

PAUL SCHERRER INSTITUT



EUROPEAN
SPALLATION
SOURCE



WIR SCHAFFEN WISSEN – HEUTE FÜR MORGEN

Artur Glavic :: Paul Scherrer Institut :: That Hard-Matter Guy

Magnets & Cryostats

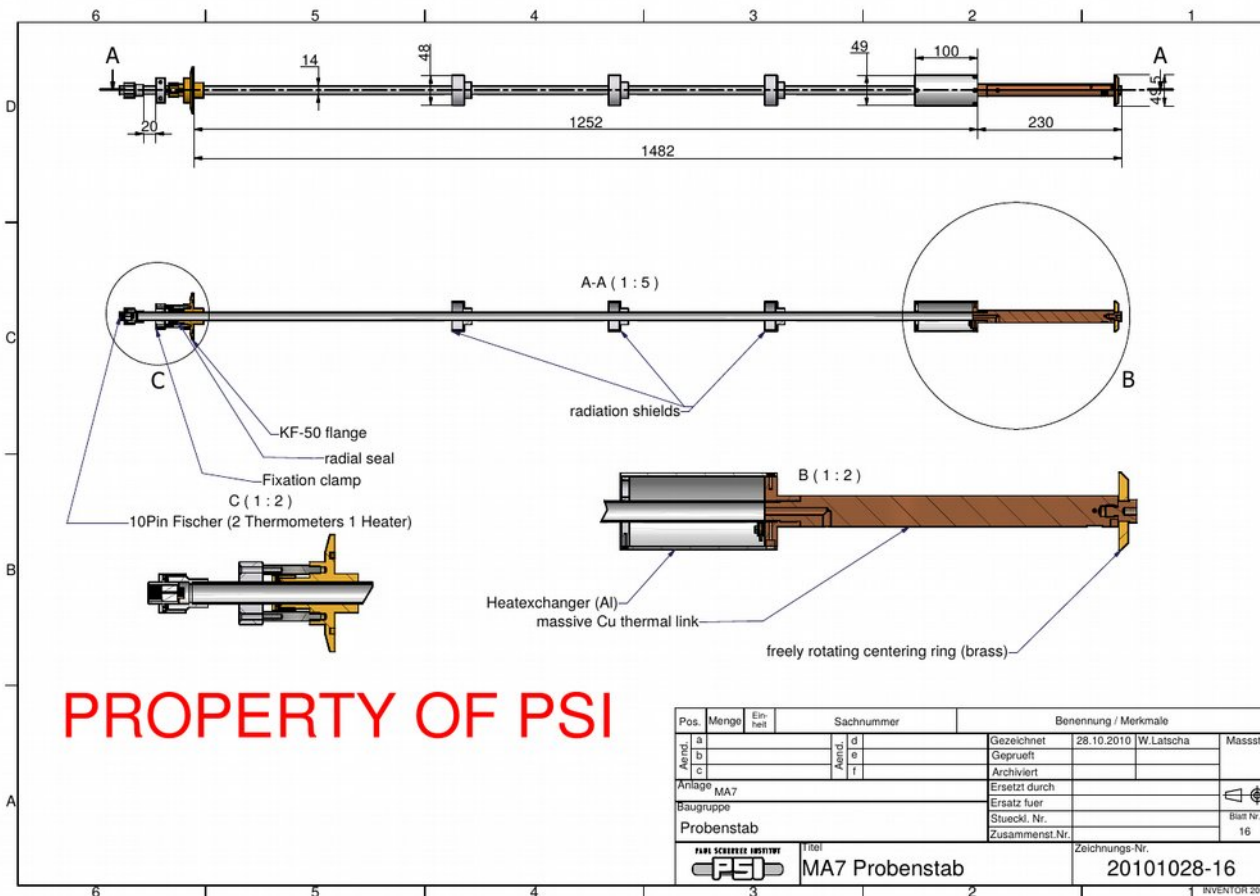
LSS SEE4ESS Workshop

29.11.2018 – ISIS



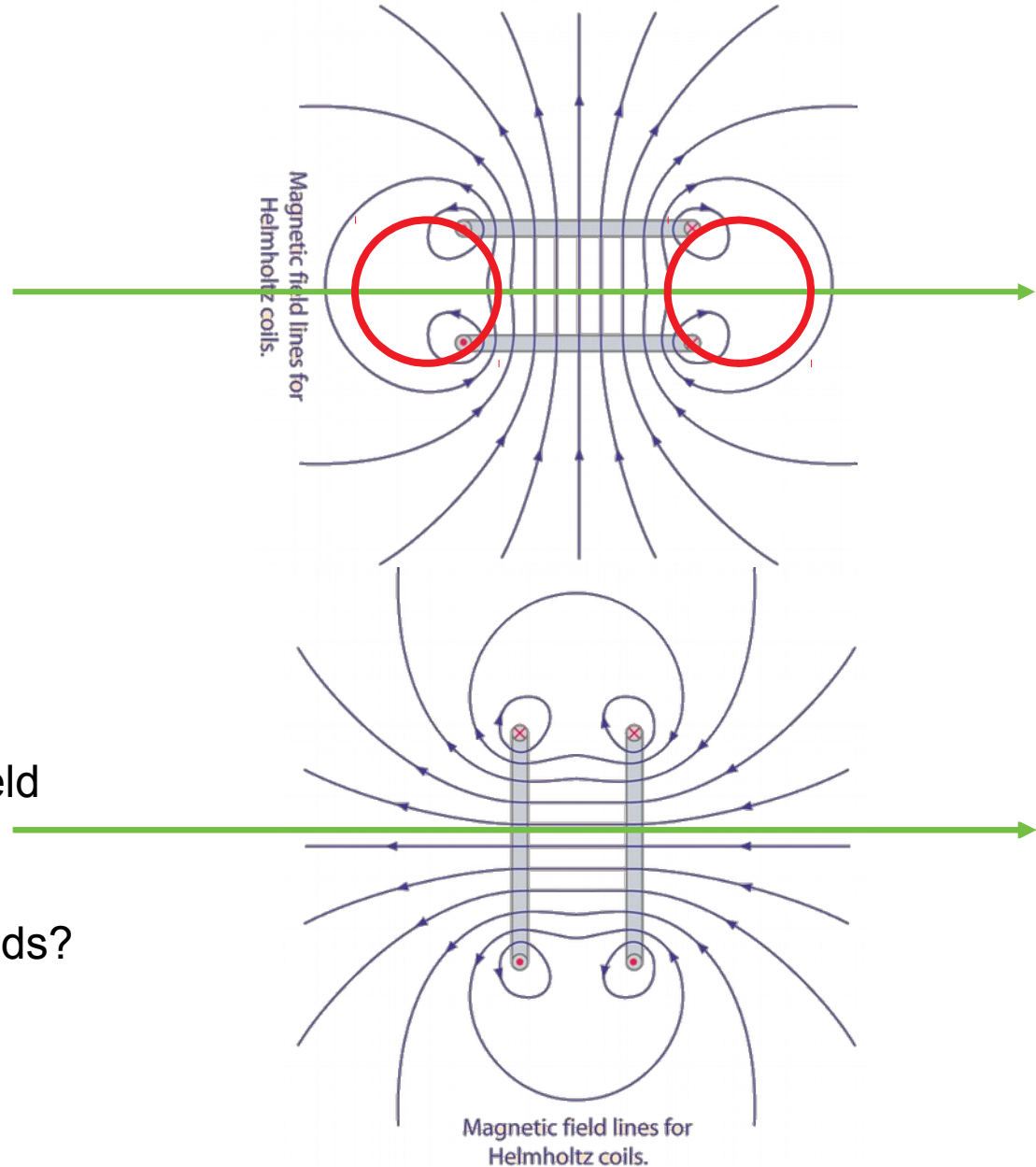
- Vacuum windows with low-Q background
 - Sapphire/Silicon/Quartz
 - OR Very thin, best pure Al
 - OR Connection to beamline vacuum
- Often moderate fields <5T
- Often moderate temperature >4K
- SANS:
 - Horizontal field w/ & w/o polarization
 - Vertical field w/ & w/o polarization
 - Std. Cryostat
- Reflectometry:
 - Any direction in-plane, only with polarization (maybe w/ analysis)
 - For magnetic contrast variation, low field (<0.5T) but large open area for any other SEE
 - Not many use cases for cryostats
- Don't forget sample holders for each device







- Use asymmetric magnet
- Have large enough guide field
- How much streigh field?
=> Which force on guide fields?



