

The dust environment of 67P/Churyumov-Gerasimenko as seen through Rosetta/OSIRIS

C. Tubiana (1), C. Güttler (1), H. Sierks (1), I. Bertini (2) and the OSIRIS Team (3)

(1) Max-Planck-Institut für Sonnensystemforschung, Justus-von-Liebig-Weg 3, 37077 Göttingen, Germany (tubiana@mps.mpg.de), (2) Department of Physics and Astronomy “G. Galilei”, University of Padova, Vicolo dell’ Osservatorio 3, 35122 Padova, Italy, (3) MPS/UPD/LAM/IAA/SSO/INTA/UPM/DASP/IDA.

Please make sure that your pdf conversion results in a document with a page size of 237 x 180 mm!

Abstract

The ESA’s Rosetta spacecraft had the unique opportunity to be in the vicinity of comet 67P/Churyumov-Gerasimenko for 2.5 years, observing how the comet evolved while approaching the Sun, passing through perihelion and then moving back into the outer solar system. OSIRIS, the Optical, Spectroscopic, and Infrared Remote Imaging System [1], was the scientific camera system onboard Rosetta. Composed of two cameras (the Wide Angle Camera (WAC) and the Narrow Angle Camera (NAC)), it imaged the nucleus and the comet dust environment from March 2014 to September 2016, while 67P/Churyumov-Gerasimenko moved from 4.1 AU inbound to 3.8 AU outbound.

WAC images, thanks to the field of view of about $12^\circ \times 12^\circ$ are the most suited to study the unresolved dust coma, investigating its diurnal and seasonal variations and providing insights into the dust composition. Comparison with ground based observations will help us to understand whether the dust coma has similar behaviors at the small scales observed by OSIRIS and at the large scales observed from ground. Hundreds of individual particles have been identified in the thousands of images dedicated to dust studies. Those particles have been characterized in terms of color, size distribution, distance, light curves and orbits (see e.g. [2]; [3]; [4]; [5]; [6]; [7]; [8]).

Acknowledgements

OSIRIS was built by a consortium of the Max-Planck-Institut für Sonnensystemforschung, Göttingen, Germany, CISAS University of Padova, Italy, the Laboratoire d’Astrophysique de Marseille, France, the Instituto de Astrofísica de Andalucía,

CSIC, Granada, Spain, the Research and Scientific Support Department of the European Space Agency, Noordwijk, The Netherlands, the Instituto Nacional de Técnica Aeroespacial, Madrid, Spain, the Universidad Politécnica de Madrid, Spain, the Department of Physics and Astronomy of Uppsala University, Sweden, and the Institut für Datentechnik und Kommunikationsnetze der Technischen Universität Braunschweig, Germany. The support of the national funding agencies of Germany (DLR), France (CNES), Italy (ASI), Spain (MEC), Sweden (SNSB), and the ESA Technical Directorate is gratefully acknowledged. We thank the Rosetta Science Ground Segment at ESAC, the Rosetta Mission Operations Centre at ESOC and the Rosetta Project at ESTEC for their outstanding work enabling the science return of the Rosetta Mission.

References

- [1] Keller, H.U. et al., OSIRIS – The Scientific Camera System Onboard Rosetta, *Space Science Reviews*, vol. 128, pp. 433-506, 2007.
- [2] Agarwal, J. et al., Acceleration of individual, decimetre-sized aggregates in the lower coma of comet 67P/Churyumov-Gerasimenko, *MNRAS*, 462, 2016.
- [3] Bertini, I. et al., The Scattering Phase Function of comet 67P/Churyumov-Gerasimenko coma as seen from the Rosetta/OSIRIS instrument, *MNRAS*, submitted.
- [4] Frattin, E. Post-perihelion photometry of dust grains in the coma of 67P Churyumov-Gerasimenko, *MNRAS*, submitted.
- [5] Fulle, M. et al., Rotating dust particles in the coma of comet 67P/Churyumov-Gerasimenko, *A&A*, 583, id.A14, 2015.

[6] Fulle, M. et al., Evolution of the Dust Size Distribution of Comet 67P/Churyumov-Gerasimenko from 2.2 au to Perihelion, *ApJ*, 821, id.19, 2016

[7] Güttler, C. et al., Characterization of dust aggregates in the vicinity of the Rosetta spacecraft, *MNRAS*, submitted.

[8] Ott, T. et al., Dust Mass Distribution around Comet 67P/Churyumov-Gerasimenko determined via Parallax Measurements using Rosetta's OSIRIS Cameras, *MNRAS*, submitted.