Minutes of the 129th WP2 Meeting held on 4/9/2018

Participants: X. Buffat, J-P. Burnet, E. Maclean, R. De Maria, M. Giovannozzi, S. Kostoglou, G. Iadarola, N. Mounet, A. Oeftiger, E. Metral, A. Oeftiger, S. Papadopoulo, J. Jowett, F. Plassard, S. Kostogolou, N. Karastathis, F. Plassard, K. Skoufaris, B. Salvant, Y. Papaphilippou

AGENDA:

1 GENERAL INFORMATION (R. TOMAS)

Minutes of the previous meetings will be discussed at the next meeting.

2 STABILITY IN AN IP-STAGED COLLISION PROCESS (X. BUFFAT)

Xavier presented the difference in stability between combined and staged collapse processes.

Collapsing first IP1 followed by IP5 would improve the beam stability w.r.t. the usual simultaneous collapse. The gain in the required telescopic index to stabilize the beam goes from 2.3 to 1.7 for the case with the nominal collimator upgrade and 570 A and Nominal BCMS scenarios. For the ultimate parameters and only the LS2 collimation upgrade the gain is from 2.9 to 2.2. In case of no collimation upgrades the gain is from 3.9 to 3.0.

Impedance is slightly larger in the vertical plane, therefore it is preferred to start the collapsing process at the IP with horizontal separation.

DA simulations should be performed with the newly proposed telescopic indexes as there were issues with DA at start of collision with index of 3.3. **Riccardo** will provide the optics and **Nikos** will perform the DA simulations. Action: Riccardo and Nikos.

3 STATUS OF THE STUDIES ON 50 HZ MULTIPLE NOISE AND IMPLICATIONS FOR HL-LHC (S. KOSTOGLOU)

Sofia presented an overview of the observations, tests with active filters and first simulations.

The observations suggest that the beam oscillates with these 50 Hz harmonics as different instruments in different locations see them plus phase differences are compatible with the betatron phase. The frequency of the lines are independent of tunes, therefore the excitation source is dipolar. BBQ and ObsBOX are compatible with a noise source at 7 kHz. The pattern of the harmonics suggests that source is the Silicon C Rectifiers of the power converters. The lines have slow frequency modulations which is compatible with main 50 Hz modulation from the DCCT devices. **J-P. Burnet** clarified that the measurement device comes with its own 50 Hz perturbation and it is filtered out from the DCCT, therefore they cannot measure precisely the 50 Hz perturbations in the magnet.

The experiment of switching on and off active filters showed effects on the 600 Hz lines and multiples as expected from the hardware. The changes of the 600 Hz and 1200 Hz modulation amplitudes are not correlated. Further studies can be carried out on existing data or new experiments. **J-P. Burnet** added that at injection the noise should be the highest. Sofia stressed that there is no visible change in the BBQ harmonics during the ramp. **J-P. Burnet** will install an acquisition system on the analog part of the DCCT during next technical stop, TS2.

First simulations show that the 3-4 kHz and 6-8 kHz lines have an impact on lifetime on the 100 hour time scale. Emittance growth is not visible. Lifetime is most sensitive to the 3.4 kHz frequency and an amplitude below 0.0015 σ should be ensured. **X. Buffat** observed that for spectral lines within the bunch tune footprint the response would require multiparticle simulations to find the relation between excitation and measured response. **J-P. Burnet** clarified that the active filter was designed for the QPS system. The active filter reduces the 600 Hz from 1% to 0.1%. The bandwidth is 5 kHz which is consistent with seeing largest oscillation amplitudes at 7 kHz.

Parasitic and End Of Fill studies will be pursued after TS2 in particular using the new measurement device. Dedicated tests in MD4 are requested.