

LHC IR Upgrades Workshop, October 2005

Questions for Working Group 1

Optics

1. What is the largest coil aperture required ($\beta^*=0.25\text{m}$) for each optics layout ?
2. How does the luminosity scale with L^* for a fixed magnet aperture (for quads first and dipoles first, assuming Nb3Sn technology)
3. Limits on chromaticity, b_6 and b_{10} at collision. What are the upper limits beyond which they cannot be corrected by nonlinear correctors?
4. What are the field quality requirements at injection ? How does it differ for the different scenarios: quad first, dipole first
5. What is the impact of beam-beam compensation wires on the IR optics ? beam size at IP, beam offsets, nonlinear fields?
6. What is the length required for crab cavities and where should they be placed? Constraints on optics functions at the crab cavities.

Energy Deposition

1. Estimated dipole field with TAS in quad first option to reduce peak energy deposition well below quench limits, Estimated thickness of internal absorbers?. Choose $L^* = 19\text{m}$.
2. Scaling laws for energy deposition. What are the limits of validity and how can they be improved? Variation with L^* ?
3. Impact of orbit corrector D0 inside the experiment on energy deposition in downstream magnets

Magnets

1. What is the limit on quad aperture from magnet design at constant pole tip field? is the aperture limit different for NbTi and Nb3Sn ?
2. Is there a quad design with either an absorber or low Z spacers in the horizontal and vertical planes ? to minimize energy deposition.
3. Are there lower limits to the systematic errors on b_6 and b_{10} with Nb3Sn ? How does this scale with the pole tip field and aperture ?
4. If 90mm quads with 11-12 T field are demonstrated by 2009, how much confidence is there that larger aperture quads can be built with the same pole tip field?