

Minutes

EN/MME meeting for HL-LHC CRAB CAVITIES

Monday, the 24th March 2014

Room112/2-023

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.

General

A meeting took place at CERN last Friday with JLAB, ODU and the LARP collaboration coordinator. It has been decided that weekly meetings will take place with the external institutes up to the project review in May. A meeting with ODU will be tentatively occurring next Friday, BNL will follow.

Aiming the actuation of the tuning systems, It has been identified a mechanical solution (movement thread) allowing warm actuation with a pitch as low as 1 μ m. A meeting at the manufacturer's headquarters will take place next Wednesday. Pep mentioned that in the new ODU actuation system design would still be possible integrating a piezo actuator in series.

BNL Cavity

Raphael reported that he received a request from Silvia V.-A. Requesting for a 1.2mm offset (outwards) of the cavity volume (ideal volume @ cold). Raphael wasn't sure about the exact position of the cavity ports, and It has been said by Rama that they are most probably aligned at the middle of the flat surfaces.

No feedback has been given up to now by the BNL team concerning CERN's request to have the HOM filters with horizontal RF connectivity – Fig. 1. Raphael is also waiting from feedback regarding the suggested position of the HOM connectivity flange (changed to a lower position). The possibility of extending the HOM hook is considered less good, as the heat path becomes longer and peak temperature become higher.

The thermal calculations of the FPC being done by Federico will include a last check of the radiation losses to the cavity interior (configuration with a pulled out hook, losses reduced from 500 to 200W), with a maximum temperature of 140°C at the top of the hook, water cooling arriving at 50°C.

Due to high temperatures reached on the copper hook, it has been identified the risk of outgassing – this is to be assessed with the colleagues of the Vacuum Group.

Pep presented a new 3-D integration possibility of the coarse/fine actuation system for tuning the DQW cavity – Fig 2. Such solution allows coarse tuning the cavity at warm by a combination of push/pull screws, as fine tuning is done by two coaxial tubes, actuated from the top. The helium/vessel interfaces make use of bellows for allowing the relative movement of parts. According

to this solution, the cavity it's constrained against itself, no rigid connection exists between the cavity and the helium vessel at this level. The bellows shown are welded, but these will be replaced by hydroformed ones, since more reliable and still within an acceptable stiffness range. The final solution is to be assessed to pressure loads. Such solution will be integrated by Raphael and sent to Norbert to be checked by calculation.

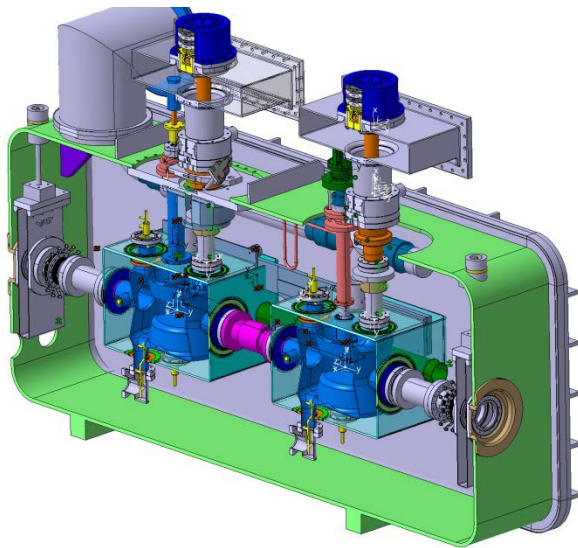


Fig. 1 – BNL Cryomodule assembly

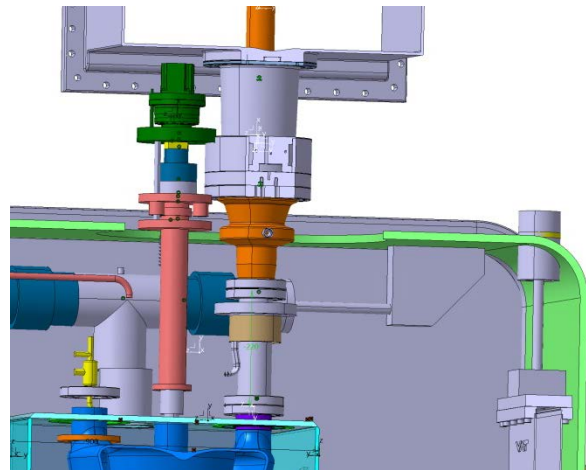


Fig. 2 – Detail of BNL tuning actuator

A new deformed shape of the inner conductor of the cavity will be prepared by Raphael according to Ofelia's directions, and send to Binping afterwards for calculation of tuning sensitivity.

ODU Cavity/cryomodule

Norbert presented the results of the latest structural assessment of the dressed cavities integration into the cryomodule (see attached files). Results show that the assembly kept together by the parallel bars and suspended by both the two FPC and a third support (on a roller, vertical force), is tilting significantly inside the cryostat. The existing solution is considered not yet acceptable. Despite the fact that no positioning is needed for the SPS Cryomodule (only monitoring), still is highly desirable to keep the positioning of the cavities within a 0.5mm range at cold. More effort will be put into finding a reasonable solution for overcoming this supporting issue.

HyekYoung (JLAB) is performing the RF/mechanical studies on the reinforced cavity; Thomas Nicol is working on the helium tank.

RF test ancillaries

Tests will be carried out with the fixed antenna configuration, 2 hooks will be niobium sputtered, and the order of new hooks in copper has been sent out.

Minutes taken by Luis Alberty