Minutes

EN/MME meeting for HL-LHC CRAB CAVITIES

Monday, the 28th July 2014

Room112/2-023

Scope: regular meeting for the HL-LHC CRAB CAVITIES (WP4) Project at EN/MME.

Attendees: Luis Alberty, Kurt Artoos, Ignacio Aviles-Santillana, Ofelia Capatina, Teddy Capelli, Federico Carra, Paula Freijedo-Menendez, Raphael Leuxe, Pierre Minginette, François Pillon, Thierry Renaglia, Silvia Verdú-Andrés.

General

François P. was invited to the meeting to present his experience from the SPL project regarding tools/interfaces for clean room assembly and cavity manipulation in SM18. A plant of the SM18 area is attached to this document. It was mentioned that a special flange design was developed to help cavity manipulation in the clean room (with a special shoulder for interfacing with tools). For the Crab cavities, interfaces in NbTi already exist. Rather than holding the cavity, tools will be holding the helium vessel, and will be designed in parallel. Raphael was asked to send to François the 3-D model of the cavities with the helium vessel, to be checked with respect to compatibility for chemical handling (Action->Raphael).

Pierre is developing with Kurt the design of a tuning system test bench for SM18. Pierre is designing the system (bellows, rods, etc) taking special care avoiding buckling. He mentioned that the top plate of the test cryostat will undergo several modifications. Kurt is asking offers for a coaxial actuation system, as well as, forecasting design/prototyping costs for the current year (budget code tbd – Action->Ofelia).

Teddy reported that he finished the activities related to the cryomodule service module (with 45º connectivity). He was contacted by Alick in view of defining the interfaces between the different cryomodules, and concluding about the implication of the different designs on the moving table dimensions. He informed that Alick is asking for the official 3-D model of the cryomodules.

Raphael was asked to check with Antoine Boucherie (BE-RF-PM) which parts were sent out for fabrication, if the design of the tuning flange for the FPC was taken into account (Action->Raphael).

Regarding the material for prototyping the HOM hooks at Cern, Ignacio informed that according to the main workshop, the existing design is not possible to manufacture, so he's waiting for feedback for getting more details on the material supply. Otherwise, the delivery delays for plate max. 4 mm thick is 6-8 weeks.

Regarding the supply of SS flanges for brazed assemblies, they are available on Cern stores: Paula will take care of ordering flanges for 3 cavities instead of 2. Ofelia asked which is the specified filling

ratio on the engineering specification. Luis answered that it shall be at least of 95%, without combination of other defects such as channels.

DQW

Raphael showed the specification drawing of the DQW cavity, in which the primary references are the axis of the beam tubes, and the secondary, the axis of the FPC port. Silvia mentioned that the shape accurary of the PoP cavity is about 5-6 mm. The effect on the performance/higher order modes is not yet known (to be measured). The general shape accuracy tolerance to be specified on the drawing is 1 mm.

Raphael contacted the metrology services at Cern, and it was concluded that the metrological control of the inner surface is very dependent on the position to be measured: close to the axis of the cavity, measurements seem possible, far from it, access is difficult – external references and thickness measurements would allow overcoming this limitation. Silvia will contact colleagues at BNL to get further details on the fabrication of the PoP cavity, as apparently, not all EBW are full penetration (Action->Silvia).

Quality control 1 of the DQWR specification drawing will be carried out by either Teddy or Thierry; control 2 is to be done by Ofelia.

Regarding the manufacturing strategies being discussed with Niowave, Luis informed that the company announced that, for the time being, X-ray inspection is not possible neither at Niowave nor at Sciaky. The requirement is not negotiable, and the company is finding a solution to overcome this limitation.

Silvia informed that the RF design of the FPC hook has been recently changed due to high sensitivity to mechanical tolerances. Federico will carry out the FE thermal analysis on the model as soon as released (Action->Silvia, Federico).

Thierry informed that a problem came out when Nb sputtering the DN40 flanges for the vertical test system – a new technique will be developed. Otherwise, the test setup with the coupler mechanism is available at the main workshop, there is only one part missing (waiting to be sputtered Nb). Two different hooks will be available: one sputtered the other on copper. Silvia mentioned that she still has the fixed hook that can also be tested. A meeting between Silvia and Alick will take place in the afternoon to discuss the test system.

A new HOM hook design was sent by Binping and Raphael is drawing it: it was remarked that the design is pretty different, the goal being to reduce the dissipated power on the hook. Raphael will also take care of developing the design of the dressed DQW cavity, as soon as Norbert comes back.

Teddy reported that he is working on the design of the supporting system for the DQW cavity, and that he recently added two threaded rods with the same thermal expansion of the supporting FPC system (to be checked by calculation).

RF-Dipole

It was mentioned that a collision was observed on the 3-D model of the dressed cavity at the level of the dummy beam pipe (Action->Luis: report to RFD team). New design of the HOM cable routing is

on-going: Luis was asked to send to Federico the dimensions of the extraction line for FE thermal calculations (Action->Luis).

Regarding a vertical test bench in SM18, Ofelia mentioned that the tuning range for the RFD cavities will be +/- 1 mm, which implies the use of a system different from BNL's design. Kurt informed that if a stepper motor is used, the system is not self-locking (is reversible). The question is: shall the motors be left loaded (current flowing through)? To be discussed (first tests will be done on BNL's system).

Minutes taken by Luis Alberty