

Abstract Submitted  
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**Electromagnetic properties of miniature corrugated plasma channels**<sup>1</sup> JOHN PALASTRO, THOMAS ANTONSEN, IREAP, University of Maryland, SIMON COOKE, Vacuum Electronics Branch, Naval Research Laboratory, HOWARD MILCHBERG, IPST, University of Maryland — Miniature corrugated plasma waveguides [1] are of interest in applications such as plasma based particle acceleration, high harmonic generation, and THz generation [2]. These corrugated waveguides support slow electromagnetic waves that can couple to ponderomotively driven currents due to the inhomogeneity of the plasma. Here we calculate the dispersive properties of such waveguides. First we use a simple model that allows for an analytic solution and gives a dispersion relation that predicts mode phase speeds and the location of stop-bands. In addition, permits calculation of the mode coupling impedance, which is important for the above mentioned applications. Second, we use a modified version of the CEM field solver CTLSS to calculate the mode properties for sample electron density profiles present in experiments. Comparison between models will be given, and the implications for the various applications will be detailed. [1] H.M. Milchberg et al., Phys. Plasmas 3, 2149 (1996) [2] T. M. Antonsen et al. Bull. Am. Phys. Soc. 50, 186 (2005)

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