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Analysis of short large amplitude magnetic structures at the Kronian bow shock

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We present a comprehensive statistical analysis of Short Large Amplitude Magnetic Structures (SLAMS) upstream of the quasi-parallel bow shock of Saturn. During its mission Cassini extensively surveyed the quasi-parallel regime. For this study we used the measurements of the Cassini Plasma Spectrometer (CAPS) and the Magnetometer (MAG).

The SLAM structures locally act as fast mode shock waves, and we observed possible ion beam reflection, multiple ion beams, deceleration and plasma heating of the solar wind protons. These features are in agreement with the near Earth observations. We also detected whistler precursor waves multiple times, which was also documented in studies of the Earth's foreshock region. Since the frequency of the upstream ULF waves detected at Saturn is lower than it is at Earth, it also has an effect on the spatial extension of the SLAM structures, which arise from these waves. With only one spacecraft's measurements it is not possible to study the SLAMS with the same efficiency as with the four-point measurements of the CLUSTER probes, but the basic observational features and the description of their evolutionary characteristics are summarized.