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Harmonic Generation in a Traveling-Wave Tube[1] PATRICK WONG, PENG ZHANG, Y.Y. LAU, GEOFFREY GREENING, RONALD GILGENBACH, Univ of Michigan - Ann Arbor, DAVID CHERNIN, DAVID SIMON, Leidos Corporation, BRAD HOFF, Air Force Research Laboratory — Crowding of electron orbits in a traveling-wave tube (TWT) may lead to significant harmonic contents in the beam current, even in the linear regime [1]. Here, we consider a wideband TWT that exhibits gain at the second harmonic. We analytically formulate equations governing the evolution of the generation of second harmonic, including axial variations of the Pierce parameters. The second harmonic output is phase-controlled by the input signal which consists only of a fundamental frequency. Several test cases are performed and compared with simulation using the CHRISTINE code. Reasonable agreement between theory and simulation is found. [1] C. F. Dong, et al., *IEEE Trans. ED* 62, 4285 (2015).

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Patrick Wong
Univ of Michigan - Ann Arbor

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