

CONTENTS

ITER PHYSICS DESIGN GUIDELINES	9
1. Beta Limit.....	9
1.1 g value (Troyon coefficient).....	9
1.2 Fast alpha/energetic beam contribution: an empirical fit.....	10
2. Safety Factor, q_{ψ}	10
2.1 q_{ψ} values.....	10
2.2 Location of $q = 2$ surface.....	10
2.3 Empirical fit for approximate modeling	10
3. Configuration	11
4. Density Limit	11
5. Temperature Limit.....	12
6. Z_{eff} : Impurity and Thermal Alpha Fractions.....	12
7. Confinement	13
7.1 Characterization of confinement	13
7.2 Figure of merit	14
7.3 Performance	14
8. Fusion Power Density	14
9. Alpha Particle Confinement and Losses	15
9.1 Toroidal field ripple.....	15
9.2 Fishbone	15
10. Internal Inductance, l_i	16
11. Loop Voltage.....	16
12. Current Drive	16
12.1 Bootstrap current.....	17
12.2 Current drive figure-of-merit (FoM, efficiency)	17
Neutral beam	17
Lower hybrid (slow waves)	18
Electron cyclotron	19
Ion cyclotron (fast waves)	20
13. Fueling and Exhaust.....	20
13.1 Methods for fueling.....	20
13.2 Exhaust demands.....	20
14. Impurity Control and Power and Particle Exhaust.....	20
14.1 Basic characteristics of the divertor concept	20
14.2 Divertor performance	21
ITER relevant physics specifications for modeling	21
Simple divertor model	22

15. Specification of Plasma Disruptions and Vertical Displacement Events.....	25
15.1 Plasma characteristics and number of discharges.....	25
15.2 Major disruptions.....	26
Number of disruptions	26
Thermal quench	26
Current quench	27
15.3 Minor disruptions.....	28
15.4 Vertical displacement events.....	28
APPENDICES	
A. LIST OF SYMBOLS (UNITS).....	31
B. GLOBAL ENERGY CONFINEMENT SCALING EXPRESSIONS.....	35
C. FIGURES OF MERIT FOR CONFINEMENT.....	38
D. POWER BALANCE: GENERAL EXPRESSIONS.....	39
REFERENCES	41