

# Contents

I.	DIGEST . . . . .	v
II.	INTRODUCTION . . . . .	vii
III.	OVERVIEW . . . . .	ix
IV.	TECHNICAL SUMMARIES	
	1. Target and Reactor Design	
	<i>John H. Nuckolls</i> . . . . .	1
	2. Ion Sources	
	<i>John E. Osher</i> . . . . .	4
	3. Low-Velocity Acceleration	
	<i>Donald E. Young</i> . . . . .	7
	4. Atomic and Molecular Physics	
	<i>Yong-Ki Kim</i> . . . . .	11
	5. Accelerator Parameters	
	<i>Lee C. Teng</i> . . . . .	13
	6. Beam Manipulations	
	<i>Mark Q. Barton</i> . . . . .	18
	7. Induction Linac	
	<i>Dennis Keefe</i> . . . . .	21
	8. Final Focusing and Transmission to Target	
	<i>William B. Herrmannsfeldt</i> . . . . .	25
	9. Systems and Cost Studies	
	<i>Glenn W. Kuswa</i> . . . . .	29
	10. Alternatives	
	<i>Norman Rostoker</i> . . . . .	31
V.	CONCLUSIONS AND NEEDED RESEARCH AND DEVELOPMENT . . . . .	35
VI.	APPENDICES	
	A1-1. Ion-Beam Target Design	
	<i>Milton J. Clauser</i> . . . . .	39
	A1-2. Ion-Stopping Power of Ionized Media	
	<i>David Mosher</i> . . . . .	39
	A1-3. Ion-Beam Reactor First-Wall Design	
	<i>Jack Hovingh</i> . . . . .	41
	A1-4. Gas-Filled Reactor	
	<i>Robert J. Burke</i> . . . . .	45
	A2-1. i. Classical Ion Sources	
	<i>John Fasolo</i> . . . . .	47
	ii. Penning Ion Sources	
	<i>David Clark</i> . . . . .	50
	iii. Duoplasmatron and Reflex-Arc Sources	
	<i>Emery Zajec</i> . . . . .	50
	iv. Berkeley Xenon Ion Source Test	
	<i>Richard M. Mobley</i> . . . . .	50
	A2-2. Pulsed High-Voltage Ion Diodes	
	<i>James W. Shearer</i> . . . . .	52
	A2-3. i. Source Options for the Induction Linac	
	<i>Richard M. Mobley</i> . . . . .	56
	ii. Reference Search on Laser Sources	
	<i>K. Prelec</i> . . . . .	57

A4-1.	Estimate of the Cross Section for the Charge Transfer Between Ions <i>Yong-Ki Kim</i> . . . . .	58
A4-2.	Closure Estimate of the Excitation and Ionization Cross Sections in High-Energy Collisions for $I^+$ and $U^+$ Ions Incident on Hydrogen, Nitrogen, and Oxygen <i>George H. Gillespie</i> . . . . .	59
A4-3.	Heavy-Ion Energy and Charge-State Availability at the LBL SuperHILAC/Bevalac <i>Jose R. Alonso</i> . . . . .	70
A6-1.	A Linac Accumulator Ring Scheme <i>Mark Q. Barton</i> . . . . .	72
A6-2.	Power Transport in Quadrupole or Solenoid Focusing Systems <i>E. D. Courant</i> . . . . .	72
A6-3.	Space-Charge Limitations of Heavy-Ion Acceleration in a Synchrotron <i>David Berley and Gordon J. Danby</i> . . . . .	74
A6-4.	Estimate of Longitudinal Space-Charge Effects in rf and Drift Bunching <i>Lloyd Smith</i> . . . . .	77
A6-5.	Intra-Beam Charge Exchange <i>Frederick E. Mills</i> . . . . .	79
A7-1.	Induction Linac Accelerator Structures for Heavy-Ion Beam Igniters <i>James F. Leiss</i> . . . . .	81
A7-2.	An Induction Linac System with a Low-Energy Accumulator Injector <i>Terry Godlove</i> . . . . .	83
A7-3.	Effects of Longitudinal Electric Self-Field in an Induction Linac <i>V. Kelvin Neil</i> . . . . .	84
A8-1.	Beam Transport in the Target Chamber <i>R. N. Sudan and Derek A. Tidman</i> . . . . .	86
A8-2.	Neutralization in the Target Chamber <i>Keith R. Symon</i> . . . . .	88
A8-3.	Kink Mode in a Resistive Medium <i>Edward Lee</i> . . . . .	89
A8-4.	Current Neutralization in Beams Traversing Gas Backgrounds <i>David Mosher</i> . . . . .	90
A8-5.	Propagation of Energetic Ion Beams Through a Target Chamber <i>S. Jorna and W. B. Thompson</i> . . . . .	92
A8-6.	Plasma Time Scales <i>S. Fenster</i> . . . . .	102
A8-7.	Final Focusing of the Ion Beams of a Pellet Fusion Reactor by Quadrupole Doublets <i>A. A. Garren</i> . . . . .	102
VII.	PARTICIPANTS . . . . .	110