



Wave normal calculations of Saturnian plasma waves using the Cassini Radio and Plasma Wave Science five-channel waveform receiver

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The Cassini spacecraft is currently in the third orbit of its four-year prime mission to study the Saturnian system. The Radio and Plasma Wave Science (RPWS) investigation is designed to study the radio emissions and plasma waves in the vicinity of Saturn. Three nearly orthogonal electric field antennas are used to detect electric fields over a range from 1 Hz to 16 MHz, and three orthogonal search coil magnetic antennas are used to detect magnetic fields over a range from 1 Hz to 12 kHz. The Five-Channel Waveform Receiver (WFR) provides simultaneous waveforms from up to five separate sensors in passbands of either 1 Hz to 26 Hz, or 3 Hz to 2.5 kHz. The wave normal and Poynting vector of various plasma waves can be calculated from the direct measurements of the three-axis magnetic and the two-axis electric wave fields. This analysis is important in determining the polarization, the mode, and the source region of these waves. During the first three periapsis passes of the Cassini spacecraft to the planet Saturn, a variety of low-frequency plasma waves have been observed, including a chorus-like emission. Poynting vector and wave normal analysis using the Means method are performed on these emissions. Initial results show the chorus-like emission propagating away from the Saturnian magnetic equator, similar to observations at the Earth.