

(DRAFT) Minutes of the HiLumi Joint Session WP4-WP9-WP12-WP15

Friday, 30 Oct 2015

The joint session between WP4-Wp9-WP12-WP15 was aimed at discussing the latest developments and layout for the SPS tests of the crab cavities. The recent (Jun 2015) decision to place the crab cavities in LSS6 was stated with the general organization of the WP4 for task distribution.

The recent issues with cavity fabrication in the US was mentioned with a parallel production line launched at CERN to rapidly produce two cavities. In this new plan, the CM assembly will be postponed to accommodate the cavity production. Nov 2017 is foreseen for the final CM assembly with only 1 month of SM18 qualification which is very tight for SM18 qualification.

The integration of the VTA for both bare cavity and dressed cavity tests with a minimum of 2 cavities should be integrated in the SM18 planning, including the clean room assembly. TE-VSC should be consulted for the cavity treatment and the γ -chamber treatment to be included in their planning. The he-vessel assembly is also performed at CERN with the cold magnetic shields manufactured in the UK and sent to CERN. A request on magnetic field monitoring was noted, but the exact integration inside the CM should be justified by BE-RF and assess the additional complexity with EN-MME. A minimum monitoring of the B-field on the he-vessel should be foreseen. A request on the basic dimensions near the CM during the upcoming visit was made to advance on the CM. This will be done manually and be replaced by the laser scan after YETS.

At present, there is no pressure safety valve foreseen between the two cavities inside the CM. Only two valves with the string assembly which will be accessible outside is in place. A rupture disk between the two valves or just outside should be considered in case of over pressure. After the CM review, safety should also give feedback on the CM design layout and safety valves. At present no electron stopper in the HL-LHC or in the SPS is foreseen.

In the new cryo proposal, LN2 is not required, however the availability will help enhance the capacity. A difference of 118 vs. 143 l/hr was mentioned for the option between the cold box on surface vs cold box in the tunnel with only horizontal piping. A question regarding the 50-80k consumption was referred to K.Brodzinski for a response. It was mentioned that that cryo capacity during cavity conditioning can be very high. A possible mitigation would be condition one cavity at a time or in pulsed mode to limit the consumption. The cold box height is mentioned to be 2.6 m with an additional 1m required above it for maintenance. The size of the BA6 lift is about 1.9x2.7m (TBC) and a possible issue in bringing the cold box down. The transfer line diameter is assumed to be 400 mm. The option with the cold box in the tunnel would automatically make it impossible to double the capacity with LN2 is needed. With the new solution of active filling of the

buffer tank, the 8-10 hrs of the MD time is no longer a constraint. Cryo should confirm on how long the conditions can be met at maximum capacity. The testing of the cryo distribution in SM18 would require that the service module installation is performed along with the CM in the YETS of 2017-18. The distribution box interface definition for SM18 should also be performed soon with cryo in view of the tight schedule. ECR for the 2K pumps to be moved from BA4 to BA6 (?)

The cooling of the FPC outer conductor was discussed. A heater is foreseen on the FPC flange to maintain the proper temperature and avoid icing. Some comments on the infrastructure on surface were mentioned along with false floor reinforcement to be followed up by G. Vandoni.

The vacuum sectorization near the LSS6 region was detailed between the QDA and the MST where the crab can be placed. The existing valves and measurement gauges were outlined along with the new scheme with a 4-valves inside the y-chamber (in addition to the CM valves) to sectorize they-chamber region for module swapping. The beam pipe near the MST is graphite and very sensitive to air which should be minimized. The function of the fast valve after the QDA was not known. The beam conditions for the vacuum levels should be clarified as the pressure rise with 2x72 bunches is not negligible. The section immediately after the CM and the entire y-chamber is NEG coated. However, the saturation effect of the pumping speed was mentioned as a possible limitation. Four supports at the 4-valves on to the movable table are foreseen to ensure the stability of the structure during movement.

A question on the BPM near the cavities was raised. At present there is no space foreseen for an additional BPM but the space between the cavities or just after the CM could potentially be used. Integration should consider the option to make sure there is sufficient space for an LHC type BPM nearby. For the LHC, the SEY for Nb should be properly taken into account for the simulations for e-cloud. A staggered proposal for the double-valve in the LHC is considered as a baseline.

The space reservations and the ECR will be followed by G. Vandoni after the Nov 2015 and YETS visit.

Action Items:

1. BE-RF to come up with a proposal for B-field monitoring and feedthroughs inside the he-vessel.
2. G. Vandoni will clarify the need of electron stopper for the SPS and the space reservation + ECRs jointly with Integration
3. Discuss with cryo on surface option - check the lift size compatibility
4. Length of 2K running with the new cold box at max capacity