

Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Absolute Instability in Coupled-Cavity TWTs¹ D.M.H. HUNG, I.M. RITTERSDORF, PENG ZHANG, Y.Y. LAU, D.H. SIMON, R.M. GILGENBACH, University of Michigan, Ann Arbor, MI, D. CHERNIN, Leidos Corp., Reston, VA, T.M. ANTONSEN, JR., University of Maryland, College Park — This paper will present results of our analysis of absolute instability in a coupled-cavity traveling wave tube (TWT). The structure mode at the lower and upper band edges are respectively approximated by a hyperbola in the (ω , k) plane. When the Briggs-Bers criterion is applied, a threshold current for onset of absolute instability is observed at the upper band edge, but not the lower band edge. The nonexistence of absolute instability at the lower band edge is mathematically similar to the nonexistence of absolute instability that we recently demonstrated for a dielectric TWT. The existence of absolute instability at the upper band edge is mathematically similar to the existence of absolute instability in a gyrotron traveling wave amplifier. These interesting observations will be discussed, and the practical implications will be explored.

¹This work was supported by AFOSR, ONR, and L-3 Communications Electron Devices.

Peng Zhang
University of Michigan, Ann Arbor, MI

Date submitted: 11 Jul 2014

Electronic form version 1.4