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Advanced Connection of Linac4 to PSB

Wim Weterings - Jan Borburgh

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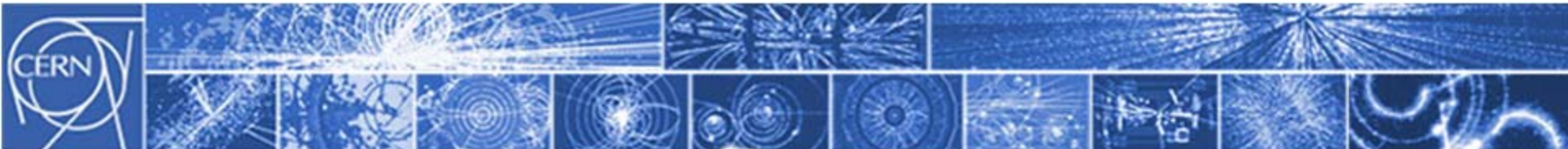


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Systems Involved

- BI.DIS & BI. SMV Magnets (M. Hourican)
- BI.DIS PFN & KSW Magnets (L. Sermeus)
- KSW Generator (T. Fowler)
- BI.BSW Magnets (J. Borburgh)
- BI.BTS (W. Weterings)
- Control systems (E. Carrier)



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BI.DIS

- Tanks and magnets are ready, HV feedthrough to be ready Q3 2011. Magnet tanks ready for installation Q1 2012.
- PFN, prototype Q4 2011, prototype testing Q1 2012, procurement components from Q3 2011, Assembly Q1 2013, Tests Q3 2013.
- Outstanding Issues: Support DVT40, Beam scrapers or collimation upstream in transfer line, Integration studies, pulse length 420 or 600 μ s.

ID	Task Name	2008				2009				2010				2011				2012
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1
6	Provide BI.DIS Magnet	[Progress bar from Q3 2008 to Q1 2012]																
7	mechanical drawings	[Progress bar from Q3 2008 to Q1 2011]																
8	vacuum vessels	[Progress bar from Q2 2009 to Q2 2010]																
9	coils produced	[Progress bar from Q3 2009 to Q3 2010]																
10	misc parts procurement	[Progress bar from Q3 2009 to Q3 2011]																
11	magnets assembled	[Progress bar from Q2 2010 to Q3 2011]																
12	system assembled	[Progress bar from Q3 2011 to Q3 2012]																
13	system tested	[Progress bar from Q3 2012 to Q1 2013]																

ID	Task Name	2011		2012				2013				2014			
		Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	
41	Provide BI.DIS pulse generator	[Progress bar from Q3 2011 to Q3 2014]													
42	prototype	[Progress bar from Q3 2011 to Q3 2012]													
43	mechanical drawings	[Progress bar from Q2 2012 to Q3 2013]													
44	misc parts procurement	[Progress bar from Q3 2012 to Q3 2014]													
45	system assembled	[Progress bar from Q3 2013 to Q3 2014]													
46	system tested	[Progress bar from Q3 2014 to Q1 2015]													



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KSW

- Magnet, drawings for Q3 2011, components for Q2 2012, assembly Q3 2013, Tests Q4 2013.
- Pulse generator, Installation 2014 feasible.
- Outstanding Issues, decision on 4 or 16 magnets and required waveform.

ID	Task Name	2011				2012				2013				2014				2015		
		Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1
23	Provide KSW magnets	[Redacted]																		
24	mechanical drawings	[Blue bar: Q3 2011 to Q2 2012]																		
25	ceramic vacuum chambers	[Blue bar: Q3 2011 to Q2 2012]																		
26	purchase magnet components	[Blue bar: Q3 2011 to Q2 2012]																		
27	misc parts procurement	[Blue bar: Q3 2011 to Q2 2012]																		
28	magnets assembled	[Blue bar: Q3 2011 to Q2 2012]																		
29	magnets assembled	[Blue bar: Q3 2011 to Q2 2012]																		
30	supply coil & mouldings	[Blue bar: Q3 2011 to Q2 2012]																		
31	system tested	[Blue bar: Q3 2011 to Q2 2012]																		

ID	Task Name	2011				2012				2013				2014				2015		
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
48	Provide KSW pulse generator	[Redacted]																		
49	prototype	[Blue bar: Q1 2011 to Q2 2012]																		
50	mechanical drawings	[Blue bar: Q1 2011 to Q2 2012]																		
51	misc parts procurement	[Blue bar: Q1 2011 to Q2 2012]																		
52	system assembled	[Blue bar: Q1 2011 to Q2 2012]																		
53	system tested	[Blue bar: Q1 2011 to Q2 2012]																		

