Abstracts

Active high-power RF pulse compression using optically switched resonant delay lines

S.G. Tantawi, R.D. Ruth, A.E. Vlieks and M. Zolotorev. "Active high-power RF pulse compression using optically switched resonant delay lines." 1997 Transactions on Microwave Theory and Techniques 45.8 (Aug. 1997, Part II [T-MTT]): 1486-1492.

We present the design and a proof of principle experimental results of an optically controlled high-power RP pulse-compression system. In principle, the design should handle a few hundreds of megawatts of power at X-band. The system is based on the switched resonant delay-line theory [1]. It employs resonant delay lines as a means of storing RF energy. The coupling to the lines is optimized for maximum energy storage during the charging phase. To discharge the lines, a high-power microwave switch increases the coupling to the lines just before the start of the output pulse. The high-power microwave switch required for this system is realized using optical excitation of an electron-hole plasma layer on the surface of a pure silicon wafer. The switch is designed to operate in the TE/sub 01/ mode in a circular waveguide to avoid the edge effects present at the interface between the silicon wafer and the supporting waveguide; thus, enhancing its power handling capability.

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