Radial Build and Composition for LiPb/FS/He System

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http://fti.neep.wisc.edu/aries-cs/builds/build.html

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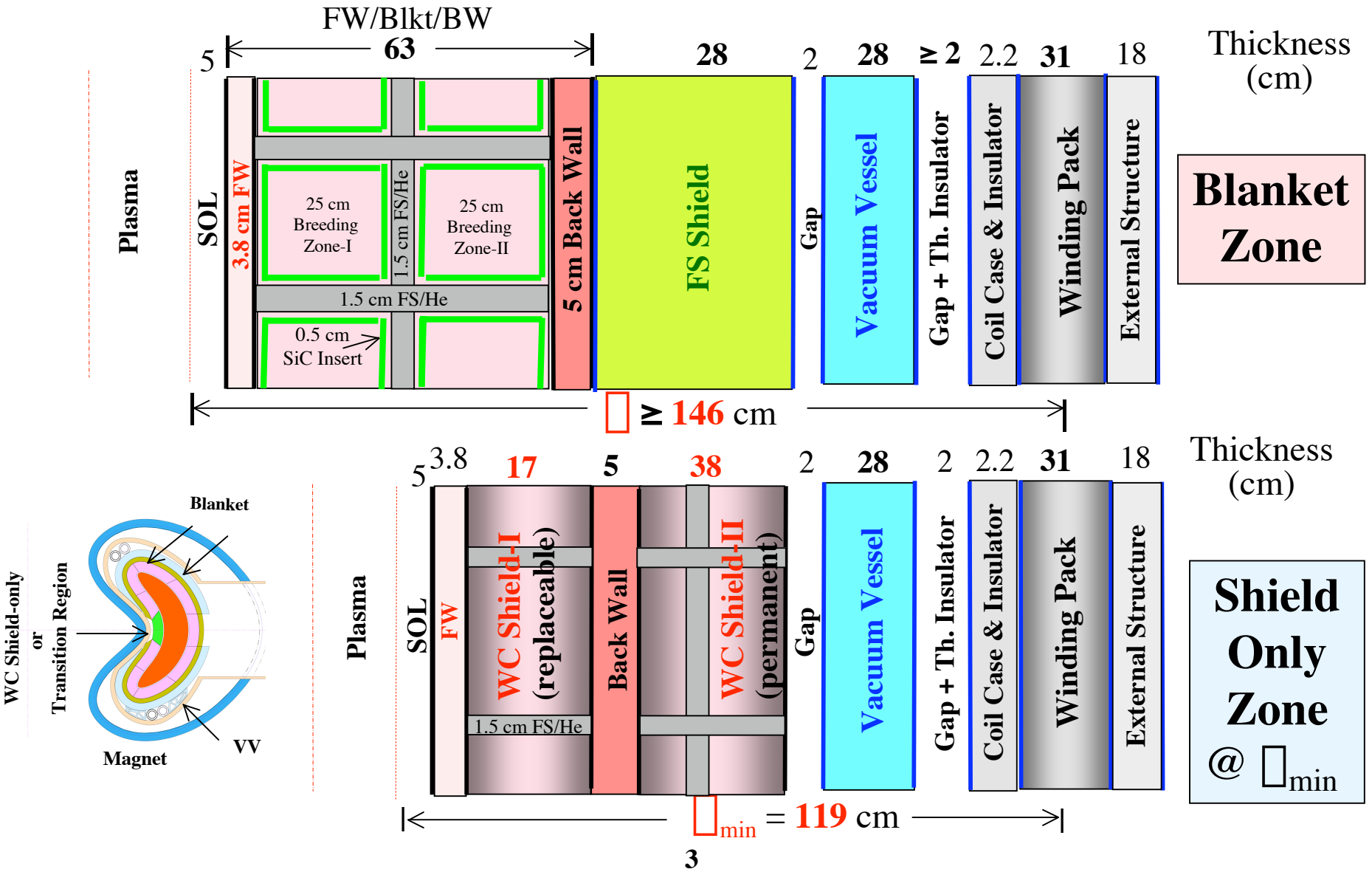
Selected Blanket Concepts
(Internal VV)

