CERN HL - LHC CRAB CAVITIES EN

Minutes

EN Meeting for HL-LHC CRAB CAVITIES

Monday, 6th October 2016

Room 376/1-020

Scope: regular meeting for the Crab cavities development in the scope of HiLumi LHC (WP4)

Attendees: Kurt Artoos, Teddy Capelli, Paula Freijedo Menendez, Carlo Zanoni, Laurene Giordanino, Alexandre Amorim Carvalho, Konrad Eiler, Raphael Leuxe, Joanna Sylwia Swieszek, Rama Calaga, Norbert Kuder, Ofelia Capatina

Materials:

Konrad showed an update of the material testing.

1. The Niobium that is used for cavities production showed an elastic limit of 88 MPa +/- 9 MPa, which is significantly higher than the certificate and minimum request (i.e. 55 MPa). The elongation at rupture is 75 %. These numbers are considered a good news for cavity strength. At cold the properties of Niobium are estimated in a yield of 630 MPa with a 3 % elongation.
2. Explosion bonding R&D. Konrad showed the latest results of Ti-to-SS with a Cu interlayer. Mechanical properties seem ok, except that the behaviour appears brittle. Leak tightness at cold is still unknown and is the main open point. Next step is testing with a Tantalum interlayer.
3. Cryophy of the 2 K magnetic shield. Properties appear comparable with values in literature for the same material. Unfortunately the information at low fields are a bit lacking. In particular, the case with 50 Hz should be investigated a bit further as it's possible a component will have that harmonic behaviour if coming from an electric AC source.

Ofelia asked to add a few info (such as testing geometry, type of materials for explosion bonding) in order to make the presentation clear also after the meeting. Reports should also be on EDMS in the WP4 node.

Cavity:

Norbert updated the stress assessment of the cavity with the last geometry (thickness reduction next to welds) and last material properties as coming from tests. The worst case determines loads below the elastic limit or acceptable after linearization.

Tuner:

Joanna presents the most recent iterations of the tuner frame design. According to previous estimation this system was introducing modes on the cavity that would affect the shape of the cavity itself. If later blades are added, the frequency of the first mode is increased to 70 Hz and doesn't include swinging/tilting of the capacitive plates to whom the tuner is attached. The buckling behaviour of the tuner rods is still to be improved instead.

Others:

Marco asked what is the best approach in terms of materials certificates for the flanges. It appears the overcost is not negligible (up to a factor 2 for small numbers). After a brief discussion, the philosophy suggested is to ask the certificate for any piece of equipment that sees pressure or vacuum or is relevant to the performance. It will also be useful to learn what would be the cost for a full cryomodule in order to adapt the strategy in view of LHC. The delivery time is unchanged, on the other hand.

For the movable table the market survey is on-going. Deadlines for tech. spec and contract issue are very tight.

Teddy showed a proto of the RF line, built for mechanical and thermal testing.

Nik from STFC is coming for a 2 weeks stay in the second half of October.

Open Actions:

	Reference person(s)
Cavity	
Clarify DQW trimming procedure	Raph, Marco, Carlo
RFD tuning interface (follow up)	Kurt
Frame(s) for BCP handling and cold testing	Tommi, Raph, Carlo
Update slides on material testing and provide EDMS report	Konrad
2K Magnetic Shield	
Integrate new screws	Raph
Fix the issue with few holes for extremities	Raph
Mounting sequence and follow up at CERN	Nik (STFC) + Raph, Carlo, Marco
Investigate permeability at 50 Hz for low fields	Konrad
Tank	
Pre-tuning system	Kurt, Raph, Joanna
Organize cutting of the proto	Paula
Tuner	
Pressure test of cryostat + insert (follow up)	Giovanna
Adjust design for SPS	Kurt, Joanna
Alternative tuning	
Design tool	Raph, Laurene
RF lines	
Mechanical test (follow up)	Teddy

Thermal Shield	
Redesign stiffeners	Nik (STFC)
Finalize thermalizations	Nik (STFC)
Follow up design and calculations	Teddy, Carlo, Fede
Warm Magnetic shield	
Detailed design and follow up	Nik (STFC) + Teddy
Calculations	Carlo
Vacuum vessel	
Finalize design	Teddy
Launch procurement	Marco
Stress assessment	Norbert, Carlo
Acquirement of alignment jacks from PSI and design of interface point	Teddy, Kurt, Joanna
Movable table	
Write spec and follow up procurement	Joanna, Kurt

This list doesn't include details of fabrication which are managed at the workshop (Marco).

Next meeting: Monday the 17th of July 2016 in room 376/1-020 **at 10:30**.

Minutes taken by Carlo