

CONTENTS

	Page
Foreword	1
Vacuum Systems	
Production of 10^{-9} Torr Within a Large Plasma Container (DCX-1)	1
— E. R. Wells, Oak Ridge National Laboratory	1
An Unconventional Ultrahigh-Vacuum Facility	7
— C. F. Barnett and J. A. Ray, Oak Ridge National Laboratory	7
Vacuum Component Developments	10
— Thomas H. Batzer, Lawrence Radiation Laboratory, Livermore	10
Optical Windows for Plasma Research	14
— David H. Mullaney, Princeton Plasma Physics Laboratory	14
A New, Versatile, Vacuum Quick-Seal and Vacuum Lock	18
— O. D. Matlock, Oak Ridge National Laboratory	18
A Method for Determining the Geometry and Current Configuration of a System of Cylindrically Symmetric Solenoid Coils from a Specified Magnetic Field Shape	20
— Klaus Halbach and Ronald F. Holsinger, Lawrence Radiation Laboratory, Berkeley	20
Energy Storage Systems and Components	
The Production of "Excited State" H_2^+ for Lorentz Dissociation in DCX-1	27
— R. S. Edwards, Oak Ridge National Laboratory	27
Sustained-Field Theta Pinch	31
— W. F. Westendorp, General Electric Research Laboratory	31
The Chalice Fast, High-Voltage Plasma Bank	35
— G. J. Yevick, G. von Voros, H. Opat, H. Nyland, and R. Southworth, Stevens Institute of Technology	35
An Inductive Energy Storage System Using Ignitron Switching	44
— Ellis D. Simon and George Bronner, Princeton Plasma Physics Laboratory	44
Reliability of the Astron Accelerator	48
— K. A. Saunders, Lawrence Radiation Laboratory, Livermore	48
Capacitor Bank Charging System	52
— T. M. Sprague, Los Alamos Scientific Laboratory	52
Pharos Crowbar System	57
— M. P. Young, U. S. Naval Research Laboratory	57
Electrolytic Capacitor Banks	63
— Donald B. Hopkins, Lawrence Radiation Laboratory, Berkeley	63
Tests of Oil-Paper Energy Storage Capacitors at High Voltage Stress to Determine Probable Lifetime	
— H. Bruce McFarlane, Lawrence Radiation Laboratory, Livermore	68
Electrical Characteristics of Coaxial Cables	
— G. P. Boicourt, Los Alamos Scientific Laboratory	72
Development of Fast 100-kV, 1-mA, Solid Dielectric Switches and Associated Triggering Studies	
— T. E. James, K. Harries, and R. D. Medford, the Culham Laboratory, U. K. A. E. A.	77
Diagnostic Instruments	
A High-Speed Data Acquisition System	91
— F. K. Bennett and C. G. Klotz, Princeton Plasma Physics Laboratory	91
A Method of Using a Computer to Evaluate Langmuir Probe Data for Obtaining the Electron Temperature	96
— G. H. Eggers and F. Schwirzke, General Atomic Division, General Dynamics Corporation	96
High-Accuracy Measurements of Large DC Pulse Currents	100
— J. W. Spinner, Princeton Plasma Physics Laboratory	100
System for Monitoring Pulse Voltages on Magnetic Cores in the Astron Accelerator	105
— L. L. Steinmetz, Lawrence Radiation Laboratory, Livermore	105
A Method for the Continuous Measurement of Plasma Potential Using a Constant-Current, Lithium-Ion-Beam Transmission Technique	109
— A. F. Waugh and G. G. North, Lawrence Radiation Laboratory, Livermore	109
A Ferromagnetic Resonance Magnetometer	112
— W. P. Ernst and A. H. Skislak, Princeton Plasma Physics Laboratory	112
Radiological Safety Measurements of X-Rays and Neutrons from Pulsed Sources	117
— H. L. Miller, Princeton Plasma Physics Laboratory	117
DCX-2 Scanning Energy Spectrometer	123
— J. S. Culver, Oak Ridge National Laboratory	123
Magnetic Fields	
Some Useful Techniques in the Design of Multipolar Windings in Closed Systems	128
— Kenneth E. Wakefield, Princeton Plasma Physics Laboratory	128
Mechanical Design and Construction of the Alice Mirror and Quadrupole Magnets	130
— Arthur R. Harvey, Lawrence Radiation Laboratory, Livermore	130
Some Problems in the Design of an Eighth-Order, Power-Optimized Solenoid	138
— J. N. Luton, Jr., Oak Ridge National Laboratory	138
Beam Inflectors for the Astron Machine	142
— James F. Ryan, Lawrence Radiation Laboratory, Livermore	142
DCX-2 Beam-Injection Duct	146
— R. L. Brown, P. R. Bell, and J. S. Culver, Oak Ridge National Laboratory	146

	Page
Sodium Cryogenic Coils	
— C. E. Taylor, Lawrence Radiation Laboratory, Livermore	152
Production of Large-Volume Magnetic Fields by Explosive Generators	
— D. B. Cummings, Research Division, Aerojet-General Nucleonics.	156
Development of an Interleaved, Fractional-Turn Coil	
— R. S. Dike, E. L. Kemp, and J. Marshall, Los Alamos Scientific Laboratory . .	162
Minimum-B Field Generated by "Baseball Seam" Conductor	
— Lee C. Pittenger, Lawrence Radiation Laboratory, Livermore	168

Special Materials and Power Supplies

Operating and Repair Experience on DCX-2 Coils	
— S. M. DeCamp, Oak Ridge National Laboratory	172
Dissipation of Heat from Large-Scale CTR Apparatus at ORNL	
— James F. Ryan, Lawrence Radiation Laboratory, Livermore	182
Astron Electron Gun	
— Charles A. Hurley, Lawrence Radiation Laboratory, Livermore.	188
A High-Voltage, Radio-Frequency, Variable Capacitor Using a Liquid Dielectric	
— Allan Deitz, Princeton Plasma Physics Laboratory.	193
High-Q Capacitor Development	
— N. W. Mather, Princeton Plasma Physics Laboratory	201
Energy Supply for a High-Power, Pulsed, Low-Frequency RF Generator	
— N. M. Turitzin, Princeton Plasma Physics Laboratory.	213

Appendix—Summary Information on CTR Groups Represented at the Symposium

Aerojet-General Nucleonics, Research Division	221
Association Euratom ~ CEA	22*
Culham Laboratory	224
General Atomic Division, General Dynamics Corporation	226
General Electric Research Laboratory.	227
Institut für Plasmaphysik.	228
Lawrence Radiation Laboratory, Berkeley and Livermore	229
Los Alamos Scientific Laboratory	231
Oak Ridge National Laboratory	232
Princeton Plasma Physics Laboratory	235
Stevens Institute of Technology	236
U. S. Atomic Energy Commission	237
U. S. Naval Research Laboratory	238

List of Attendees

Distribution