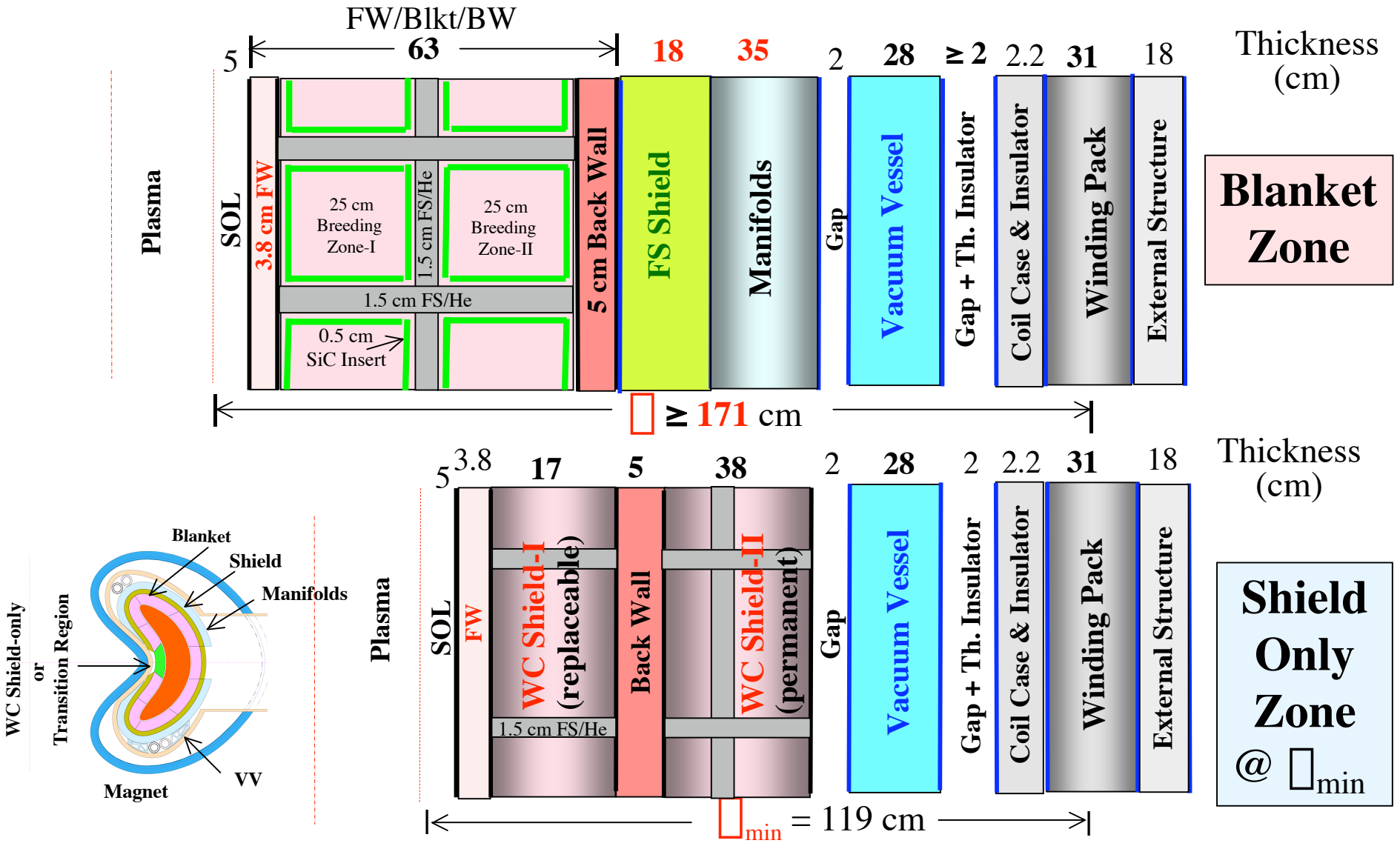
Breeder	Structure	FW/Blanket Coolant	Shield Coolant	VV Coolant
LiPb	**SiC**	**LiPb**	**LiPb**	**H_2O**
LiPb (with SiC inserts)	**FS**	**He/LiPb**	**He**	**H_2O**

At present, engineering group is focusing on LiPb/FS/He system, internal VV, modular maintenance, and 3 FP configuration.

