Abstracts

Pasotron High-Energy Microwave Source

J.M. Butler, D.M. Goebel, R.W. Schumacher, J. Hyman, J. Santoru, R.M. Watkins, R.J. Harvey, F.A. Dolezal, R.L. Eisenhart and A.J. Schneider. "Pasotron High-Energy Microwave Source." 1992 MTT-S International Microwave Symposium Digest 92.1 (1992 Vol. I [MWSYM]): 511-514.

We describe the operation and performance of a new high-energy microwave source called the PASOTRON, for Plasma-Assisted, Slow-wave Oscillator. Recently developed at Hughes Research Laboratories, the PASOTRON is a unique combination of a novel electron-gun and plasma-filled slow-wave structure which creates a source capable of generating 100 µsec-long rf pulses maintained at power levels of a few MW without the use of any magnetic focusing fields. A Hughes' hollow-cathode-plasma electron-gun is used to produce long, high-power beam pulses from which energy is efficiently extracted and converted into electromagnetic radiation. We present results which show rf output power is in the 1-to-5 MW range, for rf pulse lengths up to 120 µsec from a PASOTRON tube designed to operate in the C-band frequency range. The integrated rf energy per pulse is up to 500 J, and the electron-beam to microwave-radiation power-conversion efficiency is ~20%. Instantaneous bandwidth measurements confirm that for the long rf pulse duration, the PASOTRON's oscillation center frequency is maintained in a narrow line < 3 MHz.

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