Abstracts

Surface Waves on Plasma-Clad Metal Rods

T. Tamir and S. Palocz. "Surface Waves on Plasma-Clad Metal Rods." 1964 Transactions on Microwave Theory and Techniques 12.2 (Mar. 1964 [T-MTT]): 189-196.

Surface waves guided along a metal rod which is surrounded by a concentric isotropic plasma sheath are investigated for both the principal and the higher modes by employing a rigorous formulation. It is shown that all these modes exhibit a high frequency cutoff phenomenon; the two first modes propagate down to dc, whereas all the other modes possess a finite low frequency cut off and thus exhibit band-pass characteristics. Backward wave propagation is shown to exist when the plasma sheath is thin; dispersion curves are calculated and compared with previous data obtained by means of quasi-static approximations whose limitations and inaccuracies are also indicated. All the results are derived for the plasmaclad rod being placed either in free space or in a dielectric medium, and the dispersion features for both situations are represented in terms of universal curves.

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