

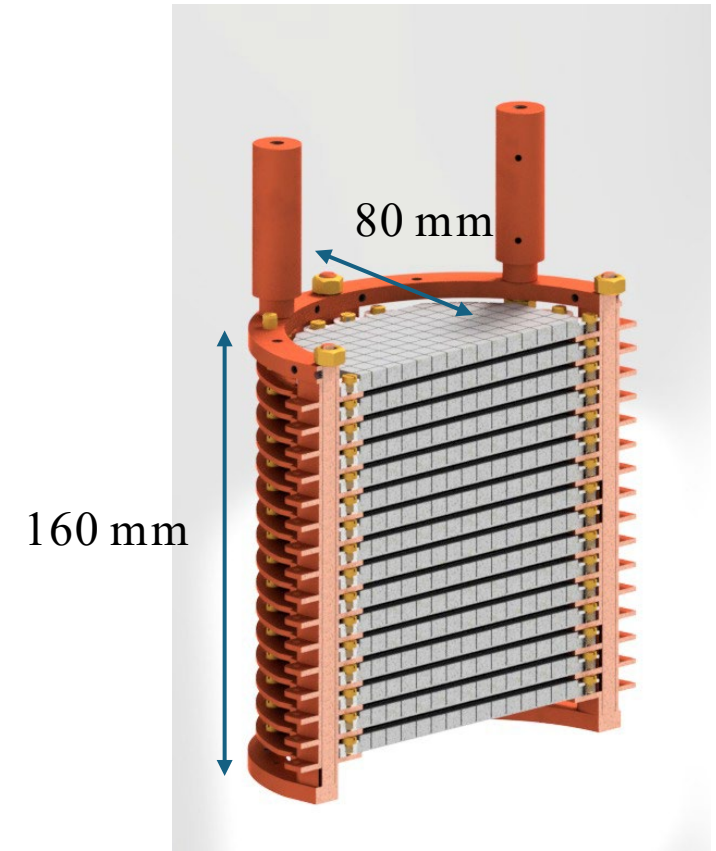
Possible technical configurations for the cryogenic shield

17/09/25

Angelo

Definition of constraints

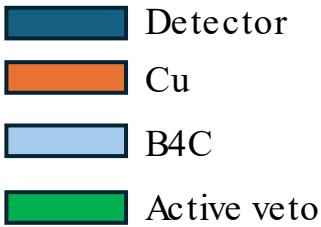
- OR of the detector: $r_{\text{det}} = 80 \text{ mm}$
- Height of the detector: $h_{\text{det}} = 160 \text{ mm}$
- Weight: $m_{\text{det}} = 5 \text{ kg}$
- Maximum TOTAL weight on the MC: $m_{\text{max}} = 250 \text{ kg}$
- OR MC: $\text{OR}_{\text{max}} = 180 \text{ mm}$
- Height M: $h_{\text{max}} = 650 \text{ mm}$



Guidelines and/or open question

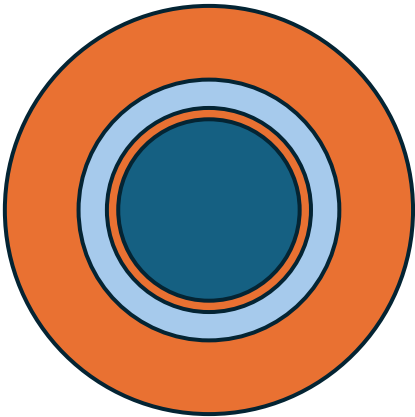
1. Needed a thickness around 50+10 mm of Cu
2. Needed on the top part of the shielding an extra thickness of about 100 mm
3. Needed an absorber for neutrons with $t_{\text{B}_4\text{C}}=20$ mm
4. If possible / easy : Include the possible upgrade with A.VETO
5. Thickness of A.VETO around 25 mm, material: BGO or GAGG
6. Radiopurity of GAGG/BGO -> need for internal CU shielding

Configuration: Baseline 1



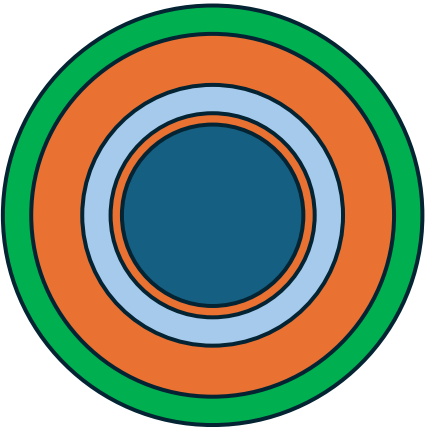
60 mm Cu, 22 mm B4c, 10 mm Cu
t_{up}=t_{lat}

