# Abstracts

## A Vlasov Description of the Gridded Gap-Electron Flow Interaction

*S.A. Kheifets, J. Jaeger and S.S. Yu. "A Vlasov Description of the Gridded Gap-Electron Flow Interaction." 1985 Transactions on Microwave Theory and Techniques 33.6 (Jun. 1985 [T-MTT]): 467-476.*

Self-consistent solutions of the system of Vlasov equations are found for the case when the electric field in the gap does not depend on the longitudinal coordinate, The solution is valid: a) for an arbitrary nonrelativistic particle distribution in velocity and time at the gap entrance, b) for any gap length, c) for any beam current, and d) for a broad class of field dependence on time. In the region of applicability of the small-signal approximation (small beam current, small transit angle of the gap), the solution derived reproduces the results of the small-signal approximation. Numerical results for the input klystron cavity and for an idler cavity are given and compared with the calculations in small-signal approximation. Possible applications of this formulation are discussed. In particular, we argue that the Vlasov description provides a suitable framework for developing one-dimensional models of a multiple-cavity klystron. These models will be valid for huge signals, and are useful therefore for predicting the performance of high-power klystrons.

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