Comet Prospects for 2019

Unless some bright long period comets are discovered it promises to be a disappointing year for comet enthusiasts. The year begins with a potentially naked eye comet from 2018, though as it is close to the Earth it will be large and diffuse. The year closes with another close approaching comet but its brightness is uncertain. A long period comet that reaches perihelion in 2020 should be within small telescope or binocular range at the end of the year. Not much is visible in between!

These predictions focus on comets that are likely to be within range of visual observers, though comets often do not behave as expected and can spring surprises. Members are encouraged to make visual magnitude estimates, particularly of periodic comets, as long term monitoring over many returns helps understand their evolution. Please submit your magnitude estimates in ICQ format. Guidance on visual observation and how to submit estimates is given in the BAA Observing Guide to Comets. Drawings are also useful, as the human eye can sometimes discern features that initially elude electronic devices.

Theories on the structure of comets suggest that any comet could fragment at any time, so it is worth keeping an eye on some of the fainter comets, which are often ignored. They would make useful targets for those making electronic observations, especially those with time on instruments such as the Faulkes telescopes. Such observers are encouraged to report electronic visual equivalent magnitude estimates via COBS. When possible use a waveband approximating to Visual or V magnitudes. These estimates can be used to extend the visual light curves, and hence derive more accurate absolute magnitudes. Such observations of periodic comets are particularly valuable as observations over many returns allow investigation into the evolution of comets.

In addition to the information in the BAA Handbook and on the Section web pages, ephemerides for new and currently observable comets are on the JPL, CBAT and Seiichi Yoshida's web pages. The BAA Observing Guide to Comets is available on the Section web page.

29P/Schwassmann-Wachmann is an annual comet that has outbursts, which over the last few decades seem to have become more frequent, though this could just reflect more intense coverage. Richard Miles has developed a theory that suggests that these outbursts are in fact periodic, and arise from at least four independent active areas on the slowly rotating nucleus. Possible dates for outbursts based on this theory are given in the Handbook. The activity of the active areas evolves with time. The comet is an ideal target for electronic observations and it should be observed at every opportunity. It is in solar conjunction in March and at opposition in October. The comet has moved into the northern celestial sphere, and should be adequately placed for observation from the UK in the second half of the year.

38P/Stephan-Oterma was at perihelion in late 2018 and should still be 10^{th} magnitude at the beginning of the year, though it fades fairly quickly.

46P/Wirtanen was also at perihelion late in 2018 when it made a close approach to the Earth. It starts the year as a potential naked eye object in Camelopardalis, though it will

be large and diffuse. The comet circles through the front paws of Ursa Major and could be a binocular object into February. It remains well placed as it fades into March.

289P/Blanpain was discovered in 1819 November when it made a close pass to the Earth. It wasn't seen again until the Catalina Sky Survey discovered an asteroid in 2003 November, which was then linked to the comet. It passed 0.025 au from the Earth in December of that year (the 4th closest approach by a comet, though not included in the MPC list), but was of stellar appearance. On its way in to the 2014 return it was at least five magnitudes brighter than expected, indicating an outburst. It makes a relatively prolonged close approach to the Earth at the end of the year, closing to 0.089 au on 2020 January 10. Unless it outbursts again it may only reach 18th magnitude.

2016 R2 (PanSTARRS) is likely to be fading from around 11th magnitude at the beginning of the year. It does however have a rather erratic light curve, it might be worth observing to see if it is brighter than expected.

2017 T2 (PanSTARRS) does not reach perihelion until 2020 and is largely considered with the predictions for that year. It could reach 9th magnitude by the autumn and is well placed for observation from the UK for most of the apparition. It becomes conveniently placed in the evening sky from October onwards. It passes within three degrees of M1 in the first half of September and is close to M35 at the end of October. It is about a degree from open clusters: NGC 1857 around November 14, NGC 1528 and 1545 around December 15 and NGC 1444 around December 24. It may have a short tail by the end of the year.

2018 Y1 (Iwamoto) was discovered at the end of 2018 by a Japanese amateur, his second discovery of the year. The comet starts the year at about 11th magnitude and brightens towards a close approach (0.3 au) on February 12 when it is near opposition. For UK observers it comes into the morning sky in mid January, but swiftly transitions into the evening as it nears close approach. It could be 8th magnitude at close approach, then fades rapidly.

