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Saturn Observations of Z-mode Wave Intensity and Possible Electron Acceleration

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Past and recent studies have shown that chorus and z-mode/electron wave-particle interactions can lead to electron acceleration in planetary magnetospheres. These electrons may then form a partial source of planetary radiation belts. The wave acceleration process depends on the local plasma density and on the distribution of wave intensity in frequency and spatial coordinates. Following up on past chorus studies, in this work we identify and bin the narrowband z-mode wave intensity observed by the Cassini radio and plasma wave science (RPWS) investigation in the low density region $r \lesssim 7R_s$ near the inner edge of the Enceladus plasma torus, where the condition $f_p/f_c < 1$ can be met (f_p = plasma freq., f_c = cyclotron freq.). The spatial bins include radial distance, latitude, and local time. Within each spatial bin we calculate the mean intensity-versus-frequency profile relative to 5kHz, which can then be analytically fit. One goal of the investigation is to provide a database for use in quasilinear models requiring the calculation of pitch angle and momentum diffusion coefficients. In this report we present our initial findings, where significant z-mode emission is found near Saturn.