FORMING OF LONG NANOSECOND PULSES WITH A RECTANGULAR ENVELOPE IN A COMPACT ACTIVE MICROWAVE PULSE COMPRESSOR

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This work presents the results of the study of an active microwave pulse compression system capable of forming rectangular pulses with duration ~10–100 ns and having dimensions many-fold smaller than the emitted wave train. Such compression system is based on the compact planar-voluminal resonant cavity made in the shape of a meander from waveguide sections and H-plane tees. The sections of the resonant cavity are parallel and are located in the same plane with tees. The energy input element is located in the input end of the first section. The output device designed as the H-tee interference switch is connected to the output end of the last section. Each end of remaining sections is connected through a straight arm to a H-tee with a short-circuited quarter-wave second straight arm.

Experiments demonstrated that under certain conditions such compressors with compact storage cavity can generate nearly rectangular pulses with duration equal to the time of wave double traveling along the resonant cavity, and with power compatible with the power of the wave in the resonant cavity and the length of radiated wave train several-fold exceeding the size of compressor. At pulse duration equal to 25 ns, gain coefficient was 13 dB and pulse power was 40 MW. The work demonstrates the possibility to change the geometry of resonant cavity by rearrangement of its components without changing the output pulse parameters, and the possibility to make microwave compressing system with a compact voluminal resonant cavity made of moderately multimode waveguide with TE01 working mode.

Keywords: *microwave compressor, microwave compression system, high-power, plasma switch, waveguide, cavity.*