

# PREFACE

This book presents a snapshot in time of the status of research on high-power microwave (HPM) sources and technologies in the United States circa 1999. The focus of this book is on HPM topics that are of particular interest to the U.S. Department of Defense (DoD). In fact, much of what is presented herein are the results of high-power narrowband source research that has been sponsored by, or closely aligned with the DoD Multidisciplinary University Research Initiative (MURI) to investigate novel high-energy microwave sources. By closely aligned we mean research that was performed internationally, yet whose results were shared in a common forum among the scientists with significant interaction having taken place. This MURI program officially came into existence in 1995, was funded at a rate of U.S. \$3M/year, and ended in the Spring of 2000. It was established on a foundation of more than a decade of microwave research efforts funded by the plasma physics office of the Air Force Office of Scientific Research (AFOSR) where one of us (RJB) is program manager. It is also synergistic with the ongoing Tri-Service Vacuum Electronics Initiative led by Robert Parker of the Naval Research Laboratory (NRL), as well as with AFOSR and the Air Force Research Laboratory – Rome Laboratory Site’s former Advanced Thermionic Research Initiative (ATRI).

Under the auspices of the MURI program, HPM scientists at nine U.S. universities have been conducting research projects under three Consortia led by Magne Kristiansen at Texas Tech University (Lubbock), Victor Granatstein at the University of Maryland (College Park), and Neville Luhmann at the University of California (Davis). The other university participants include the other coeditor (ES) at the University of New Mexico (Albuquerque), John Nation at Cornell University (Ithaca), Ned Birdsall at the University of California (Berkeley), George Caryotakis at Stanford University (Stanford Linear Accelerator Center), Ronald Gilgenbach at the University of Michigan (Ann Arbor), and Tony Lin at the University of California (Los Angeles). To facilitate the rapid transition of research results into the industrial community, formal collaborative subcontracts were established with James Benford (Microwave Sciences), Carter Armstrong (Northrop-Grumman), and Howard Jory (CPI). Furthermore, cooperative ties were strengthened with the ongoing HPM research and development efforts at the Air Force Research Laboratory–Phillips Research Site (Kirtland Air Force Base, NM) first under the coordination of Jack Agee and later through the liaison efforts of John Gaudet.

The first chapter of this book orients the subject matter, defines needed terminology, and describes the underlying structure of the presentations. Following that introduction in Chapter 1, Chapter 2 presents HPM source research in the broad context of

