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Approaching the Plasma Coma of 67P/Churyumov-Gerasimenko With the Rosetta Plasma Consortium

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Abstract

After being ten years in space the Rosetta spacecraft finally arrived at its target, comet 67P/Churyumov-Gerasimenko. Though the comet is still in a state of low-activity, its interaction with the solar wind already causes plasma conditions different from standard solar wind characteristics. The five plasma sensors of the Rosetta Plasma Consortium allow investigating these cometary activity driven modifications. In this presentation, we show first observations and results obtained during the cometary approach phase of the mission. Among the first signs of cometary activity we shall discuss distributions of pick-up cometary ions directly detectable by the Ion Composition Analyzer (RPC-ICA) and the Ion and Electron Sensor (RPC-IES) as well as ion cyclotron waves generated by the pick-up process by the Fluxgate Magnetometer (RPC-MAG). Electron density enhancements will be visible in the spacecraft potential accessible by the Langmuir probes (RPC-LAP) and any associated high frequency waves by the Mutual Impedance Probe (RPC-MIP).

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Observations presented in this presentation are from the Rosetta mission. Rosetta is an ESA mission with contributions from its member states and NASA. Rosetta's Philae lander is provided by a consortium led by DLR, MPS, CNES and ASI. Rosetta will be the first mission in history to rendezvous with a comet, escort it as it orbits the Sun, and deploy a lander to its surface. Comets are time capsules containing primitive material left over from the epoch when the Sun and its planets formed. By studying the gas, dust, and organic materials associated with the comet, via both remote and in-situ observations, the Rosetta mission should become the key to unlocking the history and evolution of our Solar System, as well as answering questions regarding the origin of Earth's water and perhaps even life.