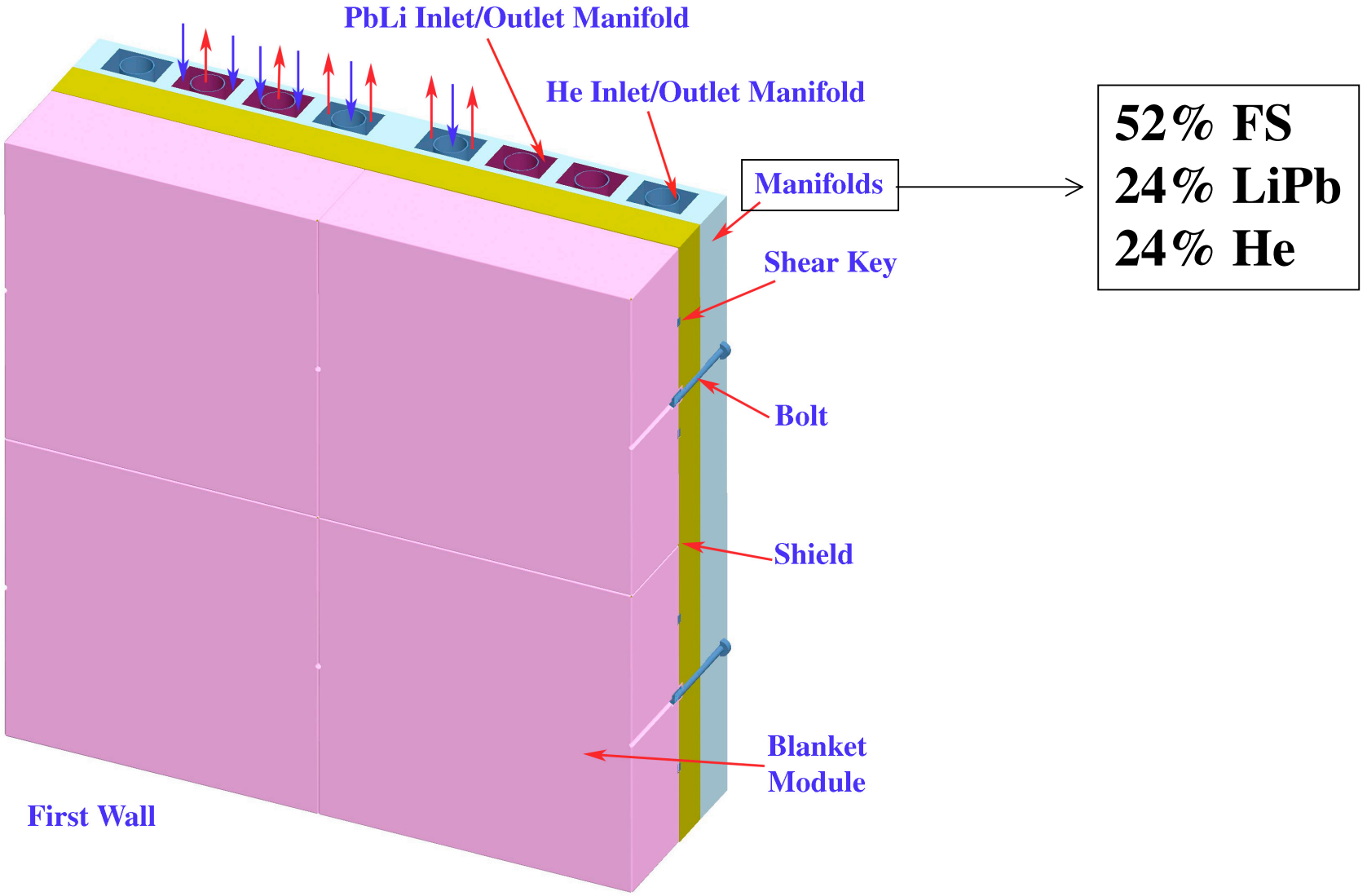
New Radial Build w/o Manifolds
(3 MW/m^2 peak □)



New Radial Build with Manifolds
(3 MW/m^2 peak □)



LiPb & He Manifolds
(X. Wang)



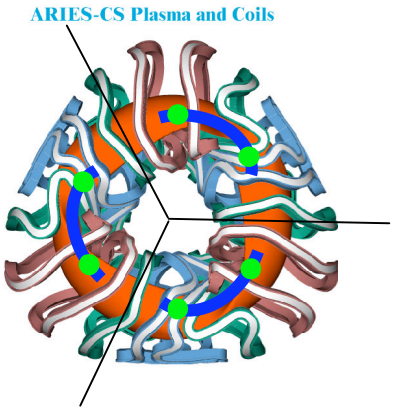
LiPb/FS/He System

Component	Thickness	Coverage Fraction	Composition
FW*	3.8 cm	100%	34% FS Structure 66% He Coolant
Blanket*	54.3 cm	85%#	79% LiPb (90% enriched Li) 7% SiC Inserts 6% FS Structure 8% He Coolant
Back Wall*	5 cm	100%	80% FS Structure 20% He Coolant
FS Shield	18 - 28 cm	80+5% ?	15% FS Structure 10% He Coolant 75% Borated Steel Filler
Manifolds	35 cm	80% ?	52% FS Structure 24% LiPb (90% enriched Li) 24% He Coolant
WC Shield-I*	17 cm	5%	88% WC Filler 5% FS Structure 7% He Coolant
WC Shield-II	38 cm	5%	15% FS Structure 10% He Coolant 75% WC Filler
VV	28 cm	100%	28% FS Structure 49% **Water** 23% Borated Steel Filler

