TRAPPIST bright comets production rates: 12P/Pons-Brooks, 13P/Olbers, 62P/Tsuchinshan 1, 144P/Kushida and C/2021 S3 (PanSTARRS)

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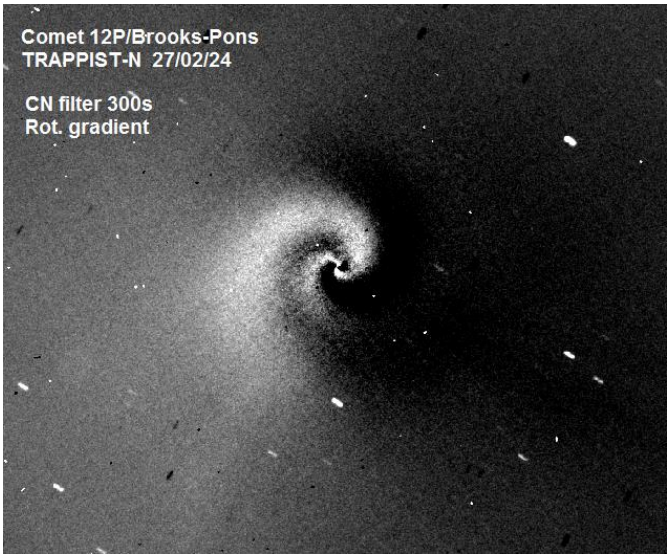
The authors report that they obtained from TRAPPIST robotic telescopes (Jehin et al. 2011) recent observations under clear skies using broad band and cometary HB narrowband gaseous and dust continuum filters (Farnham et al. 2000) for the following comets and computed preliminary production rates at 10.000 km using a Haser Model (Vp=Vd=1km/s) (Haser 1957). The dust production rates proxy A(0)f(rho) were estimated by profile fitting at 10.000 km (A'Hearn et al. 1984) and corrected for the phase angle (Schleicher 2007).

12P/Pons-Brooks
Date UT=2024-02-25, r_h=1.26 au, Delta=1.71 au, DT=-55 days
Q(OH) = 1.54 +/- 0.43 E29 s-1
Q(CN) = 4.37 +/- 0.28 E26 s-1
Q(C2) = 7.99 +/- 0.28 E26 s-1
A(0)fp(RC) = 17041 +/- 275 cm
A(0)fp(BC) = 14911 +/- 568 cm



The 12P Halley comet is now very low on horizon but it is very active and it was observed continuously during the last month with TRAPPIST-North thanks to great weather in

Morocco. Its gas production rates have been increasing steeply in the last two weeks and the coma shows two bright spiral CN jets. C2 has been rising faster than other species, the comet shows now a high abundance of C2 compared to CN. While no outburst was detected during the last month of observations, last night, on February 29, 19:30 UT an outburst of 0.9 mag was measured in all BVRI filters compared to the previous night and a typical compact inner coma is observed in all filters. The comet is still 2 months from perihelion, but it will not be visible anymore in April.

13P/Olbers
Date UT=2024-02-25, r_h=2.13 au, Delta=2.29 au, DT=-125 days
Q(OH) = 5.66 +/- 3.78 E27 s-1
Q(CN) = 4.37 +/- 0.19 E25 s-1
Q(C2) = 2.99 +/- 0.34 E25 s-1
A(0)fp(RC) = 1251 +/- 21 cm
A(0)fp(BC) = 1087 +/- 59 cm

This other Halley type comet is slightly depleted in C2.

62P/Tsuchinshan
Date UT=2024-02-20, r_h=1.44 au, Delta=0.52 au, DT=+57 days
Q(OH) = 2.68 +/- 0.46 E27 s-1
Q(CN) = 1.37 +/- 0.07 E25 s-1
Q(C3) = 2.72 +/- 0.18 E24 s-1
Q(C2) = 1.37 +/- 0.10 E25 s-1
A(0)fp(RC) = 155 +/- 6 cm
A(0)fp(BC) = 122 +/- 8 cm

Two months after perihelion the comet is still bright and all gas species easily detected. It has a typical composition.

144P/Kushida
Date UT=2024-02-20, r_h=1.43 au, Delta=0.8 au, DT=+26 days
Q(OH) = 6.34 +/- 0.77 E27 s-1
Q(CN) = 2.44 +/- 0.09 E25 s-1
Q(C3) = 5.78 +/- 0.54 E24 s-1
Q(C2) = 2.36 +/- 0.29 E25 s-1
A(0)fp(RC) = 193 +/- 24 cm
A(0)fp(BC) = 139 +/- 35 cm

One month after perihelion the comet is still bright and all gas species easily detected. It has a typical composition.

C/2021 S3 (PANSTARRS)
Date UT=2024-02-23, r_h=1.33 au, Delta=1.35 au, DT=+9 days
Q(OH) = 5.19 +/- 0.87 E27 s-1
Q(CN) = 2.63 +/- 0.10 E25 s-1
Q(C2) = 2.35 +/- 0.11 E25 s-1
A(0)fp(RC) = 2897 +/- 29 cm
A(0)fp(BC) = 1992 +/- 46 cm
This dynamically new comet has just passed perihelion, it has a typical composition.

Notations: rh= heliocentric distance (in au), Delta=geocentric distance (in au), DT= Time to perihelion. OH, NH, C3, CN, C2 are the HB gaseous narrowband filters for the corresponding species, and BC, GC, RC are the blue, green and red dust continuum filters (Farnham et al. 2000).

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