

TABLE OF CONTENTS

	<u>Page No.</u>
<u>Editors' Introduction</u>	
<i>John P. Blewett and Francis T. Cole</i>	xiii
<u>Preface</u>	xv
<u>Dedication</u>	xvii
<u>Introduction</u>	
<i>M. Reiser and N. Rostoker</i>	xxi
<u>Early Papers on Collective Accelerators</u>	
Relativistic Stabilized Electron Beam, <i>G. J. Budker, Cern Symposium 1956</i>	1
Collective Linear Acceleration of Ions, <i>V. I. Veksler et al., Dubna Conference 1956</i>	23
The Use of Plasma Waveguides as Accelerating Structures in Linear Accelerators, <i>Ia. B. Fainberg, Cern Symposium 1956</i>	33
<u>Electron Ring Accelerator</u>	
Trapping and Compression of Electron Rings in the Pustarex Device, <i>C. Andelfinger, W. Herrmann, D. Jacobi, H. B. Schilling, M. Ulrich, Max-Planck-Institut für Plasmaphysik, Garching, Germany</i>	49
Longitudinal Coupling Impedance of an Electron Ring in an Anisotropic Conducting Cylinder, <i>Peter Merkel, Max-Planck-Institut für Plasmaphysik, Garching, Germany</i>	59
Optical Diagnostics of Electron Rings, <i>Uwe Schumacher, Max-Planck-Institut für Plasmaphysik, Garching, Germany</i>	71

TABLE OF CONTENTS

Page No.

Experiments on Nitrogen Ion Acceleration in Prototype of Collective Heavy Ion Accelerator in the Joint Institute for Nuclear Research,
G. V. Dolbilov, V. I. Mironov, V. G. Novikov, E. A. Perelshtein, G. K. Radonov, V. P. Sarantsev, A. P. Sumbaev, S. I. Tutunnikov, V. P. Fartushny, A. A. Fateev, A. S. Schuelin, Joint Institute for Nuclear Research, Dubna, USSR. 83

Magnetostatic System of the Collective Electron Ring Accelerator,
V. K. Plotnikov, Institute for Theoretical and Experimental Physics, Moscow, USSR 97

Recent Studies on the University of Maryland Electron Ring Accelerator,
C. D. Striffler, R. A. Meger, M. P. Reiser, H. Kim, R. Kulkarni, E. Lindstrom, T. F. Wang, University of Maryland. 103

Beam Trapping in the University of Maryland Electron Ring Accelerator Experiment, *R. A. Meger, C. D. Striffler, and E. Lindstrom, University of Maryland* 117

Wave Accelerators

A High Current, Steady State Auto-Resonant Accelerator, *W. E. Drummond, Austin Research Associates, Austin, Texas.* 129

Auto-Resonant Acceleration of Ions, *M. L. Sloan, E. P. Cornet, W. W. Rienstra, J. R. Thompson, and H. V. Wong, Austin Research Associates, Austin, Texas.* 145

TABLE OF CONTENTS

	<u>Page No.</u>
<p>The Auto-Resonant Accelerator Experimental Program, <i>J. R. Uglum,</i> <i>H. A. Davis, D. E. Hasti, and</i> <i>T. P. Starke, Austin Research</i> <i>Associates, Austin, Texas.</i></p>	157
<p>Performance Characteristics of the Auto-Resonant Accelerator Electron Beam Generator, <i>D. E. Hasti, J. R.</i> <i>Uglum, Austin Research Associates,</i> <i>Austin, Texas, and Roger White,</i> <i>Maxwell Laboratories, Inc.,</i> <i>San Diego, California.</i></p>	171
<p>Computer Simulation of Linear and Nonlinear Wave Growth Phenomena, <i>G. I. Bourianoff, B. N. Moore, and</i> <i>B. R. Penumalli, Austin Research</i> <i>Associates, Austin, Texas.</i></p>	191
<p>Nonlinear Characteristics of Cyclo- tron Waves in an ARA Configuration, <i>R. J. Faehl, W. R. Shanahan, and</i> <i>B. B. Godfrey, Los Alamos Scien-</i> <i>tific Laboratory, Los Alamos,</i> <i>New Mexico</i></p>	211
<p>Slow Cyclotron Wave Growth by Periodic Inductive Structures, <i>W. R. Shanahan, B. B. Godfrey,</i> <i>and R. J. Faehl, Los Alamos Scien-</i> <i>tific Laboratory, Los Alamos,</i> <i>New Mexico</i></p>	235
<p>Space Charge Waves and Collective Ion Acceleration, <i>R. Adler, G.</i> <i>Gammel, J. A. Nation, G. Providakes,</i> <i>and R. Williams, Laboratory of</i> <i>Plasma Studies and School of Elec-</i> <i>trical Engineering, Cornell Univer-</i> <i>sity, Ithaca, New York</i></p>	249

