

## Notable COMETS of 2021

### [C/2019 N1 \(ATLAS\)](#)

C/2019 N1 (ATLAS) already reached perihelion on December 1st of 2020. However, being located at the opposite side of the sun its elongation (apparent sun-comet distance) has been very poor. As the comet is moving south on its highly inclined orbit, it will become better observable from the Southern hemisphere. Up until August of 2020, its increase in brightness has been somewhat less than average, so I would expect the brightness of this comet to end up somewhere between magnitude 12.0 and 12.5 around closest approach on February 8 of 2021.

### [141P/Machholz](#)

Periodic comet 141P/Machholz, discovered in 1994, has an orbital period of 5.3 years. From the year of its discovery the comet is already known to be accompanied by several smaller fragments from a pre-discovery break-up. For the 2021 apparition, the main component was recovered by PANSTARRS in August and then not seen for a while. It was observed again on December 4<sup>th</sup> by Alan Hale. On December 5, two smaller fragments were found by Michael Jäger, which have been tentatively identified as the fragments -b and -d as observed in 1994. The main component reached perihelion on December 16, 2020 and its brightness at the beginning of 2021 will be somewhere between magnitude 13.5 and 14. The comet will be closest to earth (0.53 AU) on January 19, 2021.

### [398P/Boattini](#)

Following its recovery in August of 2020, periodic comet P/2009 Q4 (Boattini) has been redesignated as numbered comet 398P/Boattini. The comet has performed better than expected in the last months of 2020 and begins the year 2021 as bright as magnitude 12.2, conveniently located in the winter constellation of Orion. Perihelion occurred on December 26, 2020 so the comet is expected to begin fading ever more rapidly over the course of January and February of 2021.

### [246P/NEAT](#)

Jupiter-family comet 246P/NEAT was discovered in 2004 and has an orbital period of 8.05 years. After a close approach to Jupiter in 2001, the comet's perihelion distance has decreased to 2.86 AU, resulting in increased activity. The comet was already extensively observed in the first half of 2020 with a reported brightness of magnitude 14 during the early summer, which is much brighter than the parameters published by the MPC would suggest. Images taken by Michael Jäger showed a very long (~2 degree) tail. It hasn't been observed after the summer due to low elongation, but it should be observable again in the morning sky by the time it reaches perihelion on February 22, 2021. Closest approach to earth will be on July 1st, at which time the comet will be located in the constellation of Sagittarius, favouring mid-latitude observers. Given the brightness estimates from 2020, it may reach magnitude 12.5 at closest approach.

### [C/2020 R4 \(ATLAS\)](#)

Discovered last September, C/2020 R4 (ATLAS) is one to keep an eye on. Recent observations suggest that it has brightened rapidly between November and December. Although this could be an indication of fragmentation, it could also mean that the comet may become visually observable in medium sized instruments from the Northern hemisphere around closest approach (0.46 AU) to earth on April 23, when the comet is also expected to be at its brightest. Perihelion will occur on March 1 already, but the comet will be distant (1.7AU from earth) and at poor elongation at that time.

### [28P/Neujmin](#)

Periodic comet 28P/Neujmin has an orbital period of 18.44 years and will reach perihelion on March 11, 2021. Unfortunately, this apparition is not a good one. Elongation will be poor at least until July, at which time the comet's brightness is expected to have already dropped to magnitude 14.5 or fainter. Closest approach to earth will occur on November 6, 2021.

### [C/2020 N1 \(PANSTARRS\)](#)

Comet C/2020 N1 (PANSTARRS) was discovered in July 2020 and is expected to reach magnitude 14.5 around perihelion on March 12, at 1.29 AU from the sun. Closest approach to earth will occur on February 3<sup>rd</sup>, 2021. A single visual observation from December 19 that puts the comet over a magnitude brighter than the overall trend, has yet to be confirmed.

### [C/2020 F5 \(MASTER\)](#)

C/2020 F5 (MASTER) is a distant comet that will reach perihelion at 4.33 AU from the sun on March 24, but it will be at its brightest at closest approach (3.57 AU from earth) on August 21. It is not expected to get brighter than magnitude 14.3 or so.

### [10P/Tempel](#)

Also reaching perihelion on March 24, 2021 is 10P/Tempel. Unfortunately, the 2021 apparition of this Jupiter-family comet is an unfavourable one with the comet at poor elongation until the summer, when it has already faded significantly.

### [C/2020 J1 \(SONEAR\)](#)

Comet C/2020 J1 (SONEAR), discovered in May of 2020, will reach perihelion on 18 April 2021 at a large distance of 3.36 AU from the sun, just outside the main asteroid belt. Based on a relatively small number of observations, it can be expected reach magnitude ~13.5 around closest approach (2.37 AU) on May 16.

### [7P/Pons-Winnecke](#)

As it does every 6.3 years, periodic comet 7P/Pons-Winnecke will reach perihelion on May 27, 2021. This apparition is quite favourable, as the comet will approach earth to 0.44 AU on June 12, just over two weeks after perihelion. The comet was recovered in January of 2020 when it was still as faint as magnitude 21. Parameters currently published by the MPC suggest that the comet would almost reach magnitude 8, but these values seem to be tied to estimates obtained when the comet was in outburst back in 2008. Looking at average data from 2002, 2008, 2015 a peak brightness of around magnitude 11.3 seems far more likely, unless of course a new outburst occurs.

### [C/2020 K5 \(PANSTARRS\)](#)

Discovered last May and observed until late summer, C/2020 K5 (PANSTARRS) is currently not observable but may, based on default parameters, reach magnitude 14 or so around closest approach on May 19 and perihelion on June 5, 2021. Its highly inclined orbit favours the southern hemisphere.

