Marco Garlaschè – EN/MME

PSB Injection – Design Technical meeting

Meeting 21/05/2014

Cedric Baud (CB), Caterina Bertone (CBe), Jan Borburgh (JB), Andrea Cornacchini (AC), Alessandro Dallocchio (AD), Melanie Delonca (MD), Frederic Delsaux (FD), Tobias Dobers (TD), Gerrit Jan Focker (GF), Robert Froeschl (RF), Marco Garlaschè (MG), Jan Hansen (JH), Eva Barbara Holzer (EH), Michael Hourican (MH), Nicolas Jean Jurado (NJJ), Cesare Maglioni (CM), Antony Newborough (AN), Remy Noulibos (RN), Alexandre Ouzia (AO), Chiara Pasquino (CP), Axel Ravni (AR), Benoit Riffaud (BR), Federico Roncarolo (FR), Stephane Burger (SB), Wim Weterings (WW), Francesca Zocca (FZ), Christos Zamantzas (CZ), Carlo Zannini (CZa), Laurent Zuccalli (LZ)

Present: CB, SB, MG, MH, JH, NJJ, JMM, RN, BR, WW, LZ

Link to Indico page of meeting

SUMMARY

1. **BI.STR box design + instrumentation**
2. **News from BSW & BHZ INCONEL chambers**
3. **AOB**

1. BI.STR box design + instrumentation

BI.STR:

RN presented current design of stripping box (see presentation).

Box will be produced starting from a single block in 304 st.steel (3D forged, CERN UHV compliant).

ACTION 7.4 Proceed with order of material for two pieces (i.e. for prototype).

BTV:

JNN presented design of BTV system (see figg. 1-2). Two working conditions foreseen:

- 'Camera IN', for beam shape analysis
- 'Camera OUT', for visualization of stripping foil condition

