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The dust coma of 67P/Churyumov-Gerasimenko as seen by OSIRIS onboard Rosetta

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1. Introduction

The dust coma of 67P was detected and monitored by OSIRIS, the scientific camera onboard Rosetta, since the beginning of the post-hibernation operations in March 2014. A complete description of the coma during the approach phase to the comet was presented in [5], including the detection of a sudden cometary outburst at the end of April 2014. OSIRIS images acquired at the end of the approach (July 2014) and during the escort phase were used to characterize dust particles present in the comet's inner coma ([4], [3], [2], [1]).

2. The comet's dust environment

OSIRIS images, calibrated following the instrument pipeline described in [6], were used to obtain photometric measurements of the unresolved coma and individual dust grains. A large number of individual dust grains have been detected and characterized in terms, for example, of size, colors, orbits [2].

In this study, following a similar way as described in [5] for the first three months of the mission, surface brightness vs. comet distance profiles are used to characterize the comet's dust environment and its evolution with heliocentric distance.

Images acquired with different filters, spanning the wavelength range from 240 nm to 1000 nm, allow us to measure coma colors, their diurnal variations, and changes with heliocentric distance, providing insight into the dust composition.

Montecarlo simulations are used to constrain dust parameters (such as size, size distribution and velocities of the dust particles) by comparing synthetic and observed images.

Additionally, images acquired at phase angles between 0º and 160º allowed us not only to measure the dust phase function in different colors but also to investigate the intimate nature of cometary dust particles by solving the inverse scattering problem.

References

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