

Outburst of comet C/2021 A1 (Leonard) on January 7, 2021

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on 27 Jan 2022; 19:50 UT
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Subjects: Optical, Comet

We report about an outburst of comet C/2021 A1 (Leonard) that happened between January 6 and 8, 00:00 UT 2021. Observations were carried on with TRAPPIST-South (code=I40, Chile) robotic telescopes about every night since Dec 20 until Jan 25, using broad band and cometary HB narrowband filters (Jehin et al. 2011). The production rates are computed at 10.000 km using a Haser Model ($V_p=V_d=1\text{km/s}$) (Haser 1957) and the dust production rates proxy $A(0)f(\rho)$ are estimated by profile fitting at 10.000 km (A'Hearn et al. 1984) and corrected for the phase angle (Schleicher 2007). After five days around perihelion (Jan 3, 2022) of continuous decrease of the fluxes, there was a quick increase of about 1.5 magnitude in R band measured in an aperture of 5" centered on the nucleus on the images obtained on Jan 8, 00:15 UT ($R=8.9\pm 0.07$) compared to those of Jan 6, 00:15 UT ($R=10.5\pm 0.08$). The production rates of all the species were multiplied by about a factor of 4 with respect to Jan 6, as well as the $A(0)f_p$. All the values peaked on Jan 9 UT and are reported below, with a $Q(\text{H}_2\text{O})$ close to $2.5\text{E}29\text{ s}^{-1}$, the highest value measured on the whole period. The flux started to drop again on Jan 10, UT.

C/2021 A1 (Leonard) Date UT=2022-01-09, $r_h=0.63\text{ au}$, $\Delta=1.12\text{ au}$, $DT=+6\text{ days}$
 $Q(\text{OH})=(2.37\pm 0.42)\text{ E}29\text{ s}^{-1}$
 $Q(\text{NH})=(1.07\pm 0.35)\text{ E}27\text{ s}^{-1}$
 $Q(\text{CN})=(3.86\pm 0.49)\text{ E}26\text{ s}^{-1}$
 $Q(\text{C}_2)=(4.41\pm 0.61)\text{ E}26\text{ s}^{-1}$
 $A(0)f_p(\text{BC})=9053\pm 85\text{ cm}$
 $A(0)f_p(\text{RC})=12915\pm 54\text{ cm}$

Notations: r_h = heliocentric distance (in au), Δ =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).

Acknowledgments: TRAPPIST is a project funded by the Belgian F.R.S.-FNRS under grant PDR T.0120.21. TRAPPIST-North is funded by the University of Liege, and performed in collaboration with the Cadi Ayyad University of Marrakesh. Observations were carried on from the ESO La Silla Paranal Observatory. We thank NASA, David Schleicher and the Lowell Observatory for the loan of the HB comet filters.