach perihelion until May 2023. But it appears to be a large and active object and even though its trend of brightening is somewhat slower than average, it is still expected to reach magnitude 13 by September of 2022. Throughout the autumn of 2022 it will be observable from the northern hemisphere, while moving towards Polaris through the constellations of Ursa Major and Draco. By the end of the year, it will probably be brighter than magnitude 10.5, remaining brighter than magnitude 13 until January of 2024.



Returning periodic comets

Periodic comets with perihelion in 2022

Comet(s)		Perihelion				Nearest approach			
designation	period	date	mag	radius[1]	elong[2]	date	mag	delta[3]	elong
9P/Tempel	5.6 yrs	04/Mar/22	11.4	1.54 AU	61.6°	28/Jul/22	13.6	1.15 AU	142.8°
19P/Borrelly	6.8 yrs	01/Feb/22	9.5	1.31 AU	69.5°	11/Dec/21	13.1	1.17 AU	83.6°
22P/Kopff	6.4 yrs	18/Mar/22	15.7	1.55 AU	45.9°	14/Sep/22	15.8	1.38 AU	148.2°
41P/Tuttle-Giacobini-Kresak	5.4 yrs	13/Sep/22	12.1	1.05 AU	17.1°	21/Sep/22	12.2	1.96 AU	18.1°
44P/Reinmuth	7.1 yrs	23/Apr/22	15.5	2.11 AU	33.4°	31/Oct/22	15.4	1.59 AU	159.9°
45P/Honda-Mrkos-Pajdusakova	5.3 yrs	25/Apr/22	9.4	0.56 AU	7.4°	10/May/22	10.4	1.50 AU	18.7°
51P-A/Harrington	7.1 yrs	03/Oct/22	14.1	1.69 AU	138.9°	03/Sep/22	14.0	0.73 AU	163.7°
51P-D/Harrington	7.1 yrs	01/Oct/22	20.0	1.69 AU	142.8°	04/Sep/22	20.0	0.72 AU	164.4°
61P/Shajn-Schaldach	7.1 yrs	24/Oct/22	14.5	2.12 AU	166.9°	14/Oct/22	14.5	1.13 AU	173.0°
73P/Schwassmann-Wachmann	5.4 yrs	25/Aug/22	11.4	0.97 AU	56.5°	21/Sep/22	11.7	0.96 AU	64.3°
80P/Peters-Hartley	8.1 yrs	08/Dec/22	13.1	1.62 AU	11.1°	29/Jul/23	14.9	2.02 AU	124.4°
81P/Wild	6.4 yrs	15/Dec/22	11.0	1.60 AU	55.2°	18/May/23	12.6	1.22 AU	150.8°
86P/Wild	6.8 yrs	07/Feb/22	18.6	2.26 AU	47.8°	13/Jul/22	17.9	1.54 AU	155.5°
97P/Metcalf-Brewington	10.4 yrs	15/Feb/22	18.9	2.57 AU	65.7°	18/Oct/21	18.4	1.73 AU	168.8°
