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Control of powerful microwaves using EBG plasma structures.[1]
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— Glow discharge plasmas have great potential for application as control elements in microwave devices designed on the basis of electromagnetic band gap (EBG) structures. In this report, a plasma control of powerful microwave propagation by means of 1D and 2D EBG structures is under investigation. Three pulsed discharges in argon (or helium) at atmospheric pressure are applied in the capacity of plasma inhomogeneities. Temporal behavior of electron concentration in discharge is determined. The transmission spectra of 1D EBG structure formed solely by plasma in the X-waveguide are measured. The amplitudes of short (˜200 ns) and powerful (50 kW) microwave pulses at frequency of 9.15 GHz are strongly suppressed (more than on 40 dB) when plasma structure exists. The propagation of these powerful microwave pulses through the triangular metallic 2D EBG structure with the plasma control elements is investigated, too. It is shown that the transmission of the 2D EBG structure at the angle of 45^{o} ceases quickly (during a few tenth of nanoseconds) when plasma acts as a compensator of defect in the front row of the structure. On the contrary, the transmission arises quickly once plasma acts as an additional defect.

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