

- Aim of the discussions
 - To converge on a proposal for the powering of the IR magnets. Such a proposal should be presented at a HL-LHC TC meeting. It has been agreed to have a presentation in some weeks to review the current status of these studies, announcing that a final decision should be taken by the end of the year 2015. The proposal is to aim at the TC on 19/4.
- It is very likely that all new power converters will have to be of class 1, but this be checked with beam dynamics simulations.
- Triplets
 - A baseline powering scheme exists.
 - Studies have been carried out to check the possibility of improving the baseline powering scheme. Two alternative schemes have been proposed.
 - Aspects to be considered to rate the alternatives:
 - Power converter performance
 - Cables
 - Magnets' protection
 - Impact on beam dynamics and optics/tune measurement (ripple)
 - Impact on operational efficiency (squeeze and ramp down time)
 - Cost
 - Magnets' protection will require the results of the tests of the triplet magnet short model (end of the year), while the other aspects can be analysed already now.
 - Ripple: tolerances on the most dangerous ripple frequencies should be worked out based on beam dynamics simulations and there is good hope that it will be possible to cancel the ripple effects completely thanks to improvements in the power converter.
 - Ramp down time should be assessed for both alternative powering circuits.
- IR quadrupoles
 - The analysis of the pre-squeeze and squeeze sequences for HLLHCV1.0 has been performed. All matched optics have been used for the evaluation of the pre-squeeze and squeeze times. No smoothing algorithm has been applied to reach the matched optics with zero current derivative. This implies that the time estimates are no correct in absolute terms, but are nevertheless relevant for optimisation purposes.
 - Better performance than that provided by 1Q power converters is needed to ensure a reasonably short pre-squeeze and squeeze. 1Q power converters with one or two diodes seem an appealing option.
 - The solution with 1Q power converters with one or two diodes can be tested now! This might have an interesting positive impact on LHC performance. It would be interesting to evaluate the gain in squeeze time for the nominal machine thanks to such an improvement.
 - The impact of ripple on Q4 should be assessed with beam dynamics simulations.
 - The ramp down time is not expected to be an issue for these magnets.
- Separation dipoles
 - Potential issues related with ripple effects should be considered in beam dynamics simulations.
 - The ramp down time is not expected to be an issue for these magnets.
- Ramp down
 - Tests of improved ramp down times are on going or planned during the LHC

hardware commissioning.

- Tests of reduced ramp down times for triplets will be performed in the coming days. It is worth stressing that the current triplets in IR2/8 will be operational also in the HL-LHC era.
- MQs have been already shown to be capable of a much faster ramp down time than during Run I. Nonetheless, the ramp down time is anticipated to be around 28 min, with respect to 20 min for the dipoles. It has been mentioned that in the first part the current decreases in a controlled manner, while the second part it is in free fall. Due to this, it is not clear if further reduction on the ramp-down times are still possible and therefore to be taken account when comparing them with the ramp-down times of the HL triplets. Clearly, as already shown, a timely analysis would also be beneficial for LHC performance.