99P/Kowal	15.1 yrs	12/Apr/22	17.2	4.71 AU	179.2°	14/Apr/22	17.2	3.70 AU	178.9°
100P/Hartley	6.4 yrs	10/Aug/22	18.1	2.02 AU	56.7°	25/Mar/22	19.0	1.42 AU	139.8°
104P/Kowal	5.7 yrs	11/Jan/22	10.5	1.07 AU	79.0°	28/Jan/22	10.7	0.64 AU	82.0°
107P/Wilson-Harrington	4.3 yrs	24/Aug/22	17.0	0.97 AU	69.8°	20/Jul/22	16.8	0.40 AU	88.0°
113P/Spitaler	7.1 yrs	01/Jun/22	19.3	2.14 AU	6.5°	27/Jan/23	19.1	1.79 AU	163.3°
116P/Wild	6.5 yrs	16/Jul/22	14.1	2.20 AU	57.3°	23/Feb/22	13.8	1.44 AU	165.3°
117P/Helin-Roman-Alu	8.3 yrs	07/Jul/22	13.3	3.04 AU	169.5°	02/Jul/22	13.3	2.03 AU	171.3°
118P/Shoemaker-Levy	6.1 yrs	24/Nov/22	15.0	1.83 AU	114.2°	18/Jan/23	14.6	0.92 AU	167.1°
119P/Parker-Hartley	7.4 yrs	11/Aug/22	15.7	2.33 AU	52.0°	05/Jan/23	15.0	1.57 AU	168.0°
127P/Holt-Olmstead	6.4 yrs	10/Aug/22	17.6	2.21 AU	90.7°	04/Nov/22	17.0	1.33 AU	161.6°
129P/Shoemaker-Levy	8.9 yrs	01/Dec/22	19.7	3.92 AU	102.1°	11/Feb/23	19.3	2.94 AU	176.9°
135P/Shoemaker-Levy	7.4 yrs	07/Apr/22	17.1	2.68 AU	123.8°	28/May/22	16.7	1.69 AU	174.0°
148P/Anderson-LINEAR	6.9 yrs	13/Jun/22	19.2	1.63 AU	9.2°	07/Oct/21	20.7	1.80 AU	155.1°
152P/Helin-Lawrence	9.5 yrs	13/Jan/22	20.5	3.09 AU	28.5°	08/Jul/22	19.4	2.23 AU	171.8°
157P/Tritton	6.7 yrs	09/Sep/22	13.4	1.57 AU	52.9°	10/Feb/23	13.9	1.27 AU	145.2°
169P/NEAT	4.2 yrs	09/Jul/22	15.5	0.60 AU	26.0°	06/Jun/22	15.8	1.05 AU	49.1°
176P/LINEAR	5.7 yrs	22/Nov/22	18.6	2.58 AU	121.6°	30/Sep/22	18.2	1.59 AU	179.3°
179P/Jedicke	14.5 yrs	29/May/22	18.3	4.12 AU	18.3°	09/Dec/22	17.6	3.26 AU	164.1°
181P/Shoemaker-Levy	7.6 yrs	08/Jan/22	16.6	1.16 AU	46.5°	12/Jul/21	29.2	1.57 AU	135.2°
182P/LONEOS	5.1 yrs	12/May/22	19.0	0.99 AU	37.0°	01/Jun/22	19.1	1.55 AU	41.2°
189P/NEAT	5.1 yrs	28/Aug/22	19.2	1.21 AU	85.4°	26/Jul/22	19.4	0.73 AU	92.8°
196P/Tichy	7.4 yrs	29/Oct/22	17.2	2.17 AU	172.7°	27/Oct/22	17.2	1.18 AU	172.8°
197P/LINEAR	4.9 yrs	07/Dec/22	18.2	1.06 AU	2.0°	10/Dec/22	18.2	2.05 AU	2.8°