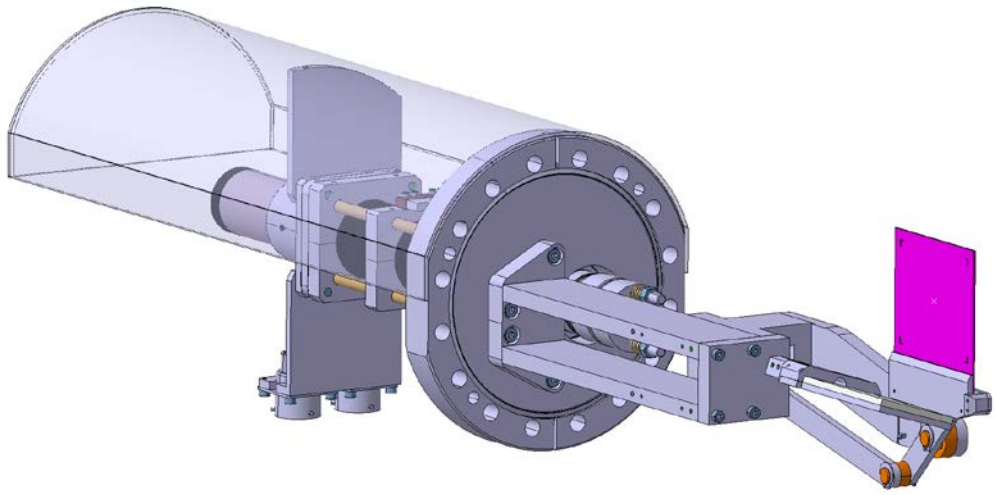

Figure 1: BTV system

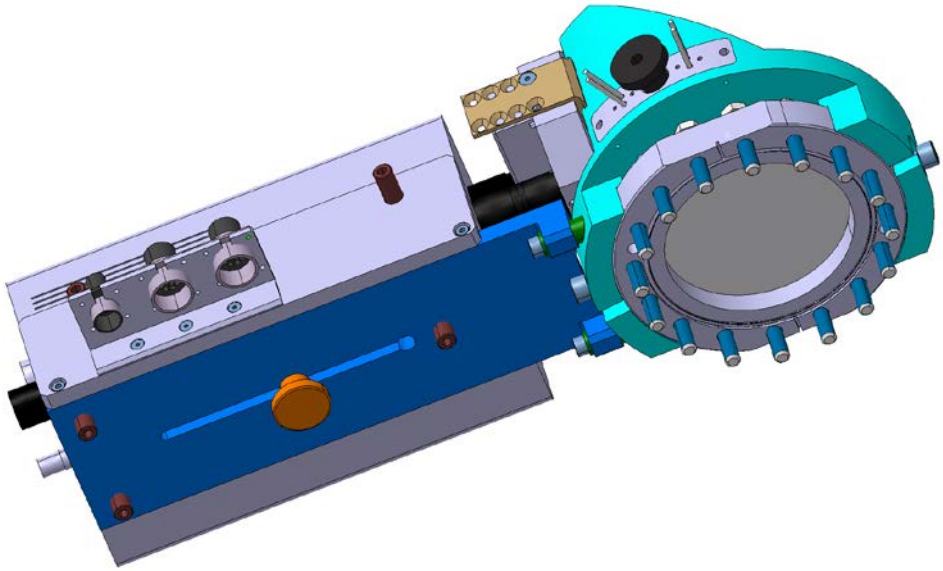

Figure 2: General assembly with camera

In total, 7 BTV systems needed:

- PSB Injection → 4x
- Half Sector Test → 1x
- L4 Line Transfer → 1x
- Spare → 1x

ACTION 7.3 Check with J.P.Corso encumbrance of equipped BI.STR (+BTV) inside tunnel.

2. News from BSW & BHZ INCONEL chambers

BSWx chambers:

Call for tender for chambers production can go on, as no further design changes are foreseen on this part (see action 1.26).

Concerning theoretical VS. produced chamber undulation: (WW)

- shape of undulation is not critical.
- the only constraints are
    - keeping undulation equivalent length equal to theoretical value
    - Structural resistance of undulation
    - Minimum internal & maximum external envelopes

  Everything else can change accordingly to Kompaflex needs.

Current material baseline is Inconel X750, but machining of 625 is known to Kompaflex.

ACTION 1.30 Confirm that x625 may also be used for BSWx chambers.

ACTION 1.31 Order material for BSWx chambers.

BHZx chambers:

(JMM) Inside call for tender, prototype production has been asked to Kompaflex (1 complete chamber + 1 chamber subassembly in 'ready for welding' condition).

Supplier for edge-welded bellow shall be found, as Kompaflex cannot provide such component.

(LZ) Design ongoing for axial fixation system on collars (needed by Kompaflex for vacuum testing).

3. AOB

Review of ACTIONS

Action ID	who	What	started	Status/info/comments
		CHAMBERS & BELLOW DESIGN		
1.8	***LZ***	Foresee holes in chamber support plates (for unscrewing of magnet extremity plates)	24/04/2013	
1.9	***LZ***	Implement max compression block on compression system design	24/04/2013	~~COMMENT (JH): system shall be dismountable i.o. not to hinder actions during assembly in tunnel.~~ ~~Waiting for more detailed design of inter-magnets (sectorising…)~~ Design is done, current system may not be able to serve for lab vacuum testing (see action 1.29).
1.10	***MME***	Implement fixation for vacuum chamber inside BR.BHZ11	26/06/2013	Following meeting with Kompaflex: system shall also provide deformation of chamber to final shape

1.12	***MME***	Define detailed procedure for BHZx chambers substitution	03/10/2013	
1.13	***TD***	If possible, measurement of BHZ11&162 chambers position with respect to magnets	03/10/2013	
1.14	***MME, AN***	Evaluate feasibility of BHZx chamber alignment with current fixation system. If impossible, design new system	03/10/2013	New alignment/position system proposed, checked by AN. Ok to be given once LS2 changes in magnet geometry are accounted for
1.18	***BR***	Follow up on: (i)RF loops redesign by B. Goddard/E. Benedetto, (ii) Impedance analyses by BE/ABP (C. Zannini)	23/10/2013	(i) ~~Design is ok and number of contacts is more than sufficient. Waiting for BE input (end of January) to finalize where contacts shall be put (at injection or upstream/downstream)~~ (ii) RF shielding not needed for pumping ports; check stripping box
1.19	***MG, WW***	Structural evaluation of BSWx chambers	27/11/2013	with 0.4mm thickness w.r.t 0.45mm, 6mm undulations w.r.t 7mm, both with current BHZ and with BSW style of cross sections

