CONTROL ID: 1484572

TITLE: Conversion of ionospheric heater HF waves into electron acoustic waves in warm ionospheric plasma *(Invited)*

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ABSTRACT BODY: The Stanford full-wave method (StanfordFWM) was developed in order to calculate generation and propagation of electromagnetic waves in cold magnetized stratified plasmas. We generalize it by including the effects of electron temperature, by following a procedure analogous to that of [Budden and Jones, 1987, doi:10.1098/rspa.1987.0077]. The advantage of StanfordFWM is that it is intrinsically numerically stable against ``swamping'' by evanescent waves while in the method of Budden and Jones [1987] ``the problem of numerical swamping is severe ...'' The new method is used to calculate mode conversion between electron acoustic (Langmuir) and electromagnetic modes for propagation in a warm ionospheric plasma with a gradient of electron density and an arbitrary direction of the background geomagnetic field, in the vicinity of density corresponding to the plasma resonance. As a numerical check, we demonstrate good agreement with previous calculations of Budden and Jones [1987] obtained by a numerically-unstable full-wave method scheme; Mjolhus [1990, doi:10.1029/RS025i006p01321] obtained by the method of contour integration in the complex n-plane; and Kim et al [2008, doi:10.1063/1.2994719] using a numerical electron fluid simulation code. We demonstrate that under certain conditions the linear conversion of the ordinary HF electromagnetic waves radiated by an ionospheric heater into electron acoustic waves may be very efficient, with implications for the HF heating of the F-region of ionosphere.

KEYWORDS: [2403] IONOSPHERE / Active experiments, [2487] IONOSPHERE / Wave propagation.

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