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STEREO Observations of Turbulent Solar Wind Waveforms

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Studies of solar wind turbulence have heretofore concentrated on Kolmogorov-type studies of the full MHD equations, without regard to the separate modes of the possible solutions. Further understanding of the nonlinear processes of the cascade, and especially transference of wave energy to particles, would seem to depend on more detailed understanding of the waves, their modes and their separate electric and magnetic fields. .
A part of the SWAVES experiment on the STEREO spacecraft was designed to study the waves in the dissipation region of the turbulence spectrum. However, compatibility with SECCHI, the optical sensors, required that only monopole antennas could be accommodated, and these respond both to electric fields and to density fluctuations. This seemed to require that one measure four quantities with only three signals. After several years, the response of the antennas to density fluctuations was reduced, due to changes in photoemission coefficients, and measurement of separate electric fields became possible.
It is found that sometimes there are short periods when a sinusoidal waveform appears which seems sufficiently pure to represent a single mode. Results of study of the fields of such waves will be presented.