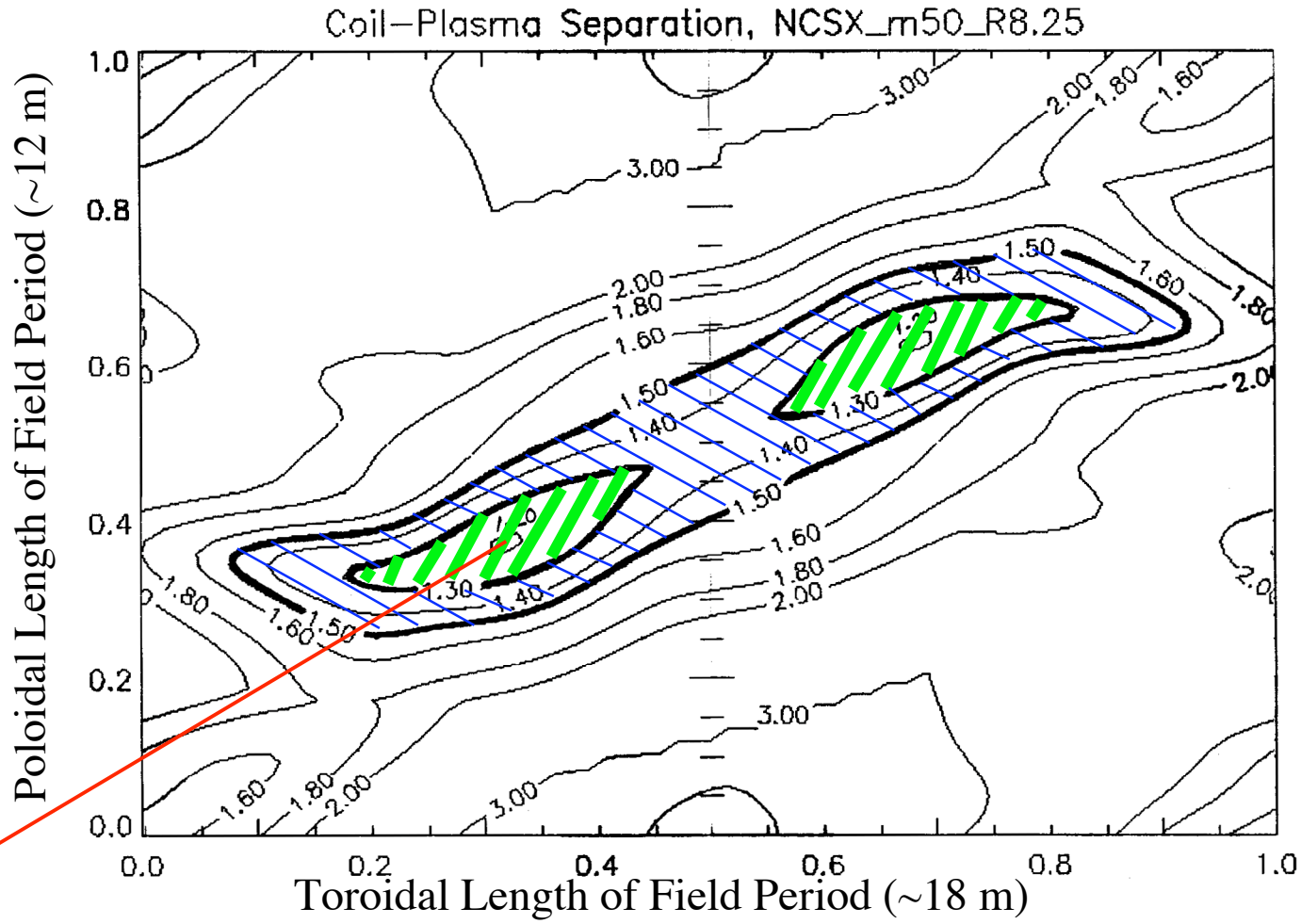
* Replaceable component.

For blanket and divertor.

