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Rapid determination of the sense of polarization and propagation for random electromagnetic wave fields. Application to GEOS-1 and AUREOL-3 data

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ABSTRACT

The wave distribution function (WDF) concept is used: first, to define the strategy to be applied for the rapid determination of the sense of polarization and of the sense of the parallel component of the direction of propagation, for a random electromagnetic wave field in a cold and collisionless magnetoplasma, when all the six wave field components are not available; and second, to evaluate the contribution to those quantities of the different families of waves simultaneously present. The importance of the wave and plasma characteristic parameters is emphasized. For instance it is shown that, at frequencies just below the local proton gyrofrequency L-mode waves need to have a wave energy density 100 times, or even 1000 times, higher than the R-mode waves to be detected. Applications to the 6-component nongeostationary GEOS-1 satellite and to the 5-component AUREOL-3 satellite are discussed.

This paper can purchased at the following site, where there is also a short abstract in French: <http://cat.inist.fr/?aModele=afficheN&cpsidt=7951400>

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