

529. Title:Analytical exploration of folded waveguide circuit design for high-power traveling-wave tube amplifier

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Abstract:In this paper, we analyze the design of the folded waveguide slow-wave circuit for traveling-wave tube (TWT) amplifiers. On the basis of physical analyses, an improved physical-based design method that is especially suitable for high-power devices is developed. The proposed method overcomes the difficulties resulting from increased operating voltages and requirements for higher interaction impedance in high-power designs. It enables balancing of dispersion and interaction impedance, which is a flexible approach in addressing operational problems. Furthermore, the essential relationship between the proposed and the existing methods are revealed. A Ka-band folded waveguide TWT amplifier is designed and examined, thereby confirming that the new design method is effective and reliable.