Coverage Fraction
(3 FP Configuration, R= 8.25 m)

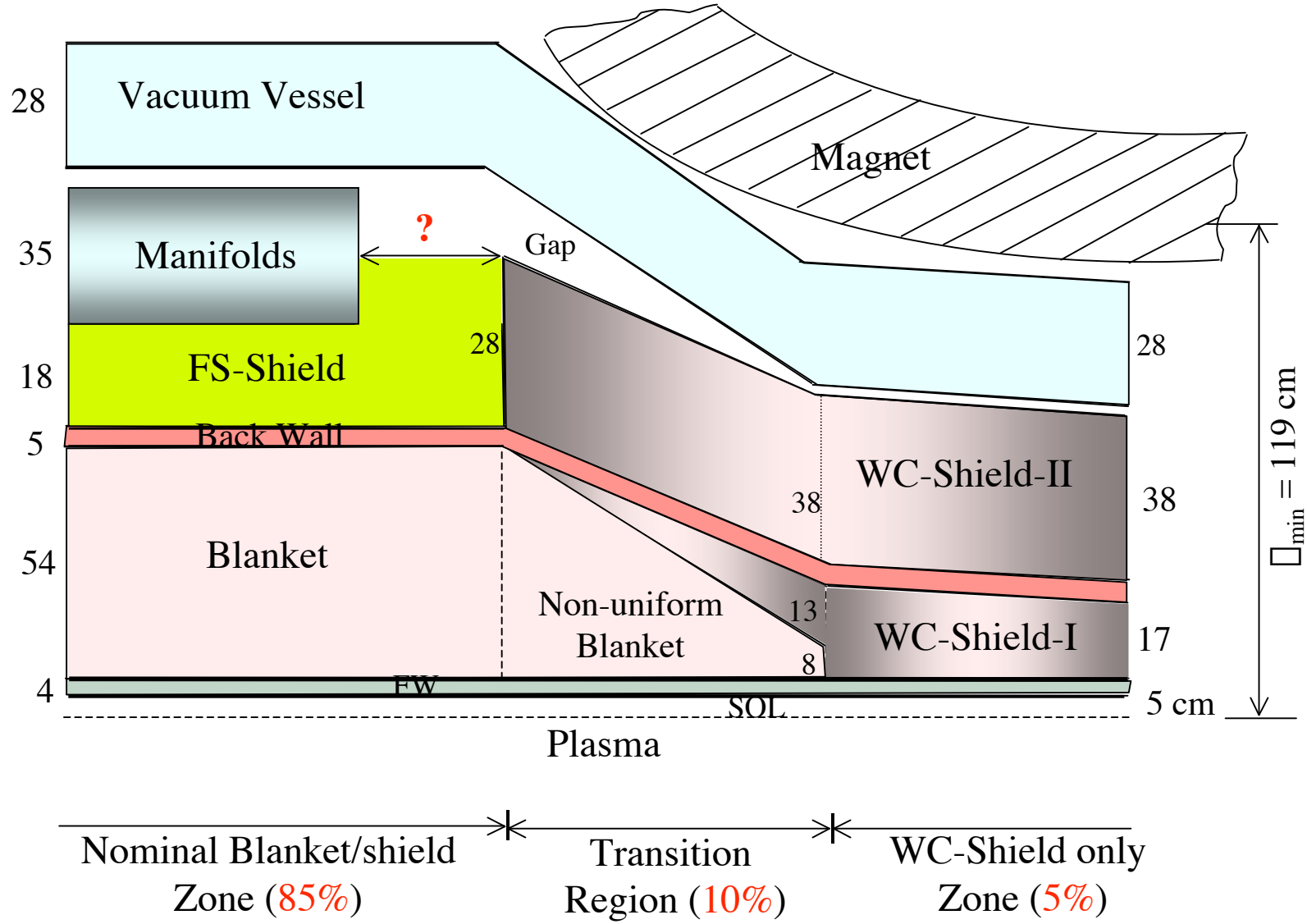


Cross Section
(next page)



Shield-only zone (**green**), transition region (**blue**), and nominal blanket zone cover **5%, 10% and 85%** of FW area, respectively

Non-uniform Blanket for Transition Region to Meet Breeding Requirement



Transition Region
(Average Dimension and Composition)

Component	Thickness	Coverage Fraction	Composition
FW*	3.8 cm		34% FS Structure 66% He Coolant
Blanket*	27 cm	10%	~79% LiPb (90% enriched Li) ~ 7% SiC Inserts ~ 6% FS Structure ~ 8% He Coolant
Back Wall*	5 cm		80% FS Structure 20% He Coolant
WC Shield-I*	7 cm	10%	88% WC Filler 5% FS Structure 7% He Coolant
WC Shield-II	33 cm	10%	15% FS Structure 10% He Coolant 75% WC Filler
VV	28 cm		28% FS Structure 49% **Water** 23% Borated Steel Filler

* Replaceable component.