# Comet Prospects for 2011

*For many, the best comet for the year is likely to be 2009 P1 (Garradd), which might reach 7th magnitude at the end of the year. 45P/Honda-Mrkos-Pajdusakova makes a close pass to the earth and will be well placed in the Southern Hemisphere prior to perihelion in September and visible in the north post perihelion. 73P/Schwassmann-Wachmann also returns, but it is not clear how many of the multiple fragments will be visible and even the brightest is likely to be fainter than 12th magnitude. P/Levy (2006 T1) may reach 9th magnitude at the end of the year prior to perihelion in mid January 2012.*

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. This would make a useful project for CCD observers. Perhaps the most spectacular example of such fragmentation is 73P/Schwassmann-Wachmann, which exhibited a debris string of over 60 components as it passed close to the Earth in May 2006, and which returns this year. Ephemerides for new and currently observable comets are published in the *Circulars*, Comet Section Newsletters 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.

**27P/Crommelin** has a poor return and will not be visible from the UK. Its maximum elongation whilst brighter than 14th magnitude is only 37°, and it is then at a northern declination, so it is possible that no-one will make a visual observation. The comet is named for the BAA Comet Section Director, A C Crommelin, who first computed a linked orbit for comets seen in 1818, 1873 and 1928. It was quite well observed in 1984 when it served as a test comet for the International Halley Watch.

**29P/Schwassmann-Wachmann** is an annual comet that has outbursts, which in recent years seem to have become more frequent. The outbursts were more or less continuous in 2008/9 and at some the comet became as bright as $10^m$. The comet is an ideal target for those equipped with CCDs and it should be observed at every opportunity. The comet begins the year retrograding in Leo and reaches opposition on March 7, when it may show some additional brightening because of the small phase angle. It moves into Sextans in late March and resumes direct motion in May, when UK observers will loose it. The comet passes through solar conjunction in September but UK observers are unlikely to pick it up again until the new year as it is now at a southern declination.

This year there is an excellent return of **45P/Honda-Mrkos-Pajdusakova**. Southern Hemisphere observers are likely to pick it up near opposition in July, when it is a 12th magnitude object in Pisces Austrinus. It heads even further south, brightening rapidly as it passes only 0.06 AU from the Earth on August 16, when it might be seen with the naked eye. It passes through conjunction at the end of the month and fades a little, but brightens again as it approaches perihelion at the end of September. UK observers get a chance to see it between mid September and mid October, although it will be quite low in the morning sky.

**73P/Schwassmann-Wachmann** is unlikely to be as well seen this year when compared to its astonishing display in 2006, when many fragments were seen strung along the orbit. The two brightest fragments should be recovered, but their brightness is uncertain as the fresh surfaces from the break-up are likely to have aged.

**2009 P1 (Garradd)** currently holds the best prospect for UK observers. We should be able to pick it up around mid-summer, when it may already be $10^{th}$ magnitude. Moving north and west from Pisces, it reaches opposition in early August on the borders of Pegasus at perhaps $9^{th}$ magnitude. It becomes nearly stationary in Hercules in November, but then accelerates northwards, ending the year here at approaching $7^{m}$.

One SOHO comet is predicted to return, and should become visible in the SOHO LASCO field if the satellite is still operation, or in the STEREO fields.

The other periodic and parabolic comets that are at perihelion during 2011 are unlikely to become brighter than $12^{th}$ 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 2012, **P/Levy (2006 T1)** could be $7^{th}$ magnitude just after perihelion in mid January 2012, when it passes 0.19 AU from the Earth. It is well placed prior to perihelion and UK observers should be able to follow it through the autumn and winter of 2011, with the comet reaching $9^{th}$ magnitude by the end of the year. There is however some uncertainty about its brightness, as it seems probable that it was in outburst at discovery. **2009 P1 (Garradd)** will be at its best during the first couple of months of the year and becomes circumpolar at this time. **96P/Machholz** will be a bright object at perihelion, but is then close to the Sun and will not be visible from the UK.

