



The optical and physical properties of cometary dust particles from 67P/Churyumov-Gerasimenko collected in situ by Rosetta/COSIMA

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The COMetary Secondary Ion Mass Analyzer (COSIMA) instrument on-board the Rosetta spacecraft collected dust particles in the coma of 67P/Churyumov-Gerasimenko at low velocity on metallic targets [1]. Images of the collected particles were obtained with the internal camera, the COSISCOPE, with a resolution of 14 μm x 14 μm allowing the study of their optical [2] and physical [3, 4, 5, 6] properties. We could show that the individual particles have a wide range of albedo and are on average brighter than the comet nucleus [2]. The size distribution of the particles collected by COSIMA varies along the trajectory of the comet around the Sun, in particular, only small particles are collected when the southern hemisphere of the nucleus is illuminated [6]. This observation can be explained by the re-deposition in the northern hemisphere of the large particles (>500 μm in size) ejected from the southern hemisphere. The cometary particles are fragmented upon impact at low velocity on the COSIMA targets revealing their fragile nature [4], the analysis of the impact patterns suggests that the surfaces of the sub-units forming the aggregates collected by COSIMA are covered with amorphous carbon rather than silicate or water ice.

References: [1] Kissel et al., 2007, Space Science Reviews, 128, 82 [2] Langevin et al., 2017, MNRAS, 469, S535-S549 [3] Langevin et al., 2016, Icarus, 271, 76 [4] Hornung et al., 2016, P&SS, 133, 63 [5] Hilchenbach et al., 2017, Phil. Trans. of the Royal Society A, 375, 2097, id.20160255 [6] Merouane et al., 2017, MNRAS, 469, S459-S474