International MUON Collider Collaboration

Magnets

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Objectives, Deliverables and Resources

Objectives							
Basic: Promote R&D tasks required to developed magnet designs to allow implementation of the collider in the Geneva area or elsewhere.							
Propose a magnet design for each area and assess its maturity							
High-level Deliverables							
1) Define a high field/large bore solenoid for the target area							
2) Develop high field HTS magnets for cooling stage; develop and test a complete cooling module, with a superconducting solenoid and a NC RF							
3) Define a conceptual magnet design for the accelerator ring							
4) Define a conceptual magnet design for the collider ring							
Resources	1	2	3		1	2	3
Staff				Student			
Postdoc				Material			
Interested partners							
CEA, RAL, ???							

Resources are given in total number of FTE-years for the whole duration and in kEuro for material

Tasks and Resources

WP1 Priority	Target end solenoid	Resource estimate staff [FTEy]	postdoc [FTEy]	PhD [FTEy]	material [kEuro]
1	Define magnet specification	1x0,5	1x3		
1	Evaluate realistic parameters (conductor mechanical performances, radiation loads, material radiation tolerance…)	1x3			
1	Assess the nominal cooling operation from the physics; evaluate the required cooling power and the cooling mode	0,5x3			
3	Conceptual design of a +15T large bore solenoid and of the ancillaries (cryoplant, quench protection system, DAQ…)	3	1		

Tasks and Resources

WP2 Priority	Cooling magnet	Resource estimate staff [FTEy]	postdoc [FTEy]	PhD [FTEy]	material [kEuro]
2	Engineering design of a 30T horizontal cooling solenoid	2x3	1x3	1	
3	Prototype and mock-up fabrication to demonstrate winding techniques, mechanical design, quench protection strategy	1x3	1x3	1	300
3	Components procurement and 30T magnet fabrication	2x3	1x3	1	1100
3	Cryo tests of the 30T solenoid	0.5x3	1x3	1	50
1	Feasibility studies of a 50T solenoid	1x3	1x3	1	
1	Conceptual design of a rectlinear cooling channel, and of the associated magnets	1x3	1x3	1	

Tasks and Resources

WP2 Priority	Muon cooling module	Resource estimate staff [FTEy]	 postdoc [FTEy]	 PhD [FTEy]	 material [kEuro]
1	HTS magnet design based on a existing design (20T-25T with proven technologies), and interface definition with the RF WG	1.0x3	1x3	1	
2	Magnet components procurement and magnet fabrication	0.5x3	1x3	1	800
2	Integration and tests (In collaboration with the RF WG)	0.5x3	0,5x3	1	200

WP3	Accelerator ring	Resource estimate staff [FTEy]	 postdoc [FTEy]	 PhD [FTEy]	 material [kEuro]
2	VFFA cost scaling model	0.5x3			
3	VFFA engineering design based on ISIS upgrade model	1.5x3			
1	Fast ramped magnet (to be added here ?)	0.5x3	1x3		

Tasks and Resources

WP4	Collider ring	Resource estimate staff [FTEy]	postdoc [FTEy]	PhD [FTEy]	material [kEuro]
1	Define magnet specification, and radiation level	1	1.5	1	
2	Evaluate available options for combined function magnet (nested coils *vs.* L/R asymmetric coils)	0.5	1.5	1	
	Conceptual design of open mid-plane magnets (optional)				

Work Package Description

Workpackage Description
Explain the important issue addressed and how it is addressed.