BEAM-PLASMA PROCESSES RELEVANT TO HIGH-POWER WIDE BAND PLASMA-FILLED MICROWAVE SOURCES

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Abstract

Main features of non-relativistic Cherenkov-type beam-plasma microwave amplifier with hybrid plasma-cavity slow-wave structures are described. The estimations of fundamental parameters of beam-plasma microwave device based on analysis of cylindrical beam-plasma system in external magnetic field are presented:

Plasma density (up to 10^{12} cm^{-3}), electron beam (3 A, 20 kV, $3 \cdot 10^{9}$ cm^{-3}), magnetic field (0.25 T), working gas pressure ($1 \cdot 10^{-3}$ Torr) and also current threshold for electron-electron instability as a stage of beam-plasma discharge.

Results of experimental investigation of beam-plasma in propagation channel of electrodynamic structure carried out in the presence of microwave generation are given. Beam-plasma amplifier has been created to operate at output microwave power over 20 kW, electron efficiency up to 35 % and pass-band width 30 %.

(Full text not available)