**Comets reaching perihelion in 2011**

| Comet | T | q | P | N | $H_1$ | $K_1$ | Peak mag |
|---|---|---|---|---|---|---|---|
| Beshore (2009 K3) | Jan 9.3 | 3.90 | | | 8.5 | 10.0 | 17 |
| 9P/Tempel | Jan 12.4 | 1.51 | 5.52 | 11 | 7.0 | 21.5 | 13 |
| Catalina (2009 Y1) | Jan 28.9 | 2.52 | | | 9.0 | 10.0 | 15 |
| D/Helfenzrieder (1766 G1) | Jan 29.7 | 0.42 | 4.52 | 1 | 6.0 | 10.0 | |
| Cardinal (2010 B1) | Feb 7.1 | 2.94 | | | 7.5 | 10.0 | 14 |
| D/Swift (1895 Q1) | Mar 1.4 | 1.48 | 7.40 | 1 | 11.4 | 10.0 | |
| 243P/NEAT (2010 P5) | Mar 3.5 | 2.46 | 7.52 | 1 | 12.5 | 10.0 | 19 |
| D/Barnard (1884 O1) | Mar 7.9 | 1.33 | 5.45 | 1 | 8.9 | 10.0 | |
| 238P/Read (2010 N2) | Mar 10.7 | 2.36 | 5.63 | 1 | 14.5 | 10.0 | 20 |
| P/LINEAR (2006 U1) | Apr 15.8 | 0.51 | 4.63 | 1 | 18.5 | 10.0 | 16 |
| D/van Houten (1960 S1) | Apr 23.3 | 4.07 | 15.7 | 1 | 8.5 | 10.0 | |
| P/LINEAR-NEAT (2004 T1) | Apr 24.9 | 1.71 | 6.47 | 1 | 12.5 | 10.0 | 17 |
| 231P/LINEAR-NEAT | May 16.7 | 3.03 | 8.08 | 1 | 14.5 | 5.0 | 19 |
| 164P/Christensen | Jun 2.4 | 1.68 | 6.98 | 2 | 11.0 | 10.0 | 15 |
| Boattini (2008 S3) | Jun 7.4 | 8.02 | | | 4.0 | 10.0 | 17 |
| 213P/Van Ness | Jun 16.2 | 2.12 | 6.33 | 2 | 10.5 | 10.0 | 14 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 130P/McNaught-Hughes | Jun 24.8 | 2.10 | 6.65 | 3 | 12.5 | 10.0 | 16 |
| 62P/Tsuchinshan | Jun 30.4 | 1.38 | 6.37 | 7 | 9.5 | 15.0 | 13 |
| 123P/West-Hartley | Jul 4.5 | 2.13 | 7.58 | 3 | 11.5 | 10.0 | 17 |
| 69P/Taylor | Jul 17.2 | 2.27 | 7.64 | 6 | 7.3 | 10.0 | 13 |
| P/PANSTARRS (2010 T2) | Jul 29.2 | 3.73 | 13.2 | 0 | 11.5 | 10.0 | 19 |
| 3D/Biela | Jul 29.9 | 0.80 | 6.56 | 6 | 7.5 | 10.0 | |
| D/Harrington-Wilson (1952 B1) | Jul 30.1 | 1.28 | 5.58 | 1 | 12.1 | 10.0 | |
| 27P/Crommelin | Aug 3.8 | 0.75 | 27.92 | 5 | 12.0 | 20.0 | 11 |
| 97P/Metcalf-Brewington | Aug 21.0 | 2.60 | 10.53 | 3 | 4.6 | 15.0 | 12 |
| 228P/LINEAR (2009 U2) | Aug 23.8 | 3.43 | 8.51 | 1 | 14.5 | 5.0 | 19 |
| Hill (2010 G2) | Sep 2.1 | 1.98 | 930 | | 8.0 | 10.0 | 12 |
| P/SOHO (1999 R1) | Sep 7.1 | 0.05 | 3.99 | 3 | 22.1 | 12.8 | 6 |
| 45P/Honda-Mrkos-Pajdusakova | Sep 28.8 | 0.53 | 5.25 | 11 | 12.5 | 20.0 | 6 |
| 48P/Johnson | Sep 29.3 | 2.30 | 6.94 | 9 | 5.6 | 15.0 | 12 |
| 115P/Maury | Oct 7.0 | 2.04 | 8.76 | 3 | 11.5 | 15.0 | 17 |
| 73P-Schwassmann-Wachmann C | Oct 16.8 | 0.94 | 5.36 | 2 | | | 12 ? |
| P/Lagerkvist (1996 R2) | Oct 17.1 | 2.61 | 7.38 | 1 | 11.0 | 10.0 | 16 |
| 73P-Schwassmann-Wachmann B | Oct 18.6 | 0.94 | 5.36 | 6 | | | 12 ? |
| 49P/Arend-Rigaux | Oct 19.1 | 1.42 | 6.72 | 9 | 11.3 | 11.0 | 14 |
| 41P/Tuttle-Giacobini-Kresak | Nov 12.2 | 1.05 | 5.43 | 10 | 9.4 | 17.2 | 11 |
| P/Larsen (2004 H3) | Nov 23.3 | 2.45 | 7.72 | 1 | 13.0 | 10.0 | 19 |
| P/LINEAR-NEAT (2004 R3) | Nov 28.4 | 2.13 | 7.49 | 1 | 14.5 | 10.0 | 19 |
| LINEAR (2010 R1) | Nov 28.5 | 6.66 | | | 6.0 | 10.0 | 18 |
| Lemmon (2009 S3) | Dec 10.3 | 6.48 | | | 6.5 | 10.0 | 19 |
| 37P/Forbes | Dec 11.0 | 1.58 | 6.35 | 10 | 10.5 | 10.0 | 15 |
| 71P/Clark | Dec 15.8 | 1.57 | 5.53 | 7 | 9.7 | 7.9 | 13 |
| Garradd (2009 P1) | Dec 23.8 | 1.55 | | | 4.0 | 10.0 | 7 |
| 36P/Whipple | Dec 29.6 | 3.09 | 8.54 | 11 | 8.5 | 15.0 | 17 |
| McNaught (2009 F4) | Dec 31.9 | 5.45 | | | 3.0 | 10.0 | 14 |

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.

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

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