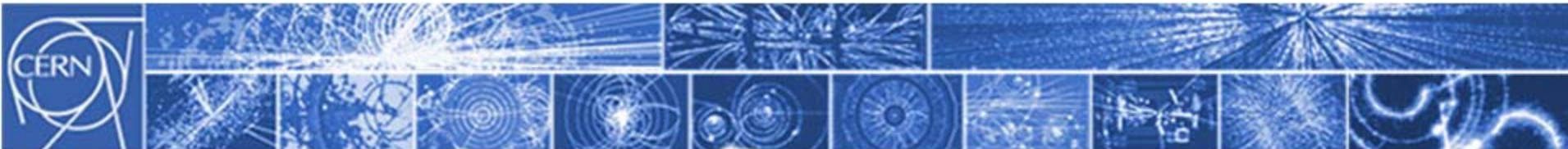


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BI.BSW

- Magnets can be delivered as planned in EVM, except for mechanical drawings which will only start Q3 2011. in time for installation January 2014.
- Power supply to be delivered by L4 WP 2.10.
- Outstanding Issues: validation of obtainable field quality for beam, influence from vacuum chambers on field.
- Removal of current injection region Q1 2014.
- Many interactions with other WP's: magnets, vacuum group, BI, BI.BTS, TE/EPC etc: need for close coordination!

ID	Task Name	2011				2012				2013				2014				2015		
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	
33	Provide BI.BS magnets																			
34	prototype	■																		
35	mechanical drawings			■																
36	vacuum chambers					■														
37	coils produced					■														
38	misc parts procurement							■												
39	magnets assembled									■										
40	system assembled									■										
41	system tested											■								



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BI.BTS

- Equipment delivery as planned in EVM, but assembly and test Q3 2013.
- Outstanding Issues, foil behavior and stability during motorized movement and vacuum pumping, Copyright of commercial foil changer, foil behavior with beam.
- Interactions with other WP's: magnets, vacuum, instrumentation etc: need for close coordination!

ID	Task Name	2009				2010				2011				2012				2013		
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
75	Provide foil handling system																			
76	mechanical design																			
77	mechanical drawings																			
78	build prototype																			
79	test prototype																			
80	stripping foils																			
81	motorisation																			
82	mechanical parts																			
83	Vacuum equipment																			
84	system assembled																			
85	system tested																			
86	installation in BI line																			
87	Provide controls for H- injection																			
88	design controls system																			
89	purchase hardware																			
90	build system																			
91	infrastructure																			
92	test system																			
93	build prototype																			
94	test prototype																			

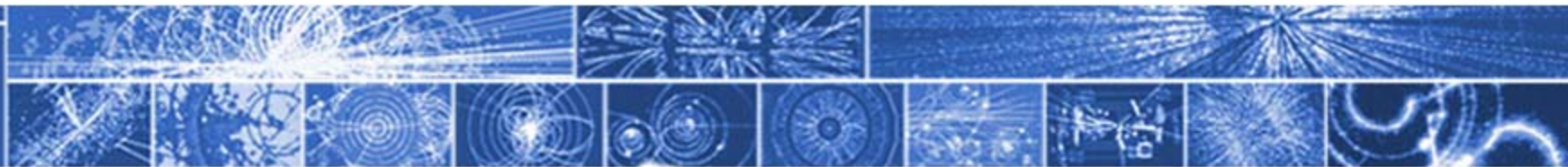


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Control Systems

- There are no technological problem to achieve the 2014 deadline, the problem is allocating manpower and priorities of other projects.
- Outstanding Issues;
 - Validation of the use of stepping motors for stripping foils control.
 - Final specification of KSW pulse generator for validation of electronic circuit and start prototype development.

ID	Task Name	2011				2012				2013				2014				2015		
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
67	Provide controls for kickers magnets and generator	[Gantt bar spanning from Q1 2011 to Q4 2014]																		
68	design controls system	[Gantt bar from Q1 2011 to Q3 2013]																		
69	purchase hardware	[Gantt bar from Q3 2012 to Q4 2014]																		
70	build system	[Gantt bar from Q3 2013 to Q4 2014]																		
71	test system	[Gantt bar from Q3 2014 to Q3 2015]																		
72	build prototype	[Gantt bar from Q1 2011 to Q4 2013]																		
73	test prototype	[Gantt bar from Q3 2012 to Q4 2013]																		
74	infrastructure	[Gantt bar from Q3 2013 to Q4 2014]																		



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Conclusion

- In principle no show stoppers to meet the 2014 deadline, **provided**:
 - Sufficient manpower can be allocated to this activity (re other priorities);
 - Design office support can be adjusted to our planning;
 - Production of key items can start now and must not wait for RCS decision;
 - Other L4 WPs supply items for our equipment in time
(beam instrumentation, dumps, power converter, vacuum systems, ...)
- Other issues:
 - Installation coordination, multiple WP activities in injection straight section. could seriously influence the schedule.
 - Modification of vacuum systems up-downstream of BI.SMV
 - Space allocation in BA361 and 'cabling space' to the PSB
 - The need for integration studies needs to be addressed.
 - Late decision point for switch over to Linac4-PSB (end 2013)
leaves no margin for errors, in a complex zone
risk of workload peak in already busy startup period