1.21	***LZ***	BHZx Chambers re-usage	04/12/2013	Ensure that current cut on current chambers is done in a position such that we may reuse them in case production of new ones becomes critical
1.26	***LZ***	Evaluate feasibility of collar between chambers and welded extremities	02/04/2014	CLOSED new All ok. Only change: minimum longitudinal space required from Kompaflex for weldability of collar is 5÷6mm. This value is higher than what initially foreseen, design of collars & str. Box to be changed accordingly (no changes on Inconel chambers)
1.29	***MME***		14/05/2014	Design dedicated bellow-support systems for vacuum testing (see action 1.9). Check current design for transport.
1.30	***MH***	Material of BSWx chambers	21/05/2014	Can Inconel x625 be used instead of x750?
1.31	***JMM, WW***	Order material for BSWx chambers		

		MAGNET & POSITIONING DESIGN		
2.1	***CB***	--	02/04/2014	• ~~Confirm if we need insulating material (and which thickness) between BSW4 magnet and shielding. RF should be informed about such gap between magnet and shielding. For the moment steel block (seating dump and carrying cooling) is nearer than 10mm.~~ NOT NEEDED • Provide indication of encumbrance of magnet current input; they could have integration problems with cooling input.
2.2	***BR, LZ***	BSW1 assembly electrical behaviour	16/04/2013	input beam pipe and bellow (beside BSW1) do not touch the magnet/ be insulated from it, in order not to close electrical loop
2.3	***LZ***	--	16/04/2013	target positioning system on the magnets should not be attached to the yoke shims, but rather on the lateral assembly plates
2.4	***BR***	Production of magnet parts	14/05/2014	30/06/2015 is the wished date for magnet pieces, is this critical for workshop?

		DUMP DESIGN		
3.2	***BR, LZ***	Design options for maximizing cooling surface.	03/04/2013	
3.10	***AO***	Ti bulk: finalize analyses	27/11/2013	- add slide reporting on convection coefficient, velocity and ΔT of water. - evaluate 10% scenario with (i) radiation of magnet towards ambient at 30°C, (ii) final dump geometry, (iii) thermal contact surfaces nearer to final tightening configuration) report on steady and transient behaviour of 2% baseline scenario.
3.11	***CM, AO***	Ti Bulk: Tritium diffusion	27/11/2013	Is tritium diffusion to-be-considered/negligible?

		SHIELDING DESIGN		
4.1	***MME***	check feasibility of 5cm lead shielding	12/03/2014	
4.2	***BR***	W shielding option	16/04/2013	- provide cost estimation of Tungsten and steel shielding material/production for comparison
		RADIOPROTECTION		
		INSTRUMENTATION		

6.4	***FZ***	Evaluate influence of joule heating on Ti foil (2% & 10% case)	09/07/2013	
6.7.	***WW, CZ, EH***	confirm BLMs ideal positions	12/03/2014	
6.8	***MME***	obtain BLM drawings and dimensions from CZ, implement them in current assembly	12/03/2014	
6.9	***LZ***	Finalise design of instrumentation cabling	02/04/2013	~~• Ask GJF which is the final diameter of the cable~~ ~~• Obtain from GJF a connector i.o.t extract real dimensions.~~ ~~• Change connection of wires from weld to a crimped one, both where wires connect to foils and where wires connect to output line~~ • Foresee insulation between wire connections and dump (i.o.t. avoid short-circuits) Strengthening of Macor component
		STRIPPING FOIL SYSTEM		

7.1	***RN, MME***		14/05/2014	Is stripping foil box design ready concerning general dimensions? If so launch material order
7.2	***RN***		14/05/2014	Verify barycentre of equipped stripping box and resistance of system
7.3	***RN***	Integration of BI.STR	21/05/2014	Check with J.P.Corso encumbrance of equipped BI.STR (+BTV) inside tunnel.
7.4	***MME***	Order material for BI.STR	21/05/2014	For 2 pieces, 304 3D-forged
		INJECTION SUPPORT FRAME		
8.1	***MG, BR, LZ***	Define loads transmitted to walls by frame	15/05/2013	
8.2	***MG***	Evaluate deflections of frame	31/07/2013	