



Observations of comets with the Herschel Space Observatory

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The Herschel Space Observatory is well suited for the study of water and its isotopologues in comets through the observation of their submillimetric rotational lines. A large part of the guaranteed time key programme “Water and related chemistry in the Solar System” is devoted to this topic [1].

C/2008 Q3 (Garradd) was the first comet to be observed with the HIFI instrument in July 2009 at a heliocentric distance of 1.8 AU [2]. Three fundamental rotational lines of water (557, 1113 and 1669 GHz) were observed. A rate of water outgassing of $1.7\text{--}2.8 \times 10^{28} \text{ s}^{-1}$ was measured.

Comet C/2006 W3 (Christensen) was observed in November 2009 with the PACS and SPIRE instruments [3]. When it was at 3.3 AU from the Sun, a distance where water sublimation is limited. Complementary observations were obtained with radio telescopes from the ground (IRAM in Spain and Nançay in France). Water was not detected and the comet's coma was found to be enriched in more volatile molecules (CO, CH₃OH, H₂S) with respect to comets observed closer from the Sun. The continuum emission from 70 to 672 μm allowed us to constrain the amount of dust released from the comet nucleus and the dust size distribution.

Comets 81P/Wild 2 and 29P/Schwassmann-Wachmann 1 were observed in 2010. Comets 10P/Tempel 2, 103P/Hartley 2 and possibly a new

comet as a target of opportunity are next to be observed. We will present the status of this on-going programme.

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References

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