
Comet Prospects for 2012

The year starts with a bright, well placed, binocular comet on view. 2009 P1 (Garradd) was at perihelion at the close of 2011, and should be 7th magnitude during January and February. P/Levy (2006 T1) might be a similar magnitude over the same period if it follows the same brightness behaviour as at its discovery apparition. Comet 96P/Machholz is the brightest comet of the year, but is then too close to the Sun for ground based observation.

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 periodic comets, which are often ignored. They would make useful targets for CCD observers, especially those with time on instruments such as the Faulkes telescope. In addition to those in the BAA Handbook, ephemerides for new and currently observable comets are published in the *Circulars*, and on the Section, CBAT and Seiichi Yoshida's web pages. Complete ephemerides and magnitude parameters for all comets predicted to be brighter than about 21^m are given in the International Comet Quarterly Handbook; details of subscription to the ICQ are available on the Internet. A section booklet on comet observing is available from the BAA Office.

29P/Schwassmann-Wachmann is an annual comet that has outbursts, which over the last decade seem to have become more frequent. The comet had one of its strongest outbursts yet recorded in early 2010. The comet is an ideal target for those equipped with CCDs and it should be observed at every opportunity. The comet begins the year in Corvus, less than a degree from M104, and completes its retrograde loop in nearby Virgo by mid summer. It crosses back into Corvus, before ending the year in Virgo. The comet is at opposition at the end of March and passes through solar conjunction in mid October.

78P/Gehrels reaches perihelion in January, but its distance from the Earth is already increasing, and so it is fading from its best in the autumn of 2011. It is however relatively well placed in the evening sky, and so a suitable target for telescopic observation.

Although **96P/Machholz** could be the brightest comet of the year, it will only be the solar monitoring satellites that will see it around perihelion. Southern Hemisphere observers may get to see it as a relatively poorly placed telescopic object in the morning sky prior to perihelion, and in the evening sky post perihelion.

185P/Petriew makes its third return, and although predicted to reach 11th magnitude, it will be a morning object when at its best in early August.

1994 X1 (P/McNaught-Russell) makes its first return to perihelion this year. Although not observed visually at the discovery apparition, its brightness on the Schmidt plates suggests that it might have been within range and the predictions are based on this assumption. It may become visible in July, and will be at its brightest in November and December, when it is well placed in the evening sky.

David Levy made the visual discovery of **2006 T1 (P/Levy)** on October 2.50. Observing near Saturn with his 0.41-m reflector he noted a diffuse object of magnitude 10.5. The cometary nature of the object was confirmed by Peter Birtwhistle and Richard Miles amongst others. The Japanese comet hunter Shigheki Murakami made an independent discovery of the comet on 2006 October 4, but by this time the object had been placed on the NEOCP and an IAUC issued. This is a very good return, as the comet passes 0.19 AU from the Earth, which gives it the potential to become a binocular object, if it behaves as it did at the discovery return. It is a little surprising that the comet hadn't been discovered previously, for example the 1991 return was relatively favourable, and so it may have been caught in outburst. It had not been recovered by 2011 October, which strengthens this hypothesis. It is well placed in the evening sky when at its brightest, but is rapidly moving south, so that UK observers will lose it by mid February. There is the possibility of a meteor shower from the comet with maximum on New Year's Eve.

2009 P1 (Garradd) currently holds the best prospect for UK observers. It begins the year the year at 7^m, and whilst visible for a short time in the evening sky, it is best placed in the morning due to its location in Hercules. It is moving north, and passes less than 20' from globular cluster M92 on February 3, soon becoming visible all night. It is furthest north on March 12, at just over 70° declination, but is fading and by the end of April will be 9th magnitude. Telescopic observers should be able to follow it to the end of May, by which time it will have crossed half the sky to Cancer.

2011 R1 (McNaught) may just reach 11th magnitude and is then an exclusively southern hemisphere object. Circumpolar and lying below the pole, it will be visible in the evening sky, which may encourage some observers to turn their telescopes towards it.

The other periodic and parabolic comets that are at perihelion during 2012 are unlikely to become brighter than 12th magnitude or are poorly placed. Ephemerides for these can be found on the CBAT WWW pages. Several D/ comets have predictions for return, though searches at favourable returns in the intervening period have failed to reveal the comets and it is possible that they are no longer active. There is however always a chance that they will be rediscovered accidentally by one of the Sky Survey patrols.

Looking ahead to 2013, **2P/Encke** puts on a good showing for Northern Hemisphere observers and should be a binocular object in November. **2011 L4 (PanSTARRS)** could provide one of the brighter comets of the decade after its March perihelion. Otherwise, prospects for a comet brighter than 12th magnitude in 2013 are poor.

