

Abstract Submitted
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An Exact Hot-Tube Solution For Thin Tape Helix Traveling-Wave Tube¹ PATRICK WONG, Y.Y. LAU, RONALD GILGENBACH, University of Michigan, DAVID CHERNIN, Leidos, Inc., BRAD HOFF, Air Force Research Laboratory — The exact hot-tube dispersion relation for a thin tape helix traveling-wave tube (TWT) is derived for the first time, based on its exact cold-tube solution [1]. This is an attempt to provide a reliable determination of the Pierce parameters, in particular the "AC space-charge" parameter QC , for a realistic TWT. The determination of QC remains an outstanding issue [2]. The numerical results from the exact formulation will be compared with other approximate models of TWT that were commonly used in the literature for QC [3]. [1] D. Chernin, et al., *IEEE Trans. ED* **46**, 7 (1999). [2] D. H. Simon, et al., *Phys. Plasmas* **24**, 033114 (2017). [3] G. M. Branch and T. G. Mihran, *IRE Trans. ED* **2**, 3 (1955).

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