## PROGRESS IN STELLARATOR/HELIOTRON RESEARCH: 1981-1986 CONTENTS

1.	INT	INTRODUCTION					
	1.1	Evoluti	on of the Stellarator/Heliotron Concept				
	1.2	Status	of Stellarator/Heliotron Research in 1981				
	1.3	Key Iss	sues 1981–1986				
2.	MAGNETIC CONFIGURATIONS AND COIL SYSTEMS						
	2.1 Magnetic Configurations						
		2.1.1	Simple field models				
		2.1.2	Magnetic configuration characteristics				
		2.1.3	Helical field harmonics				
		2.1.4	Configuration types				
	2.2	Coil Sy	estems				
		2.2.1	Continuous helical coils				
		2.2.2	Modular coils				
		2.2.3	Helical-axis stellarators				
	2.3	The St	ellarator Edge Region				
3.	ME	ID EQU	JILIBRIUM AND STABILITY				
	3.1	Recent	Theoretical Advances				
	3.2	Tool D	evelopment for Stellarator Equilibrium				
		and St	ability Calculations				
	3.3	Applic	ation of MHD Theory to the Optimization				
		of Stel	larator Devices				
	3.4	Compa	arison with Experimental Results				
	2 5	Future	Program				

1.	TR.	TRANSPORT				
	4.1	Particle	e Orbits			
	4.2	Carlo Studies				
4.3 Fokker-Planck Codes						
	4.4	Fluid N	Model			
	4.5	Radial	Electric Field			
	4.6	Compa	rison with Experimental Results			
	4.7	Status	of Transport Theory			
5.	EX	PERIM	ENTAL RESULTS			
	5.1	Results	s from Wendelstein VII-A and Heliotron-E			
		5.1.1	Parameter ranges and modes of operation			
		5.1.2	Attainment of high beta			
	5.2	Heatin	g Methods			
		5.2.1	ECRH			
		5.2.2	NBI heating			
		5.2.3	ICF heating			
		5.2.4	Ohmic heating			
	5.3	Plasma	a Containment			
		5.3.1	Equilibrium and stability			
		5.3.2	Heat transport studies			
		5.3.2	2.1 Electron heat conductivity			
		5.3.2	2.1 Ion heat conduction			
		5.3.3	Impurities			
		5.3.4	Pressure-driven currents			
	5.4	Status	of Experimental Progress			
6.	NE	EW EX	PERIMENTS			
	6.1	Near 7	Term Experiments			
	6.3	Next (	Generation Facilities			

7. E	NGINEERING
7.	1 Coil Construction
	7.1.1 Accuracy requirements
	7.1.2 Correction techniques
	7.1.3 Manufacturing techniques
	7.1.3.1 Continuous helical coils
	7.1.3.2 Segmented helical coils
	7.1.3.3 Demountable superconducting joints for helical coils
	7.1.3.4 Modular coils
7	2 Forces and Torques
. 7	3 Vacuum Vessel Manufacturing Techniques
7	4 Machine Assembly Techniques
7	5 Status of Stellarator/Heliotron Engineering
8. I	EACTOR CONSIDERATIONS
8	1 Continuous-Coil Designs
	8.1.1 Heliotron-H
	8.1.2 U-2MR
	8.1.3 ATR studies
8	.2 Modular Coil Designs
	8.2.1 ASR studies
	8.2.2 MSR IIB and UWTOR-M
	8.2.3 TNPP
8	.3 Status of Reactor Studies
9.	ASSESSMENT AND FUTURE DIRECTIONS
(	.1 Summary of Experimental Status
Ç	.2 Issues for Near-Term Research
9	.3 The Longer-Term Issues