Returning periodic comets (continued)

Comet(s)		Perihelion				Nearest approach			
designation	period	date	mag	radius[1]	elong[2]	date	mag	delta[3]	elong
204P/LINEAR-NEAT	6.8 yrs	16/Nov/22	17.4	1.84 AU	96.5°	01/Feb/23	16.9	0.99 AU	162.0°
205P/Giacobini	6.7 yrs	13/Jan/22	16.7	1.53 AU	25.7°	04/Jun/21	18.3	1.69 AU	144.7°
211P/Hill	6.7 yrs	04/Oct/22	18.4	2.33 AU	50.5°	25/Feb/23	17.5	1.58 AU	154.4°
214P/LINEAR	6.9 yrs	26/Sep/22	18.0	1.86 AU	3.5°	04/Jun/23	18.7	1.83 AU	147.8°
224P/LINEAR-NEAT	6.4 yrs	29/Sep/22	19.6	2.05 AU	101.3°	09/Dec/22	19.1	1.16 AU	159.0°
230P/LINEAR	6.4 yrs	19/Mar/22	16.7	1.57 AU	39.7°	10/Sep/21	17.5	1.45 AU	147.4°
238P/Read	5.6 yrs	05/Jun/22	20.6	2.37 AU	42.2°	21/Nov/22	19.5	1.56 AU	170.7°
244P/Scotti	10.8 yrs	16/Nov/22	17.4	3.92 AU	137.0°	23/Dec/22	17.3	2.94 AU	176.9°
255P/Levy	5.1 yrs	07/Sep/22	14.4	0.85 AU	28.4°	16/Aug/22	14.6	1.53 AU	35.4°
259P/Garradd	4.5 yrs	08/Feb/22	20.3	1.81 AU	12.2°	28/Oct/22	20.4	1.54 AU	162.6°
272P/NEAT	9.4 yrs	17/Jul/22	20.6	2.43 AU	16.6°	23/Dec/21	19.7	1.91 AU	159.2°
274P/Tombaugh-Tenagra	9.2 yrs	08/Apr/22	18.9	2.45 AU	76.9°	25/Dec/21	18.1	1.59 AU	170.6°
286P/Christensen	8.3 yrs	12/May/22	19.6	2.36 AU	78.8°	25/Aug/22	18.9	1.54 AU	152.6°
288P	5.3 yrs	02/Mar/22	20.6	2.44 AU	16.0°	03/Aug/21	19.2	1.63 AU	172.1°
319P/Catalina-McNaught	6.7 yrs	31/Mar/22	17.2	1.19 AU	30.8°	10/Nov/22	20.6	1.82 AU	144.3°
325P/Yang-Gao	6.6 yrs	29/Mar/22	15.9	1.43 AU	82.4°	27/Jun/22	16.2	0.91 AU	128.3°
327P/Van Ness	6.7 yrs	02/Sep/22	17.1	1.56 AU	133.1°	18/Sep/22	17.0	0.64 AU	143.3°
335P/Gibbs	6.8 yrs	12/Aug/22	21.2	1.62 AU	3.8°	29/Apr/23	22.8	1.86 AU	153.3°
337P/WISE	6.0 yrs	01/Jul/22	18.4	1.65 AU	149.5°	16/Jun/22	18.3	0.67 AU	158.0°
348P/PANSTARRS	5.6 yrs	12/Feb/22	18.7	2.18 AU	99.1°	01/Dec/21	18.1	1.32 AU	150.1°
382P/Larson	16.5 yrs	26/Feb/22	18.1	4.42 AU	6.9°	18/Aug/21	17.3	3.50 AU	173.9°
408P/Novichonok-Gerke	10.4 yrs	04/Oct/22	18.7	3.47 AU	120.2°	23/Nov/22	18.4	2.54 AU	158.0°
420P/Hill	13.0 yrs	22/May/22	18.3	2.79 AU	69.6°	16/Sep/22	17.6	1.92 AU	169.3°
422P/Christensen	15.9 yrs	13/Jan/22	18.8	3.11 AU	47.3°	11/Aug/21	18.2	2.60 AU	124.8°
429P/LINEAR-Hill	6.7 yrs	02/Jan/22	19.1	1.81 AU	83.1°	24/Sep/21	18.6	1.04 AU	159.7°
431P/Scotti	6.5 yrs	13/Feb/22	18.3	1.81 AU	51.8°	20/Sep/21	18.0	1.31 AU	142.8°
P/1997 B1 (Kobayashi)	25.1 yrs	28/Mar/22	17.3	2.06 AU	119.4°	09/Feb/22	16.9	1.15 AU	163.2°
P/2007 A2 (Christensen)	15.9 yrs	29/Nov/22	19.9	2.80 AU	99.2°	07/Feb/23	19.4	1.90 AU	161.7°
P/2007 S1 (Zhao)	7.5 yrs	07/Oct/22	18.0	2.52 AU	157.5°	23/Oct/22	18.0	1.54 AU	170.4°
P/2011 Q3 (McNaught)	11.1 yrs	19/Aug/22	17.9	2.32 AU	149.6°	11/Sep/22	17.8	1.33 AU	171.7°
P/2011 W1 (PANSTARRS)	10.1 yrs	07/Feb/22	19.0	3.32 AU	109.7°	06/Dec/21	18.6	2.36 AU	174.6°
P/2012 O3 (McNaught)	9.8 yrs	29/May/22	19.7	1.61 AU	70.1°	23/Sep/22	19.9	1.19 AU	135.4°
P/2013 G4 (PANSTARRS)	9.4 yrs	19/Jun/22	21.2	2.62 AU	83.7°	14/Mar/22	20.5	1.72 AU	171.5°
P/2014 R5 (Lemmon-PANSTARRS)	8.2 yrs	18/Aug/22	19.5	2.38 AU	155.0°	07/Sep/22	19.5	1.38 AU	176.4°
P/2015 X1 (PANSTARRS)	6.9 yrs	06/Sep/22	20.0	2.11 AU	118.5°	27/Oct/22	19.7	1.19 AU	158.7°
P/2016 J1-A (PANSTARRS)	5.7 yrs	20/Feb/22	22.6	2.45 AU	64.5°	30/Jun/22	21.5	1.58 AU	155.7°
P/2016 J1-B (PANSTARRS)	5.7 yrs	19/Feb/22	23.1	2.45 AU	64.0°	30/Jun/22	22.0	1.58 AU	155.7°
P/2017 S8 (PANSTARRS)	4.6 yrs	16/Sep/22	20.2	1.69 AU	58.6°	24/Feb/23	20.1	1.20 AU	148.5°

