Abstracts

Experimental 6-GHz Frozen Wave Generator with Fiber-Optic Feed

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Experimental results from an optically activated 6 GHz frozen wave generator (FWG) test device are presented. The several system components needed to produce a low-cost monolithic pulsed power source suitable for large phased arrays are demonstrated. Static electric energy stored in 50 ohm microstrip transmission lines is released by fast GaAs photoconductive (PC) switches activated by 50 picosecond laser pulses distributed over fiber-optics. The present device is of hybrid construction, using commercial fiber-optic pigtailed integrated optic couplers and semi-insulating (SI) GaAs metal-semiconductor-metal (MSM) photoconductive switch chips bonded into microstrip. However, exclusive of the laser, the design lends itself to monolithic microwave and integrated optic techniques especially at high frequencies. Experimental test results compare well with circuit simulation predictions, showing that hybrid techniques introduce negligible parasitic at the design frequency. Lower resistance PC switches are needed to fully demonstrate the high power performance capabilities of this type of device.

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