Abstracts

Super-Reltron Analysis and Experiments

R.B. Miller, W.F. McCullough, K.T. Lancaster and C.A. Muehlenweg. "Super-Reltron Analysis and Experiments." 1992 MTT-S International Microwave Symposium Digest 92.1 (1992 Vol. I [MWSYM]): 237-240.

We have developed a highly efficient, high-power microwave tube called SUPER-RELTRON. We have achieved operation at >400 MW with ~50% efficiency at 1 GHz, and >300 MW with 50% efficiency at 3 GHz. The rf pulse durations are typically a few hundred nanoseconds. These lightweight, compact tubes do not require an external magnetic field. The rf output coupling is straightforward and power is delivered directly via the fundamental TE/sub 10/ wave in rectangular waveguide without a mode converter. The key features of our tube include generation of a well-modulated electron beam by periodic virtual cathode formation, post-acceleration of the modulated beam to reduce the relative electron energy spread, and a multi-cavity output section that efficiently extracts power without rf breakdown. In this paper, we discuss various aspects of our device and briefly summarize our experimental results.

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