SYSTEM	LABEL	DETAIL	UNIT COST	BUDGET	RESPONSIB LE	READY BY 1st	LEAD TIME	LOKI	SKADI	ESTIA	FREIA
CryoStream & linear changer	CRYO		tbc	OPS	DREAM	21/Q1				POSSIBLE	
CryoStream & robotics	CRYO			40 NSS	NMX	22/Q1				POSSIBLE	
Dry Cryostat #1 PTR, CCR	CRYO			100 NSS	SAD	21/Q1	24 month	Q3/22	possible		
Dry Cryostat #2 PTR, CCR	CRYO	low background		100 NSS	SAD	22/Q1	24 month				
Dry Cryostat #3 spec. geom.	CRYO	top loading		100 NSS	VESPA	23/Q2	24 month				
FlowCryostat #1	CRYO			20 NSS	ESTIA	21/Q1	1yr			Q2/21	
FlowCryostat #2	CRYO			20 OPS	ESTIA	LATER	1yr			SPECIFIC	
FlowCryostat #3	CRYO			20 OPS	ESTIA	LATER	1yr			SPECIFIC	
Wet Cryostat OC #1	CRYO	Tmin < 2 K		50 NSS	SAD	21/Q1	2 yr	Q3/22	Q1/23		
Wet Cryostat OC #2	CRYO	Tmin < 2 K		50 NSS	SAD	21/Q1		Q3/22	Q1/23		
CryoFurnace #1 general	CRYOFURNACE	Tmax > 600K		50 NSS	SAD	21/Q4	24 months	Q3/22		POSSIBLE	
CryoFurnace #3 incl 20 changer	CRYOFURNACE	4K < T < 800K		300 NSS	DREAM	21/Q1				POSSIBLE	
CryoFurnace #5 incl 20 changer	CRYOFURNACE	4K < T < 800K		300 OPS	HEIMDAL	25/Q1				POSSIBLE	
6 kV HV supply #1	HV			25 NSS	SAD	21/Q2	18 months		Q1/22	Q4/24	
6 kV HV supply #2	HV			25 NSS	SAD	21/Q2	18 months		Q1/22	Q1/24	
6 kV HV supply #3	HV			25 OPS	SAD	LATER			Q1/22	Q1/23	
1T Electromagnet	MAGNET			50 NSS	SAD	21/Q1	18 months	Q3/22		Q2/21	
2.5T Warm bore cryomagnet	MAGNET	incl. Changer		335 NSS	SAD	22/Q1	3 yr	Q3/22		Q1/22	
2.5T Warm bore cryomagnet #2	MAGNET	Small footprint		280 NSS	SAD	22/Q3	24 month	LATER	LATER		LATER
3D Cryomagnet	MAGNET	Low priority		400 OPS	SAD	21/Q1	3-4year			Q4/24	
3D Helmholtz electromagnet	MAGNET	Low priority		100 OPS	SAD	22/Q3	2 yr			Q4/24	
5T Warm bore cryomagnet	MAGNET			400 NSS	SAD	22/Q3	3-4 yr	LATER	LATER		LATER
Horizontal 11T cryomagnet	MAGNET	Split coil, SANS/refl focused		450 NSS	SAD	22/Q1	3-4 yr		Q1/23	possible	
Pulsed Magnet	MAGNET		tbd	EXTERN	SAD	LATER	3-4year		possible	possible	LATER
Vertical 15T cryomagnet	MAGNET	split coil (used)		50 NSS	SAD	21/Q1	1yr				
Vertical 5T cryomagnet	MAGNET	split coil (used)	tbd	NSS	SAD	21/Q1	1yr				
Vertical 8T cryomagnet	MAGNET	large opening		1000 NSS	SAD	22/Q2	3-4 yr			Q1/23	
Vertical hybrid cryomagnet	MAGNET	LTc - HTc		2000 EXTERN	BIFROST	24/Q2	4yr				
3He / 4He Dilution Fridge #1	ULT	Tmin < 0.1 K		250 NSS	SAD	21/Q1			possible	POSSIBLE	
3He / 4He Dilution Fridge #2	ULT	Tmin < 0.1 K		250 NSS	SAD	21/Q1			possible	POSSIBLE	
3He Sorption Fridge	ULT	Tmin < 0.5 K		150 NSS	SAD	21/Q1	24 month		possible	POSSIBLE	