### [C/2019 F1 \(ATLAS-Africano\)](#)

This distant comet has already been around for a while and will reach closest approach and perihelion on June 21 and 22 of 2021, respectively. It probably won't get brighter than magnitude 14, as observed from the southern hemisphere.

### [C/2020 T2 \(Palomar\)](#)

Also reaching perihelion in the summer of 2021, but favouring the northern hemisphere for a change, is C/2020 T1 (Palomar). The comet has an orbital period of 5718 years. Unfortunately, approaching earth to 1.4 AU on May 12 and the sun to 2.1 AU on July 11 of 2021, the comet is not expected to get much brighter than magnitude 14.5.

### [15P/Finlay](#)

Jupiter-family comet 15P/Finlay has an orbital period of 6.6 years and will reach closest approach on June 17, and perihelion on July 13 of 2021. This apparition is marginally better than that of 2014 and the comet may therefore be expected to reach magnitude 10 or so. During the 2014 apparition however, two outbursts occurred at which the comet brightened to around magnitude 8.5 and 7 respectively. Although outbursts are entirely unpredictable by nature, one can always hope for such events to be repeated.

### [8P/Tuttle](#)

8P/Tuttle is remarkable in the sense that it has a very high inclination of almost 55 degrees, which is uncommon for short-period comets. Its orbital period is 13.6 years, and it will reach perihelion on August 27, 2021. Unfortunately, the 2021 apparition is as about as unfavourable as it gets, with the comet at poor elongation throughout the year.

### [4P/Faye](#)

Discovered by Hervé Faye in 1843, 4P/Faye is yet another short-period Jupiter-family comet reaching perihelion in the year 2021. It has an orbital period of about 7.5 years, and in 2018 the comet approached Jupiter to 0.63 AU, which slightly reduced its perihelion distance from 1.66 to 1.62 AU. It will reach perihelion on September 9, and closest approach to earth on December 5, 2021. Between those dates, it is expected to brighten to magnitude 11 or so.

### [6P/d'Arrest](#)

Jupiter-family comet 6P/d'Arrest has an orbital period of 6.5 years and will reach closest approach to earth (0.75 AU) on August 2, and perihelion on September 17, 2021. The apparition is quite good, and the comet is expected to be slightly brighter than magnitude 10 for about two months in August and September.

### [110P/Hartley](#)

Although 110P/Hartley will be observable when it reaches perihelion on October 18, this apparition is far from ideal with the comet located at distance of 2.3 AU from earth at the time. The comet is not expected to be at its brightest (barely reaching magnitude 14) until closest approach in January of 2022.

### [67P/Churyumov-Gerasimenko](#)

Were it not for its recently acquired celebrity status, 67P/Churyumov-Gerasimenko would have been little more than the next one in our list of Jupiter-family comets reaching perihelion in 2021. But now that the comet has enjoyed the companionship of the Rosetta spacecraft and Philae lander during its 2015 apparition, 'rubber ducky' has become the most extensively studied comet in human history. On November 12, 2014 the Philae lander performed the first successful landing on a comet and on September 30 of 2016 - at the end of its mission - the Rosetta spacecraft also ended up on the surface of 67P in a controlled crash. The apparition of 2021 marks the first return of 67P/Churyumov-Gerasimenko since those memorable events, making observations of this comet in 2021 not just interesting, but also scientifically relevant. If any noteworthy changes occur, attempts will certainly be made to correlate them to the scientific data that was obtained during the space mission. Around the end of 2018, 'Chury' came relatively close to Jupiter, slightly reducing its perihelion distance from 1.24 to 1.21 AU. Seen from earth, the 2021 apparition will be far more favourable than that of 2015. Perihelion will occur on November 1<sup>st</sup>, 2021 - only 10 days before closest approach at 0.42 AU from earth. It is expected to brighten to magnitude 9 or so at sublime elongation.

### [132P/Helin-Roman-Alu](#)

The 2021 apparition of Jupiter-family comet 132P/Helin-Roman-Alu is the most favourable in many years, in part due to a close encounter with Jupiter in 2016 that has significantly altered the comet's orbit. The orbital period has been reduced from 8.23 to 7.66 years, and the perihelion distance from 1.91 to 1.69 AU! The comet will be at its closest to earth (0.74 AU) on October 9, and perihelion will follow just over a month later, on November 13, 2021. Based on previous activity, the comet is expected to become slightly brighter than magnitude 14, but the decreased perihelion distance may induce an increase in activity. This certainly is a comet that should be monitored closely during its 2021 apparition.

### [C/2019 L3 \(ATLAS\)](#)

C/2019 L3 (ATLAS) will reach perihelion on January 9 of 2022, only three days after its closest approach to earth. Despite its large perihelion distance of 3.55 AU, it is performing well and has already been extensively observed in 2020. It probably is a large and active object and based on observations so far it is expected to brighten from magnitude 14 to magnitude 11 or better over the course of 2021.

### [22P/Kopff](#)

Periodic comet 22P/Kopff won't reach perihelion until March 18, 2022. But by the end of 2021 it may already be observable, probably at a magnitude of somewhere between 12 and 13.

### [C/2017 K2 \(Panstarrs\)](#)

This extraordinary object was discovered while already active at a mindboggling distance of 16 AU from the sun. It will not reach perihelion until December 19, 2022 at 1.8 AU from the sun, but this remarkable comet has been gradually brightening since its discovery in 2017 and is already as bright as magnitude 15 at the end of 2020. It is expected to have reached magnitude 11.5 by the end of 2021.

*Comets are active objects that can behave unpredictably. Therefore predictions about their future performance are constantly evolving based on newly acquired data. For up-to-date information on current bright comets, see: [astro.vanbuitenen.nl/comets](http://astro.vanbuitenen.nl/comets)*