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Five years of comet narrow band photometry and imaging with TRAPPIST

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Abstract (2,250 Maximum Characters): TRAPPIST is a 60-cm robotic telescope in La Silla Observatory [1] mainly dedicated to the study of exoplanets and comets. The telescope is equipped with a set of narrow band cometary filters designed by the NASA for the Hale-Bopp observing campaign [2]. Since its installation in 2010, we gathered a high quality and homogeneous data set of more than 30 bright comets observed with narrow band filters. Some comets were only observed for a few days but others have been observed weekly during several months on both sides of perihelion. From the images, we derived OH, NH, CN, C₂, and C₃ production rates using a Haser [3] model in addition to the A_{fp} parameter as a proxy for the dust production. We computed production rates ratios and the dust color for each comet to study their composition and followed the evolution of these ratios and colors with the heliocentric distance.

The TRAPPIST data set, rich of more than 10000 images obtained and reduced in an homogeneous way, allows us to address several fundamental questions such as the pristine or evolutionary origin of composition differences among comets. The evolution of comet activity with the heliocentric distance, the differences between species, and from comet to comet, will be discussed. Finally, the first results about the one year campaign on comet C/2013 US10 (Catalina) and our recent work on the re-determination of Haser scalelengths will be presented.

[1] Jehin et al., *The Messenger*, 145, 2-6, 2011

[2] Farnham et al., *Icarus*, 147, 180-204, 2000

[3] Haser, *Bulletin de l'Académie Royal des Sciences de Belgique*, 63, 739, 1957