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Dry Cryostat #1 PTR, CCR	CRYO		100	NSS	SAD	21/Q1	24 months	Q3/22	possible		
FlowCryostat #1	CRYO		20	NSS	ESTIA	21/Q1	1yr			Q2/21	
Wet Cryostat OC #1	CRYO	Tmin < 2 K	50	NSS	SAD	21/Q1	2 yr	Q3/22	Q1/23		
6 kV HV supply #1	HV		25	NSS	SAD	21/Q2	18 months		Q1/22	Q4/24	
1T Electromagnet	MAGNET		50	NSS	SAD	21/Q1	18 months	Q3/22		Q2/21	
2.5T Warm bore cryomagnet	MAGNET	incl . Changer	335	NSS	SAD	22/Q1	3 yr	Q3/22		Q1/22	
3D Helmholtz electromagnet	MAGNET	Low priority	100	OPS	SAD	22/Q3	2 yr			Q4/24	
5T Warm bore cryomagnet	MAGNET		400	NSS	SAD	22/Q3	3-4 yr	LATER	LATER		LATER
Horizontal 11T cryomagnet	MAGNET	Split coil, SANS/refl focused	450	NSS	SAD	22/Q1	3-4 yr		Q1/23	possible	
Vertical 15T cryomagnet	MAGNET	split coil (used)	50	NSS	SAD	21/Q1	1yr				
Vertical 5T cryomagnet	MAGNET	split coil (used)	tbd	NSS	SAD	21/Q1	1yr				
Vertical 8T cryomagnet	MAGNET	large opening	1000	NSS	SAD	22/Q2	3-4 yr			Q1/23	

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FlowCryostat #1	CRYO		20	NSS	ESTIA	21/Q1	1yr			Q2/21	
Wet Cryostat OC #1	CRYO	Tmin < 2 K	50	NSS	SAD	21/Q1	2 yr	Q3/22	Q1/23		
6 kV HV supply #1	HV		25	NSS	SAD	21/Q2	18 months		Q1/22	Q4/24	
1T Electromagnet	MAGNET		50	NSS	SAD	21/Q1	18 months	Q3/22		Q2/21	
2.5T Warm bore cryomag	MAGNET	incl . Changer	335	NSS	SAD	22/Q1	3 yr	Q3/22		Q1/22	
3D Helmholtz electromag	MAGNET	Low priority	100	OPS	SAD	22/Q3	2 yr			Q4/24	
5T Warm bore cryomag	MAGNET		400	NSS	SAD	22/Q3	3-4 yr	LATER	LATER		LATER
Horizontal 11T cryomag	MAGNET	Split coil, SANS/refl focused	450	NSS	SAD	22/Q1	3-4 yr		Q1/23	possible	
Vertical 15T cryomagnet	MAGNET	split coil (used)	50	NSS	SAD	21/Q1	1yr				
Vertical 5T cryomagnet	MAGNET	split coil (used)	tbd	NSS	SAD	21/Q1	1yr				
Vertical 8T cryomagnet	MAGNET	large opening	1000	NSS	SAD	22/Q2	3-4 yr			Q1/23	