Comets reaching perihelion in 2012

Comet	T	q	P	N	H ₁	K ₁	Peak mag
P/Spacewatch (2005 JN)	Jan 6.1	2.29	6.56	1	14.0	10.0	19
131P/Mueller	Jan 7.4	2.42	7.07	3	13.0	10.0	17
P/Gibbs (2011 C2)	Jan 9.5	5.39	20.0	0	9.0	10.0	19
P/Levy (2006 T1)	Jan 12.3	1.01	5.28	1	10.5	10.0	7
78P/Gehrels	Jan 12.9	2.01	7.23	5	3.5	20.0	10
P/McNaught (2005 J1)	Jan 15.8	1.54	6.75	1	16.5	10.0	20
McNaught (2011 Q2)	Jan 19.8	1.35			10.0	10.0	13

244P/Scotti	Jan 20.3	3.92	10.8	2	9.0	10.0	17
P/Spacewatch-Boattini (2011 JB ₁₅)	Jan 28.6	5.01	20.1	0	9.0	10.0	19
5D/Borsen	Feb 5.3	0.53	5.61	5			
D/Brooks (1886 K1)	Feb 6.3	1.89	6.69	1			
Gibbs (2010 M1)	Feb 7.8	2.30			9.0	10.0	15
21P/Giacobini-Zinner	Feb 11.8	1.03	6.60	14	7.8	17.7	11
198P/ODAS	Feb 15.8	2.00	6.82	2	10.5	15.0	16
105P/Singer Brewster	Feb 26.2	2.05	6.47	4	12.5	15.0	18
3D/Biela-A	Feb 27.0	0.80	6.59	6			
182P/LONEOS	Mar 5.4	1.01	5.10	2	18.0	10.0	17
P/Novochonok-Gerke (2011 R3)	Apr 3.3	3.56	10.7	0	11.0	10.0	19
242P/Spahr	Apr 3.5	3.98	13.0	2	8.0	10.0	17
58P/Jackson-Neujmin	Apr 10.0	1.37	8.22	6	11.0	15.0	18
163P/NEAT	Apr 12.8	2.06	7.30	3	14.5	10.0	19
LONEOS (2006 S3)	Apr 16.5	5.13			2.0	10.0	12
D/Denning (1894 F1)	Apr 16.8	1.36	8.11	1			
171P/Spahr	Apr 30.6	1.76	6.70	2	10.2	15.0	16
60P/Tsuchinshan	May 13.5	1.62	6.56	7	10.5	15.0	15
LINEAR (2010 R1)	May 18.9	5.62			6.0	10.0	17
P/Gibbs (2006 Y2)	May 20.8	1.26	5.35	1	18.0	10.0	20
P/ASH (2011 N1)	May 31.1	2.86	15.8	0	11.5	10.0	18
P/LINEAR (2003 O2)	Jun 10.7	1.50	8.75	1	14.5	10.0	18
138P/Shoemaker-Levy	Jun 11.7	1.70	6.90	3	15.0	10.0	19
P/Pan-STARRS (2011 U1)	Jun 29.2	2.23	8.76	0	14.5	10.0	20
152P/Helin-Lawrence	Jul 9.2	3.12	9.54	2	10.0	10.0	18
96P/Machholz	Jul 14.8	0.12	5.28	5	13.0	12.0	2
189P/NEAT	Jul 20.4	1.18	4.99	2	19.0	10.0	16
185P/Petrew	Aug 13.5	0.93	5.46	2	11.0	10.0	11
LINEAR (2011 O1)	Aug 18.5	3.89			7.0	10.0	15
P/LONEOS (2006 Q2)	Aug 22.0	1.34	5.96	1	19.5	10.0	19
P/McNaught (2005 K3)	Sep 12.7	1.50	7.02	1	13.5	10.0	14
160P/LINEAR	Sep 18.5	2.07	7.90	2	15.0	5.0	17
158P/Kowal-LINEAR	Sep 27.5	4.58	10.3	2	9.0	10.0	18
P/Larson (2005 N3)	Sep 29.4	2.19	6.78	1	14.0	10.0	18
168P/Hergenrother	Oct 1.7	1.41	6.89	2	15.5	10.0	15
P/Christensen (2005 T2)	Oct 7.1	2.21	7.47	1	14.5	10.0	19
Bressi (2011 U2)	Oct 9.2	2.49			10.0	10.0	16
3D/Biela-B	Oct 9.9	0.83	6.74	6			
McNaught (2011 R1)	Oct 19.7	2.08			6.5	10.0	11
P/McNaught-Russell (1994 X1)	Dec 4.5	1.28	18.3	1	10.0	10.0	11
P/Spacewatch (2006 F4)	Dec 14.1	2.34	6.63	1	15.0	10.0	21
P/LONEOS (1999 RO ₂₈)	Dec 17.6	1.22	6.58	1	18.0	5.0	19
P/Hermann (1999 D1)	Dec 18.4	1.64	13.8	1	15.0	10.0	18

The date of perihelion (T), perihelion distance (q), period (P), the number of previously observed returns (N), the magnitude parameters H₁ and K₁ 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.

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

References and sources

Belyaev, N. A., Kresak, L., Pittich, E. M. and Pushkarev, A. N., *Catalogue of short Period Comets*, Bratislava (1986).

Kozlov, E. A., Medvedev, Y. D., Pittichova, J., and Pittich, E. M. *Catalogue of short Period Comets, 2nd edition*, (<http://astro.savba.sk/cat/>) (2003).
Kronk, G. W., *Cometographia*, Cambridge University Press, (1999, 2004, 2007, 2009) and <http://www.cometography.com>.
Marsden, B. G. and Williams, G. V. *Catalogue of Cometary Orbits*, 17th edition, IAU MPC/CBAT, (2008).
Minor Planet Circulars
Nakano Notes at <http://www.oaa.gr.jp/~oaacs/nk/>
Shanklin, J. D., *Observing Guide to Comets, 2nd edition* (2002)

Jonathan Shanklin