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## Guided transient signals in space plasmas – theory and observation

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The propagation of real transient UWB (ultra wide band) signals in different media is an important topic. Transients can appear frequently in Earth's natural environment, e.g. signals excited by lightning discharges, wave-particle interactions or interplanetary effects. But the theoretical problem is more general, as all the switching on-off like events on electric circuits and on wave guides generate UWB phenomena. In this paper we present a theoretical solution of the Maxwell's equations that delivers closed formed, general full-wave solution of signals excited by temporarily and spatially transient functions and propagate in square cross-sectioned wave-guide filled by homogeneous, anisotropic plasma, and display some numerical calculations of these UWB signals in comparison with some unordinary VLF phenomena recorded on board the DEMETER and the COMPASS-2 satellites. The spectral behavior (modal furcating) of these anomalistic whistler-like events shows remarkable similarities to the calculated wave-forms modeled by guided transients propagating in anisotropic plasma. This investigation offers the possibility to determine the excitation and the medium parameters along the propagation path.

As significant similarities occur on the measured and simulated spectra, it is possible, that the fact of ducted (guided) propagation influences this phenomenon. It is important to continue this investigation.