TABLE OF CONTENTS

	<u>Page No.</u>
<p>Theoretical Problems of Collective Ion Acceleration by Intense Relativistic Electron Beams, <i>K. V. Khodataev, Radio Technical Institute, Moscow, USSR, and V. N. Tsytovich, Lebedev Institute, Moscow, USSR</i></p>	263
<u>Relativistic Electron Beams - Controlled Potential Well</u>	
<p>The Power Balance Limit in Collective Ion Acceleration, <i>C. L. Olson, Sandia Laboratories, Albuquerque, New Mexico</i></p>	291
<p>Experiments and Scaling of the IFA, <i>C. L. Olson, Sandia Laboratories, Albuquerque, New Mexico</i>.</p>	305
<p>Collective Ion Acceleration in a Gas Gradient, <i>R. Mako, A. Fisher, C. W. Roberson, N. Rostoker, and D. Tzach, University of California at Irvine</i> . .</p>	317
<p>A Multiple Stage Acceleration Concept for REB Powered Collective Ion Acceleration, <i>J. Adamski, Boeing Aerospace Company, Seattle, Washington</i></p>	341
<p>A Theory of Ion Acceleration in a Gas by the Pinching of a High-Current Electron Beam, <i>V. G. Gapanovich, A. A. Kolomensky, and I. I. Logachyov, P. N. Lebedev Physical Institute, Moscow, USSR</i></p>	355
<p>Dielectric Guide Controlled Collective Ion Acceleration, <i>A. Greenwald and R. Little, Spire Corporation, Bedford, Massachusetts</i></p>	371

TABLE OF CONTENTS

	<u>Page No.</u>
Collective Ion Acceleration and Intense Electron Beam Propagation Within An Evacuated Dielectric Guide, <i>J. A. Pasour and R. K. Parker, Naval Research Laboratory; R. L. Gullickson, Air Force Office of Scientific Research; W. O. Doggett and D. Pershing, North Carolina State University</i>	383
Propagation of an Intense Electron Beam and Acceleration of Ions in Vacuum Dielectric Channels, <i>A. V. Agafonov, A. A. Kolomensky, E. G. Krastelev, A. N. Lebedev, and B. N. Yablokov, Lebedev Physical Institute, Moscow, USSR</i>	395
<u>Ion Diodes, Luce Diodes, Auto-Acceleration, etc.</u>	
Progress in the Production of Intense Proton Beams with Magnetically Insulated Diodes, <i>N. Camarcat, P. L. Dreike, C. B. Eichenberger, S. Glidden, M. Greenspan, D. A. Hammer, S. Humphries, Jr., J. Maenchen, J. Neri, R. N. Sudan, and L. G. Wiley, Laboratory of Plasma Studies, Cornell University, Ithaca, New York</i>	413
Collective Ion Acceleration in the System with Insulated Anode, <i>V. M. Bistritsky, A. N. Didenko, Ya. E. Krasik, V. S. Lopatin, V. I. Pidkatov, Institute for Nuclear Physics, Tomsk, USSR</i>	445
Collective Ion Accelerator on the PR1590, <i>R. F. Hoerberling, Air Force Weapons Laboratory, Kirtland Air Force Base, New Mexico</i>	463

TABLE OF CONTENTS

Page No.

