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Abstract

A comprehensive study of microwave vacuum electronic devices and their current and future applications While both vacuum and solid-state electronics continue to evolve and provide unique solutions, emerging commercial and military applications that call for higher power and higher frequencies to accommodate massive volumes of transmitted data are the natural domain of vacuum electronics technology. Modern Microwave and Millimeter-Wave Power Electronics provides systems designers, engineers, and researchers-especially those with primarily solid-state training-with a thoroughly up-to-date survey of the rich field of microwave vacuum electronic device (MVED) technology. This book familiarizes the R&D and academic communities with the capabilities and limitations of MVED and highlights the exciting scientific breakthroughs of the past decade that are dramatically increasing the compactness, efficiency, cost-effectiveness, and reliability of this entire class of devices. This comprehensive text explores a wide range of topics: * Traveling-wave tubes, which form the backbone of satellite and airborne communications, as well as of military electronic countermeasures systems * Microfabricated MVEDs and advanced electron beam sources * Klystrons, gyro-amplifiers, and crossed-field devices * "Virtual prototyping" of MVEDs via advanced 3-D computational models * High-Power Microwave (HPM) sources * Next-generation microwave structures and circuits * How to achieve linear amplification * Advanced materials technologies for MVEDs * A Web site appendix providing a step-by-step walk-through of a typical MVED design process Concluding with an in-depth examination of emerging applications and future possibilities for MVEDs, Modern Microwave and Millimeter-Wave Power Electronics ensures that systems designers and engineers understand and utilize the significant potential of this mature, yet continually developing technology. SPECIAL NOTE: All of the editors' royalties realized from the sale of this book will fund the future research and publication activities of graduate students in the vacuum electronics field.

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