Minutes

EN/MME meeting for HL-LHC CRAB CAVITIES

Monday, the 3rd March 2014

Room 112/4-B60

Regular meeting for the HL-LHC CRAB CAVITIES (WP4) project at EN/MME.

Attendees: Luis Alberty, Kurt Artoos, Rama Calaga, Ofelia Capatina, Federico Carra, Giuseppe Foffano, Norbert Kuder, Raphael Leuxe, Thierry Renaglia;

General

The minutes of the previous meeting were adopted without remarks.

Regarding the technical stay of our American colleagues (Thomas Nicol, Fermilab & HyeKyoung Park, JLAB), they will arrive next Monday, the 10th March. A meeting shall take place in the morning, a computer equipped with CATIA will be needed (**Action->Raphael**). HyeKyoung will be installed in Norbert's office, Tom will share office either with Thierry&Pep or Claudia Parente.

Luis has sent the specification for RRR=300 Nb to Rama for information, he (Luis) shall now ask Gonzalo/Ignacio Aviles-Santillana to release the document, in view of attaching it to the prototype cavities folder on EDMS.

Regarding the management of 3-D data, Raphael mentioned the need of discussing the SmarTeam structure of the project. It has been mentioned that the equipment code being used for the moment is LHCACFGA. From CDD, other codes have been identified as possible alternatives, which exclude: ACS_, ACSWG, ACSBO, ACSCA, ACSDM, ACSEQ (prefix: LHC).

BNL Cavity

Federico presented the latest results on the HOM calculations with temperature-dependent material properties (surface resistivity). Results show that with a high RRR Nb grade, if the boundary condition is set at 2K, the power losses to the helium bath are about 10mW. It has been asked to check this result for a boundary condition of 4K (results obtained after the meeting show a loss of about 35mW).

Norbert presented the latest results on the structural assessment of the double quarter-wave cavity. Some stress concentration effects have been observed between the pick-up and the helium vessel (titanium). He has been asked to release the contact between these two bodies and re-check results. The pressure (PS) shall be corrected to 1.8bar, as safety coefficients on relevant material properties shall be 1.5 (Luis)(**Action-> Norbert**). Norbert will be involved in the tuning system calculations; Kurt has received the 3-D models with deformed shapes from Raphael.

Raphael is looking at the assembly details for the DQW cavity, he will discuss welding details with Said Atieh (workshop welding expert) next Thursday. This is also going to be checked with Niowave.

Cryomodule BNL

A discussion focused on the HOM RF Cables was held last Friday and it was concluded that the cables are expected to carry 1kW @ 1GHz. Eric Montesinos will inform which coaxial cable is suitable for 1kW. The specifications of the cables taken into account for the first estimations are not suitable; the design of the HOM RF line of the existing LHC Cryomodule was shown and discussed (see figure 1).

It has been concluded that the LHC-type HOM connectivity is not the most suitable for the SPS Crab cryomodule (Ofelia). And since there is an interest of having a similar approach for LHC and SPS, a compromise has to be found. Thierry has been asked to carry out a preliminary integration study of such an approach (rigid cable with protuberance on vacuum vessel for extra path), in order to allow for first performance studies (**Action->Thierry**).

It has been advanced the possibility of asking the team developing the RF design of HOM hooks/filter to foresee horizontal instead of vertical RF connectivity. This solution has been adopted by the UK team for the 4-rod design (Ofelia). This is a point to be raised up next Thursday during our BNL/CERN DO phone meeting. Rama mentioned that we could envisage installing smaller cables for the SPS tests, which would be replaced by different cables for the LHC.

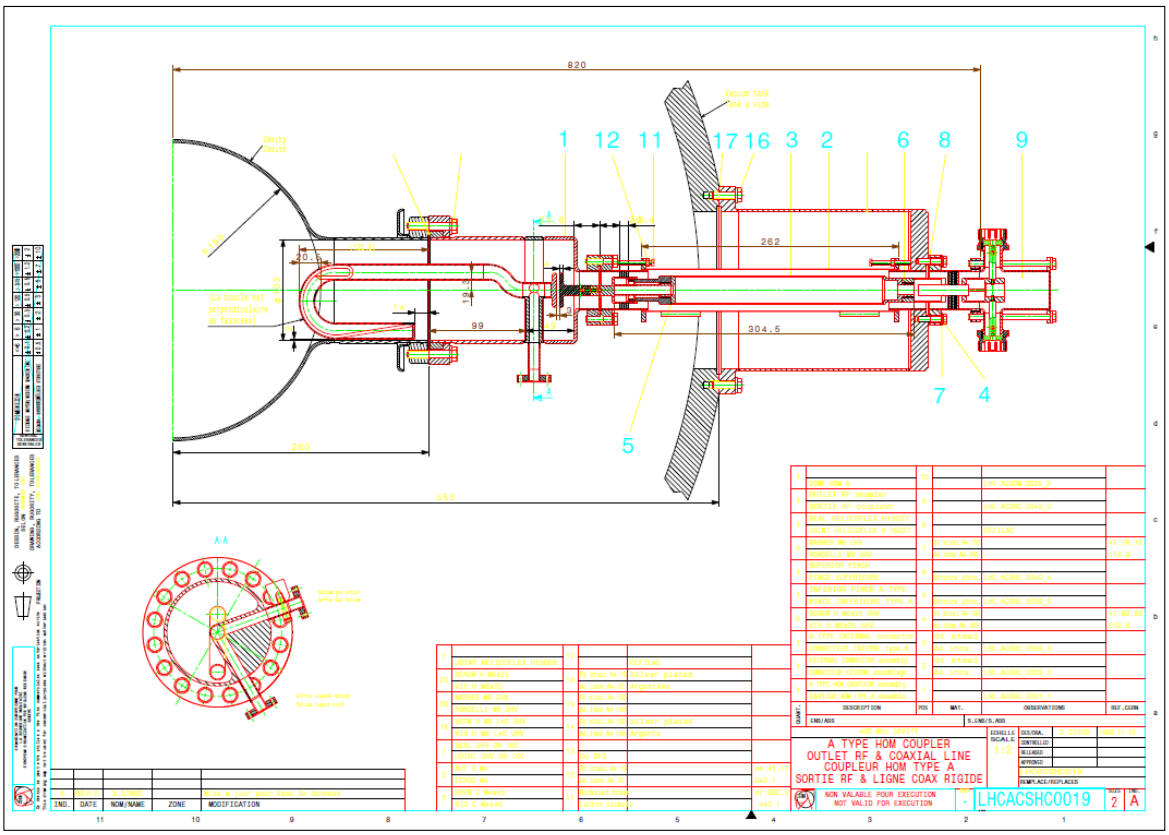

Figure 1 - LHC Cryomodule HOM RF Line

Still regarding the hom system, it has been said that it is not be possible to place the charge inside the cryomodule. The thermalisation of the hom hook and filter is a major concern, and it has been

said (Ofelia) that temperatures shall not be higher than 7-8K at the top of the filter, 2 K at the contact with the cavity.

Regarding the FPC, it has been asked if the losses on the hook are lower than 500W for the other two cavity designs. Thomas Jones will check the losses for the 4-Rod design.

Cryomodule LHC

Rama presented the possible layout of cavities for the LHC. The actual baseline is a SPS-like arrangement, with 2 cavities per cryomodule acting on the same beam line, in an alternative beam arrangement for the cryomodules.

RF Ancillaries/test equipment

It has been mentioned that Eric Montesinos approved the design of the test cryostat proposed by Thierry.

Minutes taken by Luis Alberty