



The Rosetta Langmuir Probe Instrument

Anders Eriksson (1), Niklas Edberg (1), Elias Odelstad (1), Jan-Erik Wahlund (1), Erik Vigren (1), Tomas Karlson (2), Per-Arne Lindqvist (2), Riku Jarvinen (3), Bjorn Lybekk (4), Wojciech Miloch (4), Arne Pedersen (4), Jean-Pierre Lebreton (5), Pierre Henri (5), Chris Carr (6), and Emanuele Cupido (6)

(1) Swedish Institute of Space Physics, Uppsala, Sweden (anders.eriksson@irfu.se), (2) Alfvén Laboratory, Royal Institute of Technology, Stockholm, Sweden, (3) Finnish Meteorological Institute, Helsinki, Finland, (4) Institute of Physics, University of Oslo, Norway, (5) Laboratoire de Physique et Chimie de l'Environnement et de l'Espace, Orleans, France, (6) Space and Atmospheric Physics Group, Imperial College, London, UK

Rosetta provides an unprecedented opportunity to follow the evolution of the plasma environment close to a comet as activity grows and recedes from 4 AU to perihelion and out again. Like the rest of the Rosetta Plasma Consortium (RPC), the Langmuir probe instrument (RPC-LAP) has been operational from early summer 2014 to cover also the approach of Rosetta toward comet 67P/Churyumov-Gerasimenko. The instrument uses two spherical probes mounted on short (few meters) solid booms protruding from the spacecraft body. The probes can be used as classical Langmuir probes, as electric field probes with bias current and for wave observations up to 8 kHz. In the low density solar wind before Rosetta arrived close to the comet, probe bias sweeps were dominated by spacecraft photoelectrons. This changed as plasma densities increased when Rosetta closed up to the nucleus, where a plasma of cometary origin has dominated from well outside 3 AU. As collisions are rare, this early activity comet plasma shows much higher electron temperature (order 10 eV) than expected for the inner coma of a fully developed comet (order 10 meV). This also caused negative spacecraft potential of sometimes tens of volts, clearly visible in the LAP data. We show example LAP data and discuss the performance of the instrument for various kinds of measurements in the plasmas yet encountered.