LHC IR Upgrades Workshop, October 2005
Questions for Working Group 3

1. What are the crossing angle choices: early stage: 0.3 mrad, final stage: 8 mrad? What are the required kick voltages?
2. What are the crab development/implementation time scales?
3. Choice of rf frequency, 400 MHz or 1200 MHz
4. How much free space is there near the interaction region for installing crab cavities?
5. Estimate total length of cavity system, assuming filling factor 0.5?
6. Single cells or multi-cells (number of cells?)
7. How much polarization split needed for the TM110 deflecting mode?
8. Factors influencing choice of aperture (reduced by presence of coupler for TM010 mode)
9. Optimum geometry for crab cells, choice of safe max surface fields
10. Input power coupling requirements, Q_{ext}, power handling.
11. To avoid deflecting the bunch, so as to keep beams in collision, the phase of the cavities must be highly stable; how much is tolerable?
12. How much phase jitter is tolerable to avoid beam-beam performance degradation?H
13. How to control phase jitter in crab cavity?
14. What is the tolerance on crab kick amplitude?
15. How much is the phase jitter due to the accelerating cavity, how much is tolerable?
16. What bunch length, bunch charge, average current, bunch spacing to use for design of HOM damping? (Given several different luminosity upgrade scenarios for LHC)
17. Estimate damping needed to avoid multi-bunch instability, given bunch spacing (e.g. 25 ns?)
18. Estimate growth rate of coupled bunch instabilities caused by HOMs
19. Compare to acceptable instability growth rate from accelerating LHC cavities.

20. Tuning range for tuner

21. Microphonics tolerance due to LOM coupler

22. What are the optics constraints at the cavities ?

23. What experiments at existing hadron colliders are feasible that would test predictions about the impact of cavity errors ?