

Polarisation Properties of Low-Frequency Waves in the Inner Coma of Comet 67P/Churyumov-Gerasimenko

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Abstract

Since its arrival at comet 67P/Churyumov-Gerasimenko in August 2014 the magnetometer experiment, as part of the Rosetta Plasma Consortium (RPC), onboard the Rosetta spacecraft has been detecting low-frequency waves in the cometary plasma environment. These waves are present in the frequency range of 10-100 mHz with a mean value of 40 mHz. In order to understand the properties of the waves, detailed information on their polarisation dependent on external parameters such as background magnetic field, ion density and distance to the comet is required. In this study the magnetometer data is treated to a Minimum Variance Analysis of three-minute intervals over the entire escort phase of Rosetta. This analysis is the basis of a detailed investigation of temporal and spatial variations in the direction of propagation and polarisation of the wave. This mission also offers the unique opportunity to measure these waves at two points at the same time. The ROMAP instrument onboard the lander Philae measured the same wave activity as RPC, which allows to study the correlation between these two instruments. It is found that the propagation direction is dependent on the position of the measurement in relation to the comet and that it is fluctuating heavily. Only a long term study reveals two prominent directions of propagation in the terminator plane of the comet.