The other periodic and parabolic comets that are at perihelion during 2019 are unlikely to become brighter than 11th magnitude or are poorly placed. Ephemerides for these can be found on the CBAT or other WWW pages. Several D/ comets have predictions for a return, though searches at favourable returns in the intervening period have failed to reveal the comets and the orbits will have been perturbed by Jupiter. There is however always a chance that they will be rediscovered accidentally by one of the Sky Survey patrols.

Looking ahead to 2020, if 289P/Blanpain outbursts it will still be visible at the start of the year. Otherwise it looks to be another poor year for periodic comets, with only 88P/Howell reaching as bright as 9th magnitude and then being a southern hemisphere object. 2017 T2 (PanSTARRS) might however give one of the more durable displays for some years.

Comets reaching perihelion in 2019

Comet	T	q	P	N	H_1	K_1	Peak mag
D/Lagerkvist (1996 R2)	Feb 11.5	2.59	7.33	1	11.0	10.0	17

D/LONEOS (1999 RO_{28})	Jun 26.0	1.12	6.34	1	18.0	5.0	19
D/LINEAR (2000 R2)	Jun 17.3	1.62	6.45	1	18.0	10.0	21
P/LINEAR-Spacewatch (2000 S4)	Sep 26.6	2.27	18.96	1	12.0	10.0	16
P/SOHO (2002 S11)	May 12.5	0.05	5.55	2			
P/SOHO (2002 Q8)	Mar 22.0	0.05	5.53	2			
P/SOHO (2002 R5)	Dec 12.7	0.04	5.73	2			
P/NEAT (2003 F2)	Nov 12.0	2.97	16.51	1	16.5	5.0	21
P/SOHO (2003 Q1)	Jul 3.0	0.05	5.28	2			
P/SOHO (2003 Q6)	Aug 4.3	0.05	5.31	2			
P/Spacewatch (2006 F4)	Aug 2.8	2.33	6.62	1	15.0	10.0	20
P/McNaught (2006 H1)	Dec 7.5	2.42	13.88	1	12.5	10.0	18
P/Christensen (2006 S1)	Oct 25.5	1.42	6.67	1	17.5	10.0	19
P/Gibbs (2007 T4)	Jul 23.7	2.01	12.03	1	13.0	10.0	18
P/Boattini (2008 Y1)	Sep 10.6	1.27	10.54	1	15.0	10.0	17
P/Spacewatch-Hill (2009 SK_{280})	Oct 23.9	4.21	10.46	1	11.0	10.0	20
P/Hill (2010 U2)	Sep 15.3	2.57	8.88	1	13.0	10.0	18
Boattini (2010 U3)	Feb 26.7	8.45			1.0	10.0	15
P/Gibbs (2012 K3)	Aug 17.5	2.09	6.90	1	15.0	10.0	19
P/McNaught (2012 O1)	Mar 2.3	1.44	6.65	1	17.5	10.0	21
P/McNaught (2012 O2)	May 6.0	1.69	6.89	1	17.0	10.0	20
P/Schwartz (2013 T2)	Nov 30.5	1.74	6.51	1	16.0	10.0	19
P/TOTAS (2014 C1)	Apr 13.3	1.68	5.31	1	15.5	10.0	17
P/Kowalski (2014 U2)	Oct 11.4	1.12	4.94	1	19.5	10.0	17
Lemmon (2016 X1)	May 1.7	7.57			6.0	10.0	19
LINEAR (2017 B3)	Feb 2.5	3.92			6.0	10.0	15
ATLAS (2017 M4)	Jan 15.7	3.24			6.0	10.0	13
P/PanSTARRS (2017 U3)	Apr 20.9	4.44	11.0	0	11.0	10.0	20
Asteroid (2017 U7)	Sep 11.3	6.42			10.6	5.0	18
ATLAS (2018 A3)	Jan 12.9	3.28			8.5	10.0	16
Gibbs (2018 A6)	Jul 14.3	3.02			9.0	10.0	16
PanSTARRS (2018 F4)	Dec 4.1	3.44			11.9	5.0	17
ASASSN (2018 N2)	Nov 11.2	3.13			6.0	10.0	13
P/PanSTARRS (2018 P5)	Feb 26.9	4.58	45	0	11.0	10.0	21
Lemmon (2018 KJ_3)	Sep 9.5	3.63			12.2	5.0	17
Lemmon (2018 R3)	Jun 7.2	1.29			11.5	10.0	14
Lemmon (2018 R5)	Jan 10.0	3.62	110	0	11.5	10.0	20
PanSTARRS (A/2018 V3)	Sep 8.6	1.34		0	15.7	5.0	14
Africano (2018 V4)	Mar 1.9	3.20			12.5	10.0	20
Catalina (A/2018 W1)	May 11.9	1.40		0	15.6	5.0	18
Africano (2018 W2)	Sep 15.6	1.59			9.5	10.0	11
Fitzsimmons (2018 X2)	Jul 8.6	2.13			12.0	10.0	18
Iwamoto (2018 Y1)	Feb 6.6	1.28			9.2	10.0	8
3D/Biela	Jul 12.1	0.84	6.76	6			
25D/Neujmin	Aug 18.4	1.29	5.43	2			
29P/Schwassmann-Wachmann	Mar 7.8	5.77	14.79	7	0.5	10.0	Varies
31P/Schwassmann-Wachmann	Jul 6.1	3.43	8.74	13	6.7	11.3	15
68P/Klemola	Nov 9.0	1.79	11.01	5	6.8	15.0	12
69P/Taylor	Mar 18.3	2.28	7.68	7	7.3	10.0	12
76P/West-Kohoutek-Ikemura	Oct 26.1	1.60	6.48	6	8.0	30.0	15
78P/Gehrels	Apr 2.7	2.01	7.23	6	-2.7	40.7	12
123P/West-Hartley	Feb 5.1	2.13	7.58	4	11.5	10.0	15
131P/Mueller	Jan 24.2	2.42	7.06	4	13.0	10.0	19
138P/Shoemaker-Levy	May 2.8	1.70	6.90	4	15.0	10.0	19

