

Minutes

EN/MME Meeting for HL-LHC CRAB CAVITIES

Monday, 8th December 2014

Room 376/1-020

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

Attendees: Kurt Artoos, Rama Calaga, Ofelia Capatina, Teddy Capelli, Norbert Kuder, Raphael Leuxe, Paula Freijedo Menendez, Carlo Zaroni

General

On December the 16th a meeting will be held in order to review the HOM design. The focus of the meeting is the RF performance, but also the mechanical/fabrication issues will be mentioned. The event is on indico as well. Alessandro Ratti will manage it and provide the agenda. An invitation will be sent once the meeting and the list of participants is defined (Action → Carlo).

Rama updated all the group on the TTC2014 held at KEK, Japan. The meeting touched topics of interest for the Crab Cavities as well, especially on R&D activities for the use of doped Nb and other challenging Cryomodules.

More can be found here: <http://lcdev.kek.jp/LCoffice/OfficeAdmin/TTC14/index.html>

Helium Tank

Norbert showed the FE simulations run on a more recent version of the He tank. The stresses obtained everywhere are acceptable. A new analysis will be performed trying to accurately model the welding areas (Action → Norbert). A dedicated analysis is also foreseen for optimizing the supporting rod positions (Action → Norbert, Carlo).

The manufacturing challenges have then been reported. Bending the Titanium plates is not feasible, therefore all the 6 sides have to be welded together. The welds determine a very high inaccuracy of the final shape with respect to the nominal one (magnitude ~mm), which may determine deformation and detuning of the cavity. Two designs are now under consideration. The baseline provides proper shaping of the region around the welds in order to localize the deformations. In order to assess this effect a test campaign is going to be

performed at the end of this week. The results will be circulated among all the group as soon as possible (Action → Paula).

Cavities

Ofelia highlights the need of updating the specification drawings if the He tank needs substantial modifications. In principle, the cavities design is finalized, however the issues with the helium tank may determine a further redesign of some features. After a short discussion it has been decided not to wait for test results and make the current geometry available to Niowave, so that they can keep working on the manufacturing procedure.

HOM

Carlo showed the comparison of 3 designs for the HOM: two with flexible parts (a bellow on the horizontal line or inside the vertical flange), one without. This last design is the baseline. The results show that the HOM hook-to-tube gap is reduced more in the case of the flexible designs under both pressure and thermal contraction. At the same time, the highest stress does not improve dramatically. It has been suggested to re-run the simulations in a less conservative and more realistic way (Action → Carlo). More specifically, pressure is not needed for evaluating the deformation, which is a critical parameter only during operation. Also, the highest stresses are in the flanges and as first order approximation they do not depend on the absence of flexible parts. The stresses in the remaining volume of the device should be then analysed for taking a decision.

Next meeting: Monday the 15th in room 376/1-020.

Minutes taken by Carlo.