ACTIONS FOR THE RLIUP WORKSHOP AND HL-LHC WP2

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- **RLIUP => Comments to be given on several scenarios considered: http://emetral.web.cern.ch/emetral/ICEsection/2013/2013-10-02/RLIUP_LHC_scenarios.pptx**

- **HL-LHC WP2 (16th meeting, 13/09/2013) => https://indico.cern.ch/getFile.py/access?resId=minutes&materialId=minutes&confId=270585**

RLIUP (1/3)

	$N_{b\ inj}$ [10^{11}]	ε^*_{inj} [μm]	$N_{b\ coll}$ [10^{11}]	ε^*_{coll} [μm]	B-B Sep [σ]	Min β* (xing/sep) [cm]	Xing angle [μrad]	L_{peak} [10^{34} $cm^{-2}s^{-1}$]	L_{lev} [10^{34} $cm^{-2}s^{-1}$]	τ_{lumi} [h]	Lev. time [h]	Machine eff. 6 h fills [%]	Machine eff. opt. fill length [%]	Opt. Fill length [h]	Avg. Peak-pile-up density [ev./mm]	Target int. Lumi [fb^{-1}/year]
PIC	1.3	1.28	1.24	1.54[1)]	12	40/20	285	3.6	-	5.8	-	33.9	33.6	5.1	1.24	70
PIC	1.3	1.65	1.24	1.98[2)]	12	40/20	323	3.1		8.1		35.0	35.0	6.1	0.97	70
US1	1.45	1.37	1.38	1.8[2)]	10[4)]	40/10	256	6.2	5.1	5.6	1.1	49.6	49.3	5.1	1.53	170
US1	2.0	2.18	1.9	2.62[1)]	10[4)]	40/10	320	7.4	4.6	8	3.7	41.8	41.4	7.2	1.45	170
US1	2.0	2.18	1.9	2.62[1)]	10[4)]	40/20	310	5.4	4.6	8	1.2	49.4	49.4	6.2	1.45	170
US2	2.32	2.08	2.2	2.5[2)]	12	15/15	590[3)]	20	5.1	8.2	11.2	57.3	47.3	13.0	1.16	270
US2	2.32	2.08	2.2	2.5[1)]	10[4)]	30/7.5	420	19	5.1	8.2	10.7	57.3	48.0	12.6	<1.24[5)]	270

- **PIC** => Experiments compatible with 140 PU-events crossing
- **US1** => PIC + BBLR in 1 and 5 + needs for 40 / 10 optics
- **US2** => US1 + Crab cavities + 800 MHz? + e- lens?

RLIUP (2/3)

- **Transverse beam stability and heating**
  - Are the above schemes compatible with transverse stability taking into account the collimator settings (assuming present jaw materials) presented by Roderik at the WP2 meeting on 13/9?
  - At which stage do we need to have Molybdenum-Graphite jaws with Molybdenum coating for impedance reduction?
  - Is the octupole strength sufficient for all cases up to 7 TeV?
  - When heating is becoming an issue for the present hardware?
- **Beam-beam**
  - Is there any scheme among those proposed for BCMS (see next slide) that could pose problems for beam-beam effects?
  - What is the required beam-beam separation for flat optics and no BBLR? What is the dependence on intensity?
  - BBLR position vs emittance, flat beam crossing angle with BBLR. Is it compatible with collimation?

RLIUP (3/3)

- **Filling patterns with BCMS and max of 5 PS train per SPS extraction => Any proposal or other suggestion?**

	$K_{B1/B2}$	$k_{IP1/IP5}$	k_{IP2}	k_{IP8}
Filling 1	2508	2508	2108	2204
Filling 2	2508	2472	2087	2240
Filling 3	2508	2428	2061	2284
Filling 4	2508	2384	2035	2328
Filling 5	2652	2652	1839	1859

- Abort Gap Keeper at 276 bunches
- Max. 5 PS train/SPS extraction (=240 bunches)
- No isolated bunches to ATLAS and CMS
- 12 bunches intermediate injection
- Over injection over pilot

- **E-cloud effects**
  - **What are the heat loads that we can expect after scrubbing for the considered scenarios? And during scrubbing?**
  - **What is the required SEY to achieve in the triplets to avoid electron cloud build-up?**
  - **What are the electron cloud effects that we can expect after scrubbing during the various phases?**
  - **Countermeasures?**

HL-LHC WP2 (1/2)

- BS to contact ElenaS and StephaneF to get estimates of the parameters that they are considering for the scaling of the beam-induced RF heating for HL-LHC
- GR should try and include, in his presentation on the heat load on the triplets beam screens due to electron cloud, the effect of the simultaneous presence of the 2 beams
- EM to discuss with the equipment teams about the possibility of testing with measurements and simulations the cooling effectiveness
- EM to provide estimates including the trapped mode analysis for the new TDI (being refurbished during LS1 and new design should be foreseen for after LS2)
- EM to ask for more accurate analysis of heat management (cooling effectiveness)
- Impedance team to analyze the MKI temperature data collected in 2012

HL-LHC WP2 (2/2)

- EM to transmit the information concerning the heat load on the striplines for the HL-LHC triplet
- Impedance team to check the new design of the BSRT (which should reduce the RF heating) for the HL-LHC parameters
- Impedance team to create a table with the expected heat loads for all the LHC components for which the impedance is known assuming the HL-LHC nominal beam parameters
- Impedance team to estimate the RF heating for the various upgrade scenarios (RLIUP), highlighting the need of possible interventions on some of the hardware components