

Four Days Short Course on High Power Microwaves

The course is given by James Benford and John Swegle, authors of the just-released High Power Microwaves, Second Edition. The content will follow the book, addressing practical and theoretical issues in HPM, in the following areas:

- DESIGNING HPM SYSTEMS
- APPLICATIONS-Weapons, Radar, Power Beaming, Space Propulsion
- MICROWAVE FUNDAMENTALS- Waveguides, Slow-Wave Structures, Cavities, Intense Beams and Layers, Microwave Generating mechanisms, Phase and Frequency Control
- ENABLING TECHNOLOGIES- Pulsed Power, Microwave Pulse Compression, Diodes, Antennas and Propagation, Diagnostics, HPM Facilities
- ULTRAWIDEBAND SYSTEMS
- RELATIVISTIC MAGNETRONS AND MILOS
- BWOs, MWCGs, 0-TYPE CERENKOV DEVICES
- KLYSTONS AND RELTRONS
- VIRCATORS, GYROTRONS, ELECTRON-CYCLOTRON MASERS AND FREE-ELECTRON LASERS

Some problems from the book will be solved in class, as time allows.

Day One	Introduction and Applications
Day Two	Sources (UWB and magnetrons, Cerenkov devices, klystrons, and others)
Day Three	Supporting Technologies and Systems
Day Four	Problems from the book

Introduction about Speakers

James Benford, President
Microwave Sciences, Inc.

James Benford does contracting and consulting in High Power Microwaves in Lafayette, California. His interests include high power microwave systems from conceptual designs to hardware, microwave source physics, electromagnetic power beaming for space propulsion, experimental intense particle beams and plasma physics. Previously, he worked at Physics International, where he directed the HPM Division, developing a product line in HPM components and systems. He managed the building of Orion, the state-of-the-art HPM testing facility. He earned an M.S. and Ph.D. in Physics at the University of California San Diego. He is an IEEE Fellow and an EMP Fellow, has authored 130 papers and book chapters, and is co-author of the just-released *High Power Microwaves, Second Edition*. Over the last two decades, he has taught 25 courses in High Power Microwaves in nine countries.

**Dr John Swegle, Senior Advisory Scientist,
Savannah River National Laboratory**

John Swegle is currently employed at the Savannah River National Laboratory in Aiken, South Carolina, and also works as an independent consultant on high-power microwaves. Prior to joining SRNL, he worked at Lawrence Livermore National Laboratory in Livermore, California, and at Sandia National Laboratories in Albuquerque, New Mexico, where he was a member of the plasma theory group investigating issues in magnetic insulation, high-power microwaves, and particle beam propagation. He is a graduate of Cornell University, where he obtained Ph.D. and M.S. degrees in plasma physics, and the University of Washington in Seattle, where he earned BSEE and MSEE degrees. He served two terms as an Associated Editor of *The Physics of Plasmas*, and as an editor of a special issue of the *IEEE Transactions on Plasma Science* devoted to high-power microwaves. With Jim Benford, John co-authored the book *High Power Microwaves*, and with Jim Benford and Edl Schamiloglu, he is co-author of the just-released *High Power Microwaves, Second Edition*, which has been rewritten and updated to serve as a textbook.