

High-power microwave amplifier based on overcritical relativistic electron beam without external magnetic field / S. A. Kurkin [etc.]

Abstract

The high-power scheme for the amplification of powerful microwave signals based on the overcritical electron beam with a virtual cathode (virtual cathode amplifier) has been proposed and investigated numerically. General output characteristics of the virtual cathode amplifier including the dependencies of the power gain on the input signal frequency and amplitude have been obtained and analyzed. The possibility of the geometrical working frequency tuning over the range about 8%–10% has been shown. The obtained results demonstrate that the proposed virtual cathode amplifier scheme may be considered as the perspective high-power microwave amplifier with gain up to 18 dB, and with the following important advantages: the absence of external magnetic field, the simplicity of construction, the possibility of geometrical frequency tuning, and the amplification of relatively powerful microwave signals.

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