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Narrowband large amplitude oblique whistler-mode waves in the solar wind and their interaction with electrons[1] CYNTHIA CATTELL, BENJAMIN SHORT, TIEN VO, AARON BRENEMAN, PETER GRUL, School of Physics and Astronomy University of Minnesota — Large-amplitude (up to 70 mV/m) whistler-mode waves at frequencies of ~0.2 to 0.4 f_{ce} (electron cyclotron frequency)are frequently observed in the solar wind. The waves are obliquely propagating at angles close to the resonance cone, with significant electric fields parallel to the background magnetic field, enabling strong interactions with solar wind electrons. Frequencies and/or propagation angles are distinctly different from whistler-mode waves usually observed in the solar wind, and amplitudes are 1 to 3 orders of magnitude larger. Waves occur most often in association with stream interaction regions, and are often 'close-packed.' Wave occurrence as a function of normalized electron heat flux and beta is consistent with the whistler heat flux fan instability. The oblique propagation and large amplitudes of these whistlers enable resonant interactions with electrons over a broad energy range, and, unlike parallel whistlers, don't require that the electrons and waves counter-propagate. Therefore, they are much more effective in modifying solar wind electron distributions than parallel-propagating waves. We show results from a 3d particle tracing code showing the strong interactions of electrons, providing evidence for the importance of these waves for the evolution of solar wind electrons.

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