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Typology of Cometary Particles Collected by the Cosima Instrument as Observed by the Cosima Camera (Cosiscope)

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The COSIMA instrument on-board the Rosetta spacecraft is a TOF mass spectrometer which collects cometary particles on 1 cm2 targets exposed in front of an entry funnel. The targets are imaged after each exposure by a microscope (COSISCOPE) with a resolution of 14 μm per pixel.

A first target holder with 3 targets covered by a layer of "gold black" 30 μm thick has been exposed from August 8 to December 14, 2014, and a second target holder has been exposed since December 14, 2014. The targets are imaged on a weekly basis so as to detect new collected particles. Nearly 3000 collected particles have already been identified.

We will present the typology of these particles as observed by COSISCOPE, which extends from solid grains to rubble piles and scattered aggregates at all sizes from the detection limit of COSISCOPE ($\sim$ 14 μm, the size of the pixel) to 500 μm . Albedo covers a range of more than a factor of 10. The collection velocity is low, as demonstrated by the absence of imprints in the "gold black" layer. The typology of collected particles is linked to their tensile strength. It ranges from aggregates with low tensile strengths similar to that of IDP's to solid grains with a possible link to the sub-population of cometary grains which could survive collection by "Stardust" in aerogel at 6 km/s. A companion abstract by N. Ligier et al. will present the first results of an optical characterization of clusters of collected particles and their sub-components.