Name:	CDR_1										
Description:	Configuration 1 similar to the CDR including 250 kg constraint										
Element	Name	IR	OR	t _{lat}	t _{up}	t _{down}	cyl_height	Density	weight		
		[dm]	[dm]	[dm]	[dm]	[dm]	[dm]	[kg/dm^3]	[kg]		
1	Detector	0	0,8				1,6		5		
2	Ultrapure Cu	0,8	0,9	0,1	0,1	0,1	1,6	8,96	12,22		
3	B4C	0,95	1,15	0,2	0,2	0,2	1,8	2,53	10,21		
4	External Cu	1,2	1,8	0,6	0,6	0,6	2,2	8,96	220,91		
Total									248,34		

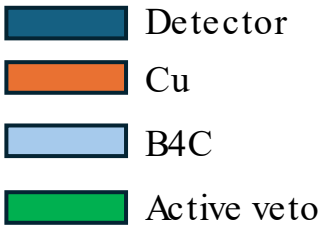


to procure copper sheets
with a thickness of 60 mm

We can include the active veto option
using sheets with 40 mm and 20 mm thicknesses



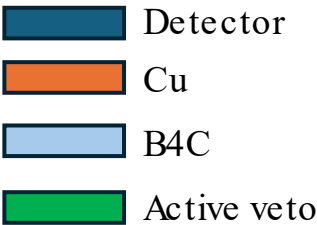
Configuration: Baseline2



50 mm Cu, 20 mm B4c, 10 mm Cu
t_{up}= 100 mm

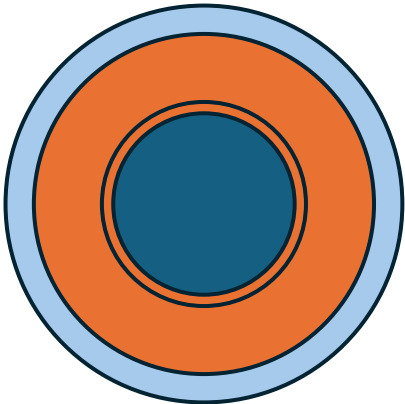
Name:	CDR_2										
Descripti on:	Configuration 2 similar to the CDR_1 including 250 kg costraint										
Element	Name	IR	OR	t_lat	t_up	t_down	cyl_height	Density			weight
		[dm]	[dm]	[dm]	[dm]	[dm]	[dm]	[kg/dm^3]			[kg]
1	Detector	0	0,8				1,6				5
2	Ultrapure Cu	0,8	0,9	0,1	0,1	0,1	1,6	8,96			12,22
3	B4C	0,95	1,15	0,2	0,2	0,2	1,8	2,53			10,21
4	External Cu	1,2	1,7	0,5	1	0,5	2,2	8,96			211,82
								Total			239,2487

Configuration: New 1

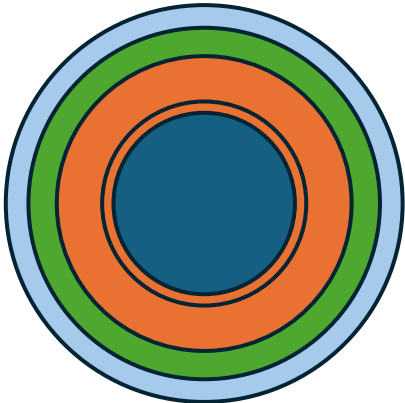


60 mm Cu, 20 mm B4c, 10 mm Cu
t_{up}= 120 mm

Name:		NEW_1									
Descripti on:		Internal Copper, no active veto									
Element		Name	IR	OR	t_lat	t_up	t_down	cyl_height	Density		weight
			[dm]	[dm]	[dm]	[dm]	[dm]	[dm]	[kg/dm^3]		[kg]
1		Detector	0	0,8				1,6			5
2		Ultrapure Cu	0,8	0,9	0,1	0,1	0,1	1,6	8,96		12,22
3		External Cu	0,9	1,5	0,6	1,2	0,6	1,8	8,96		186,96
4		B4C	1,55	1,75	0,2	0,2	0,2	3,6	2,53		28,62
									Total		232,8016

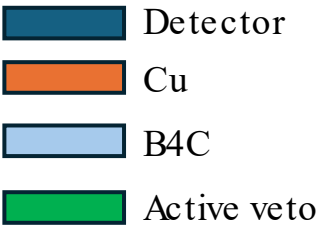


We can include the active veto
option
using sheets with 40 mm and 20
mm thicknesses



to procure copper sheets
with a thickness of 60 mm

Configuration: New2



45 mm Cu, 25 mm GaGG, 10 mm Cu
t_{up}= 135 mm

Description:		Internal Copper, active veto , modular									
Element		Name	IR	OR	t_lat	t_up	t_down	cyl_height	Density		weight
			[dm]	[dm]	[dm]	[dm]	[dm]	[dm]	[kg/dm^3]		[kg]
1		Detector	0	0,8				1,6			5
2		Ultrapure Cu	0,8	0,9	0,1	0,1	0,1	1,6	8,96		12,22
3		External Cu	0,9	1,35	0,45	1,35	0,45	1,8	8,96		143,64
4		GAGG	1,4	1,65	0,25	0,25	0,25	3,6	6,6		85,14
									Total		246,00