Collective Field Acceleration by the Interaction of a Relativistic E-Beam with an Apertured Solid Dielectric Anode (Luce Geometry), <i>O. Zucker, J. Wyatt, and H. Sahlin,</i> <i>Lawrence Livermore Laboratory;</i> <i>J. S. Luce, EG&G, Inc., San Ramon,</i> <i>California; B. Freeman, Los Alamos</i> <i>Scientific Laboratory, and R.</i> <i>Gullickson, Air Force Office of</i> <i>Scientific Research.</i>	475
Collective Acceleration and Focusing of Fast Ion Bursts, <i>J. S. Luce,</i> <i>EG&G, Inc., and W. Bostick and</i> <i>V. Nardi, Stevens Institute of</i> <i>Technology</i>	493
Helix Controlled Collective Ion Acceleration, <i>W. W. Destler, H. Kim,</i> <i>and G. T. Zorn, University of Mary-</i> <i>land, and R. F. Hoeberling, Air</i> <i>Force Weapons Laboratory, Albuquerque,</i> <i>New Mexico</i>	509
Collective Ion Acceleration in Reflecting Electron Systems, <i>R. A.</i> <i>Mahaffey, J. A. Pasour, J. Golden,</i> <i>and C. A. Kapetanakos, Naval</i> <i>Research Laboratory.</i>	521
Autoacceleration Research at N.R.L., <i>M. Friedman and T. Lockner, Naval</i> <i>Research Laboratory,</i> <i>Washington, D. C.</i>	535
Autoaccelerator Dynamics and Stability, <i>John G. Siambis, Naval</i> <i>Research Laboratory.</i>	553
Pulsar Polar Caps as Foil-Less Diodes, <i>Dean F. Smith, High Alti-</i> <i>tude Observatory, National Center</i> <i>for Atmospheric Research,</i> <i>Boulder, Colorado.</i>	569

TABLE OF CONTENTS

	<u>Page No.</u>
<u>New Problems and Accelerator Concepts</u>	
Collective Acceleration of Heavy Ions - Problems and Prospects, <i>M. Reiser, University of Maryland.</i> . . .	581
High Current Pulsed Linear Ion Accelerators for Inertial Fusion Applications, <i>S Humphries, Jr., G. Yonas, and J. W. Poukey, Sandia Laboratories, Albuquerque, New Mexico</i>	595
The Collective Focussing Ion Accelerator, <i>A. A. Mondelli and N. Rostoker, Maxwell Laboratories, Inc., San Diego, California.</i>	611
Investigation of the Radial and Longitudinal Distribution of Electron Clouds Confined in a Magnetic Mirror, <i>S. Eckhouse, A. Fisher, and N. Rostoker, University of California at Irvine.</i>	639
Design and Construction of a Toroidal Collective Focussing Experiment, <i>S. Eckhouse, A. Fisher, R. Prohaska, and N. Rostoker, University of California at Irvine</i> . . .	667
Collective - Effect Electron Acceleration, <i>R. B. Miller, Sandia Laboratories, Albuquerque, New Mexico</i> . . .	675
Radiative Collapse of a Relativistic Electron-Positron Plasma to Ultra-high Densities, <i>F. Winterberg, Desert Research Institute, Reno, Nevada</i>	687

TABLE OF CONTENTS

	<u>Page No.</u>
Experiments on the Translation and Compression of Field-Reversing E- Layers and Generation of Super- dense MeV-Proton Beams in a Magnet- ically Insulated Diode, <i>H. H. Fleischmann, D. J. Rej, M. Tuszewski, and S. C. Luckhardt, Cornell Univer- sity, Ithaca, New York</i>	699
<u>List of Participants</u>	712
<u>Author Index</u>	721
<u>Subject Index</u>	723