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# In Situ Space Gas Dynamic Measurements by the ROSINA Comet Pressure Sensor COPS Onboard Rosetta Spacecraft

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Rosetta is part of the cornerstone missions executed by the European Space Agency. It is the first space mission to orbit and also land on a comet. The Rosetta Orbiter Spectrometer for Ion and Neutral Analysis (ROSINA) is one of the core payloads on board of the Rosetta spacecraft [Balsiger et al, 2007]. ROSINA's main objective is to determine the major atmospheric and ionospheric composition in the coma and to investigate the gas dynamics around the comet.

ROSINA consists of two mass spectrometers and a pressure sensor. The COmet Pressure Sensor (COPS) includes two gauges: the "nude gauge" measures total neutral density in the coma and the "ram gauge" measures the dynamic pressure of the cometary gas flux. The combination of these two gauges makes COPS capable to derive the gas dynamics (velocity and temperature) at the location of the spacecraft.

Over several months Rosetta has been carrying out a close study of comet 67P/Churyumov-Gerasimenko. In early August 2014 COPS detected the faint and expanding atmosphere of the comet while it was still outside of 3.5 AU from the Sun. We will present ROSINA COPS observations of the evolution and gas dynamics of the cometary coma following these first observations until spring 2015.

Reference:
Balsiger, H. et al.: ROSINA-Rosetta Orbiter Spectrometer for Ion and Neutral Analysis, Space Science Reviews, Vol. 128, 745-801, 2007.