

CONTENTS

INTRODUCTION TO HIGH BRIGHTNESS

Introduction - High-Brightness Accelerators	1
Brightness, Emittance and Temperature J. D. Lawson	5
Historical Overview of High-Brightness Accelerators F. T. Cole	21

ACCELERATOR PHYSICS

High-Intensity Circular Proton Accelerators M. K. Craddock	43
High-Brightness Circular Accelerators N. Rostoker	101
Wakefield Acceleration: Concepts and Machines P. B. Wilson	129
Wake Fields: Limitations and Possibilities R. K. Cooper	157
High-Brightness RF Linear Accelerators R. A. Jameson	169
Induction Linacs D. Keefe	201
Advanced Concepts for Acceleration D. Keefe	215

BEAM PHYSICS

The Physics of Codes R. K. Cooper and M. E. Jones	233
High-Current Electron-Beam Transport in Recirculating Accelerators B. B. Godfrey and T. P. Hughes	257
High-Current Electron-Beam Transport in Linear Induction Accelerators R. B. Miller	303

Requirements on the Beam for mm- and Sub-mm-Wave Generation . . .	369
J.M. Buzzi	
Brightness Limits for Ion Sources	395
R. Keller	
Brightness Limits in Linear Ion Accelerators	411
T. P. Wangler	
Beam-Current Limits in Circular Accelerators and Storage Ring Longitudinal Coasting Beam Instabilities	427
J. Laclare	
Injectors and Ion Sources	453
T. S. Green	

ACCELERATOR ENGINEERING

Radial Transmission-Line Linear Accelerators	473
K. R. Prestwich	
RF Breakdown Limits	497
R. A. Jameson	
RF Power Sources for High-Brightness RF Linacs	507
R. A. Jameson and D. W. Reid	
Fundamental Features of Superconducting Cavities for High-Brightness Accelerators	521
G. Mueller	

APPLICATIONS OF HIGH-BRIGHTNESS BEAMS

Free-Electron Laser Amplifier Driven by an Induction Linac	559
V. K. Neil	
FEL Oscillators (Microtrons)	575
E. Sabia	
The U.K. Free-Electron Laser	593
J. M. Reid	
The ACO Storage Ring Free Electron Laser	613
P. Elleaume	
Emittance, Brightness, Free-Electron Laser Beam Quality, and the Scaled Thermal Velocity	627
C. W. Roberson, Y. Y. Lau and H. P. Freund	
Induction Linacs for Heavy-Ion Fusion	647
D. Keefe	
High-Average-Power Electron Accelerators for Food Processing . . .	659
S. Humphries, Jr.	

SUMMARY

Summary of Linear-Beam Transport	717
T. F. Godlove	

Appendix A: Poster Papers

Vacuum Arc Array Ion Injector	729
C. Burkhardt and S. Humphries, Jr.	
Impedance Variations in the Load of a Thyatron-Switched Discharge Circuit	737
G. L. Clark	
Gyrac, A Photon Factory?	743
O. Gal	
The SERC Plasma Beat Wave Experiment	755
T. Garvey, et al.	
Scaling of Current Density, Total Current, Emittance, and Brightness for Hydrogen Negative Ion Sources	761
J. R. Hiskes	
Cyclotron Resonance Laser Accelerator	767
S. P. Kuo	
Beam "Self-Trapping" in the NRL Modified Betatron Accelerator . .	773
F. Mako, et al.	
Electron Cyclotron Maser Using a Pulsed Relativistic Electron Beam	779
A. D. R. Phelps, et al.	
Transport of High-Brightness Electron Beams with Ion Focusing . .	785
J. R. Smith and R. F. Schneider	
Generation of Energetic Ion Beams from a Plasma Focus	791
I. Ueno, et al.	
Beam Dynamics Analysis in an RFQ	799
J. H. Whealton, et al.	
Appendix B: Organizing Committee, Lecturers, and Participants . .	811
Index	819