

## Message to Chairpersons of LEMIC and LCC from Ad-hoc Working Group on LHC Experiment-Machine Parameter and Signal Exchange

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Dear Keith and Steve,

At a meeting of the Ad-hoc Working Group on the LHC Machine-Experiment Parameter and Signal Exchange, held on Monday, 21 October, the issue concerning the beam screens in the inner triplets and the resulting impact on the plane of the LHC crossing angle was discussed.

The potential consequences at the nominal LHC luminosity ( $10^{34} \text{ cm}^{-2} \text{ s}^{-1}$ ) of the choice of the 'racetrack' beam screen were deemed unacceptable to the ATLAS and CMS representatives, Nick Ellis and Wesley Smith, respectively. The reduced safety margin of the energy deposition in the magnet coils of the inner triplets, from particles produced in the pp collisions at the IP, may lead to a limitation in the machine performance. Such a limitation may manifest itself in a difference of luminosity between ATLAS and CMS, with a resulting impact on the respective physics programmes due to the relative reduction of luminosity for one experiment compared to the other. The safety margin can be improved by increasing the  $\beta^*$  and decreasing the crossing angle at the more problematic IP. W. Herr stated that this can be done within a certain range of differences in  $\beta^*$  for IP1 and IP5 without losing the compensation of long-range effects. Alternatively, increasing the  $\beta^*$  at both IPs would be a possibility, but with the caveat that both experiments would need to be convinced to do so.

It is assumed that at luminosities much below nominal, the safety margin is sufficiently large so that the above limitations are not applicable.

It should be noted that the current simulations of this energy deposition have significant uncertainties and that further calculations are necessary before the results can be confirmed.

Moreover, representatives from all the experiments would like the detailed schedule of installing the 'marguerite' beam screens to be presented in the case that it is necessary to install them as an upgrade. Should it require a lengthy LHC shutdown, much beyond the normal shutdown periods, then such a stop and the corresponding loss of physics time is unacceptable to all the experiments.

In view of the above, the Ad-hoc Working Group would like to recommend that evaluation of the 'marguerite' option continues at a high priority in parallel to the development of the 'racetrack' design. Seeking manufacturers outside Europe and alternative pumping schemes, such as vacuum pumps, should be encouraged. Efforts should continue to be made so that the 'marguerite' scheme can be ready for the beam screen scheduled installation date. In such a scenario, the 'marguerite' screen would be put into the LHC machine at the outset instead of as a later upgrade.

It should not be underestimated that ATLAS and CMS require high luminosities and very reliable operation so that a sufficient number of rare events are recorded to establish a discovery.

Best regards,

Emmanuel