149P/Mueller	Feb 17.0	2.63	8.97	3	11.5	10.0	17
155P/Shoemaker	Nov 15.2	1.80	16.92	2	10.5	10.0	14
160P/LINEAR	Dec 2.4	1.79	7.32	3	15.0	5.0	17
163P/NEAT	Aug 5.2	2.07	7.32	4	14.5	10.0	20
168P/Hergenrother	Aug 5.1	1.36	6.78	3	10.3	6.7	11 ?
171P/Spahr	Jan 13.7	1.77	6.71	3	10.2	15.0	14
175P/Hergenrother	Sep 30.8	1.95	6.34	3	14.0	10.0	19
186P/Garradd	May 4.9	4.39	11.21	3	7.5	10.0	17
200P/Larsen	Jul 28.5	3.30	10.96	2	8.3	10.0	15
209P/LINEAR	Jun 12.8	0.97	5.10	3	17.0	5.0	16
215P/NEAT	Nov 18.0	3.60	9.01	3	8.0	10.0	16
222P/LINEAR	Jun 5.1	0.83	4.94	3	16.5	15.0	16
223P/Skiff	Jan 27.3	2.43	8.48	2	11.0	10.0	17
231P/LINEAR-NEAT	Jun 14.2	3.02	8.05	2	14.5	5.0	19
232P/Hill	Apr 6.6	2.98	9.50	2	11.5	10.0	18
239P/LINEAR	Jan 10.2	1.65	9.45	2	17.5	5.0	18
260P/McNaught	Sep 10.0	1.42	6.89	2	10.5	10.0	11
261P/Larson	Jun 18.6	2.01	6.51	2	14.0	10.0	18
264P/Larsen	Aug 5.0	2.44	7.68	2	13.0	10.0	18
289P/Blanpain	Dec 21.0	0.96	5.32	3	10.5	10.0	6 ?
294P/LINEAR	Nov 29.7	1.30	5.74	2	15.5	10.0	18
322P/SOHO	Aug 31.5	0.05	3.97	5	22.1	12.8	7
373P/Rinner	Apr 9.2	2.31	7.43	1	13.0	10.0	18
374P/Larson	Jan 12.0	2.68	11.11	1	12.0	10.0	18
376P/LONEOS	Sep 29.2	2.83	14.20	1	11.5	10.0	18

The date of perihelion (T), perihelion distance (q), period (P), the number of previously observed returns (N), the magnitude parameters H_1 and K_1 and the brightest magnitude (which must be regarded as uncertain) are given for each comet. The magnitudes, orbits, and in particular the time of perihelion of the D/ comets are uncertain. 168P outburst at its last return and it may be fainter than given here. 289P also undergoes outbursts, and in quiescence would be over 10 magnitudes fainter. The SOHO comets are only likely to be observed by satellite.

Note: $m_1 = H_1 + 5.0 * \log(d) + K_1 * \log(r)$

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