HL-LHC Collimators:
Design, Engineering and Prototyping #22
Minutes

Thursday, 7th April 2018

376-1-020

Attendees: A. Bertarelli (AB), G. Bregliozzi (GB), F. Carra (FC), C. Bahamonde Castro (CBC), E. Berthome (EB), L. Gentini (LG), I. Lamas Garcia (ILG), E. Rigutto (ER), J-P. Corso (JPC), G. Cattenoz (GC), S. Pelletier (SP), E. Page (EP), J-F. Fuchs (JFF), C. Boccard (CB), F. Vignot (FV), O. Aberle (OA), M. Pasquali (MP).

AGENDA:

- Approval of minutes from previous meeting and review of action list;
- Installation/maintenance/dismantling strategy for the new passive absorbers in IR7;
- Estimation of the manufacturing costs and times for the new absorbers design;
- Blind mate plugins for the BPMs cables of IR7 collimators;
- AOB.

1) *Approval of minutes from previous meeting and review of action list*

Minutes checked and approved.

2) *Installation/maintenance/dismantling strategy for the new passive absorbers in IR7*

EB shows the up-to-date design for passive absorbers, which was also presented at the last ITHACA workgroup meeting. With respect to such design, several different modifications are advised (**action E. Berthome**):

- ILG suggests to add a control mechanism to check and possibly adjust the roll position of the absorber about the beam axis;
- CBC suggests that, if possible, the absorbers should be as close as possible to the magnets to improve their shielding capabilities: it is therefore decided to relocate the absorbers at a distance of 400 mm from the magnets;
- EP suggests to remove the supports of beam chambers, which are fixed to the ground in the current design, and to substitute them with two brackets directly attached to the central section of the absorber, one fixed and one allowing the sliding of the chamber. EP will contact the metrology to check that the cambers will have the necessary rectitude values;
- JFF suggests also to redesign the absorbers supporting structure in one part only, so as to be able to use the standard LHC jacks;

AB states that with the beam chamber being directly connected to the absorber via the suggested brackets, there is the possibility for the beam not to be perfectly aligned with the chamber axis, this possibly resulting is additional losses. According to CBC however, such losses are negligible with respect to those coming from the collimation system located upstream of the absorbers, which is by far the major source of losses.

The installation, foreseen to take place at the end of 2019, will see the alignment of the chambers with respect to the absorbers performed on surface, the transport of the assembly in the tunnel and there, finally, the alignment of the absorber resorting to the standard LHC jacks. SP agreed with the proposal.

3) *Estimation of the manufacturing costs and times for the new absorbers design;*

ER states that the estimated cost for the actual design is 80 kCHF for both the absorbers, against the 40 kCHF foreseen for the original design. The drawings are expected to be delivered by the end of June of this year (**action E. Berthome**), with the completion of the manufacturing process would be December 2018. In light of the new installation, alignment and transport philosophy, AB invited EB and LG to see whether it is possible to implement quick modifications to the design with the goal of decreasing the final price.

4) *Blind mate plugins for the BPMs c cables of IR7 collimators;*

CB says that the blind mate plugins are needed for a fast and remote connection/disconnection of collimators in IR7. The first development was done with Staubli in 2012: 2 prototypes have been installed in IR7 in 2017. Staubli developed concept was not really satisfactory because of (i) the electrical impedance mismatch due to the use of PE HD insulation in contacts, (ii) the massive steel parts foreseen, (iii) the possibility to include only 4 coaxial connectors. A new DO was therefore launched in 2017 to develop a plugin with six or more coaxial inserts to be located in central position on the collimator support. The development of prototypes was completed by Fischer, which proposed a design with nine exchangeable coaxial inserts. The plugin concept developed by Fischer must be integrated in collimators for LS2: position and installation procedure are to be decided (**action L. Gentini**);

AOB:

- ILG states that the new BPMs in titanium have been ordered: the previous version in stainless steel will be used on less loaded collimators as TCLDAs.
- The TCLDA has passed the leak test; an outgassing test was also performed considering a 150°C bakeout temperature, with positive results. An additional test with the standard bakeout temperature of 250°C is also taking place.

ACTIONS

- Implement the suggested modification for the absorbers design (**action E. Berthome**);
- Complete the drawings of the absorber by July 2018 (**action E. Berthome**);
- Integrate the plugin concept developed by Fischer in collimators for LS2 (**action L. Gentini**);