Minutes of the 84th WP2 Meeting held on 31/01/2017


General information (G. Arduini)

After Chamonix the CMAC gave feedback supporting various activities: investigations of margins, e-cloud mitigation strategies (e.g. surface treating), understanding of the difference between sectors, MDs. Gianluigi thanks all people who contributed to Chamonix highlighting the quality of the work presented there.

A new series of meetings organized by Lucio, the “Project Steering Meeting (PSM)”, focuses on the state and plan of each WP and will take place on Thursday afternoons. The agenda will be published soon.

Other foreseen meetings are the review of crab cavity at CERN (April 3rd, 4th and 5th) and the US-LARP meeting at Berkeley (April 24th) with focus on e-cloud, field quality... Massimo comments that an additional topic for the US-LARP concerns the impact of the measured frequency of the triplet on DA, for which there is an ongoing discussion between Massimo and Ezio.

Update on the new design of the CMS vacuum chamber – aperture considerations (M. Giovannozzi)

New updates of the vacuum chamber in CMS are foreseen in LS2 (conical shape up to 14 m from the IP, removing the double-conic shape) and for HL-LHC. A previous intervention has occurred during LS1 (reduction of the radius in the vicinity of the IP). The tolerances in the central part have been relaxed and they include factors such as the movement of the cavern.

The most critical area is CT2, but no aperture issues have been identified neither at injection, nor at collision. For the HL-LHC additional aperture has been negotiated around the CT2 section. All the plots consider the 15 cm beta* scenario: the most critical one.

The only place that still needs a review is the TAS, everywhere else the layout is final and can be considered for formal approval by the official bodies.

Gianluigi points out the need to use the nominal beam emittance (2.5 μm) keeping it consistent among all the studies. Massimo replies that the old emittance (3.5 μm) was used to remain coherent with the report published in 2014 and it does not impact on the conclusions. **Action: Massimo to produce a revised version of the report containing the update of the emittance.**

Massimo reassures on the feasibility of Van der Meer scan with 30 m optics.

Update on the new design of the CMS vacuum chamber – impedance considerations (B. Salvant)

New drawings have been recently made available and a TREX report is foreseen soon.
The conversion from the double-conic shape to a smoother single-conic shape, has a beneficial effect on the impedance. The material has been changed from stainless steel to aluminium with NEG coating. The better conductivity of aluminium increases the impedance of some longitudinal modes, but thanks to the better shape of the chamber, all of them are now outside the bunch spectrum which is limited at around 1.2 GHz. The transverse modes are similarly shifted to higher frequencies, but also reduced in strength. For the time being, the NEG coating of the chamber has been neglected as these thin and bad conducting layers cannot be easily included in eigenmode simulations. It is nevertheless expected that the shunt impedance should slightly decrease with such coatings, therefore there will be even less impact on the beam.

It is not clear why the double-conic shape was required and if the chamber can be made even smoother by reducing the opening of the cone. **Action: Massimo and Benoit to check with experiments.**

The temperature of the chamber has been monitored and the current design is already acceptable. The new one looks even better, but one needs to consider the VAX region where they are planning for two new bellows in addition to the two existing ones. These are not shielded due to space limitations. Gianluigi asks whether the new RF finger could be considered. **Action: Benoit to verify with V. Baglin and F. Galan.**

*Reported by Dario, Gianluigi, Riccardo and Rogelio.*