Abstracts

Proposed Experiment for Eliciting Multiple Resonances from the Ionosphere (Correspondence)

W.D. Hershberger. "Proposed Experiment for Eliciting Multiple Resonances from the Ionosphere (Correspondence)." 1962 Transactions on Microwave Theory and Techniques 10.5 (Sep. 1962 [T-MTT]): 396-397.

In the theory of Herlofson only one resonance is predicted for a cylindrical plasma column irradiated by an electromagnetic wave having both its direction of propagation and electric field E perpendicular to the axis of the column, a mode which he designates as sagittal. Herlofson treats the problem by solving the wave equation in cylindrical coordinates and then imposing boundary conditions to find the frequency or frequencies for maximum scattering from the column. In his treatment, the modes which involve Bessel functions of order higher than unity have the same resonant frequency as that for the dipolar mode for which the order of the Bessel function is unity. No resonances at all are predicted for the parallel mode of excitation in which E is parallel to the axis of the column. These predictions are contrary to the experimental observations of Dattner and others for the saggital mode and also contrary to the observations reported by Willis and Petroff in which a spectrum of resonances is found for the parallel mode. Experiments by Boley have shown that the sagittal scattering for the higher order resonances is that appropriate for a dipole, that is, his experiments show that the field about the column for the higher-order modes is not quadropolar or sextupolar.

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