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Size, shape and substructure of dust particles collected by the COSIMA instrument on board ROSETTA

Nicolas Ligier (1), Yves Langevin (1), Martin Hilchenbach (2), Sihane Merouane (2), Klaus Hornung (3), and Cosima Team (2)

(1) Institut d'Astrophysique Spatiale, Orsay, France (nicolas.ligier@ias.u-psud.fr), (2) Max-Planck Institute for Solar System Research, Göttingen, Germany, (3) Universität des Bundeswehr, Neubiberg, Germany

The COSIMA instrument on-board ROSETTA is dedicated to the analysis by TOF mass spectrometry of cometary grains next collected in the inner coma of 67P/Churymov-Gerasimenko. The grains are collected simultaneously by three 10x10 mm targets exposed in front of an entry funnel. The targets are imaged at regular intervals by presenting them in front of a microscopic camera ("COSISCOPE") under grazing incidence illumination by two LED's on opposite sides of the observed target. The resolution of COSISCOPE (14 μm / pixel), makes it possible to optically characterize the particles which fill up a significant fraction of the chemically analyzed spot (50 μm FWHM).

More than 2000 cometary dusts collected by six different targets have already been detected by the COSISCOPE in less than five months. The collected dust particles present a complex typology (presented by a companion abstract by Y. Langevin). In this contribution, we report the first results of an automatic optical characterization method for classifying the collected particles based on size, shape, shadows and substructure. These results will be used to infer the volume of parent particles which shattered upon collection.