[1] Radius: The distance between the comet and the sun
[2] Elongation: The angle between the direction of the comet and the direction of the sun.
[3] Delta: The distance between earth and the comet

Other notes

Planetary approaches and other noteworthy subjects

C/2021 P4 (ATLAS)

With a perihelion distance of 1.08 AU, C/2021 P4 (ATLAS) passes relatively close to earth's orbit when it crosses the ecliptic at the beginning of August. Had it done so in March, we could have enjoyed a nearby comet. Unfortunately, we will have to settle for a closest approach of 1.96 AU on July 13, and an expected maximum brightness of magnitude 11.5, occurring at too low elongation for observations from earth.

74P/Smirnova-Chernykh

For several decades comet 74P/Smirnova-Chernykh has been traveling on a relatively stable orbit with a period of 8.5 years. But recently it as been closing in on Jupiter and it starts the year 2022 at 0.6 AU from the giant planet. Due to the nature of its orbit, the comet will remain within 1 AU of Jupiter for several years, with closest approach eventually occurring in July of 2030. During this period the comet's orbit will be constantly changing under the planet's gravitational pull. It won't be until 2033 when the comet finally escapes, eventually departing on an orbit with a period of 9.6 years.

87P/Bus

Throughout 2022, 87P/Bus will begin approaching Jupiter until it reaches its closest approach to the planet in February of 2023. By 2026, this approach will have increased the comet's orbital period from 6.4 to 9.5 years, and its perihelion distance from 2.1 AU to 3.6 AU.

118P/Shoemaker-Levy

118P/Schoemaker-Levy reaches perihelion November 4, 2022. Because it approached Jupiter to 0.65 AU in August of 2020, the comet's orbit has been slightly reduced from 6.5 to 6.1 years.

119P/Parker-Hartley

The orbital period of 119P/Parker-Hartley was recently reduced from 8.9 to 7.4 years as it approached Jupiter to 0.17 AU in August of 2019. Also, the perihelion distance was reduced from 3.0 AU to 2.3 AU, which may trigger increased activity around perihelion.

157P/Tritton

In February of 2020, 157P/Tritton approached Jupiter to 0.27 AU, increasing its orbital period from 6.3 to 6.7 years and its perihelion distance from 1.4 AU to 1.6 AU. The comet will reach perihelion on September 9, 2022

158P/Kowal-LINEAR

158P/Kowal-LINEAR will be within 0.8 AU of Jupiter throughout 2022, with closest approach occurring in July. Being under the gravitational influence of the planet for such a long time will eventually cause the orbital period to have increased from 10.3 years in 2015 to 14.0 years by 2028. Over the same period, the perihelion distance will increase from 4.6 AU to 5.2 AU

175P/Hergenrother

In February of 2022, 175P/Hergenrother approaches Jupiter to 0.46 AU, increasing its orbital period from 6.4 to 7.1 years, and its perihelion distance from 1.9 AU to 2.3 AU.

227P/Catalina-LINEAR

Comet 227P/Catalina-LINEAR will approach Jupiter to 0.54 AU in March of 2022, reducing its orbital period from 6.8 to 6.4 years and its perihelion distance from 1.8 AU to 1.6 AU.

235P/LINEAR

In the second half of 2022, comet 235P/LINEAR will begin to approach Jupiter. At the end of the year, it will be within 0.6 AU of the planet. The approach will continue until the comet is within 0.24 AU of Jupiter in June 2023. This approach will eventually reduce the orbital period from 8.0 to 6.4 years, and the perihelion distance from 2.7 AU to 2.0 AU.

255P/Levy

255P/Levy will reach perihelion on September 7, 2022. In March of 2020 the comet approached Jupiter to 0.19 AU, seeing its orbital period slightly reduced from 5.3 to 5.1 years, and its perihelion distance from 1.0 AU to 0.8 AU, meaning the comet is now well within the earth's orbit.

382P/Larson

382P/Larson will approach Jupiter to 0.6 AU in March of 2022, slightly reducing its orbital period from 14.8 AU to 14.3 years

Obviously, more comets will be discovered in 2022 and some of those will already be observable in the same year. Hopefully, some will be bright. For up-to-date information on observable comets, regularly check http://astro.vanbuitenen.nl/comets.

I wish you a happy 2022.
May the comets be bright and the skies clear.

Gideon van Buitenen