

Simulation priorities for 2015

R. Bruce for task 5.2

Cleaning performance

- **Validate cleaning in different HL-LHC optics configurations**
 - Pre-squeeze (done – M. Serluca, Merlin)
 - Possibly study all points in squeeze – Merlin?
 - HL-LHC v1.1
 - Flat beams
 - $\beta^*=10\text{cm}$
 - Compare different collimator settings
- **New materials**
 - Cleaning performance with low-impedance TCSGs. Some work started (E. Quaranta)
 - Cleaning performance with more robust TCTs

TCTs in IR1/5 (1)

- **Re-check baseline TCT settings and protected aperture**
 - **What is minimum setting allowed for cleaning?**
 - Simulations ongoing (H. Garcia): Cleaning simulations with scan of TCT setting. Get TCT inefficiency vs setting
 - Possibly need input from experiments on tolerable background
 - **What is minimum allowed setting for machine protection?**
 - Needed simulations: Asynchronous dump simulation with scan in TCT setting for TCT4 and TCT5
 - To estimate setting, include real damage limit of TCT (study W and MoGr) --> Need result of TCT damage limit study
 - Investigate potential gain with improved phase advance MKD->TCT

TCTs in IR1/5 (2)

- **Can we remove TCT4 if TCT5 is installed?**
 - Verify cleaning and machine protection in different optics configurations.
 - Can we think of a configuration where TCT5 cannot protect the triplet well and the triplet aperture is critical?

Outgoing beam from experiments

- **Protons: Check physics debris with TCLDs** installed at locations suitable for ion operation
 - Can we open TCL6 if TCLD installed?
 - Synergy with task 5.3. Should we do this with SixTrack and/or FLUKA?
- **Heavy ions: Track collision products in IR1/5** to provide starting conditions for FLUKA
 - With TCLD in proposed location: done (M. Schaumann)
 - Still missing: starting conditions on beam screen of impacted magnet without TCLDs
 - Optional: Provide starting conditions to FLUKA with orbit bump alleviation to quantify gain factor. Also for IR2

Experimental backgrounds

- **Finish study of background in 2012 machine**
 - Motivation: Study configuration with well-known machine conditions to learn and compare with 2011 study
 - Simulations: Beam-halo, beam gas (local, global), cross-talk (R. Kwee)
- **Study gain in background with TCT5**
 - Tracking simulations with and without TCT5 provide starting conditions to FLUKA for IR shower simulation (started: R. Kwee)
- **Study beam-halo background in different optics configurations**
 - So far done only for round optics 15cm
 - Synergy with validation of cleaning
 - Provide inputs for FLUKA
- **Beam-halo background with lighter TCTs**
 - Synergy with tracking for cleaning validation

Advanced concepts

- **Hollow e-lens**

- PhD student at CERN planned to start in 2015 using SixTrack
- MERLIN studies planned at Huddersfield (H. Rafique)

- **Crystals**

- PhD student at CERN planned to continue work of Daniele Mirarchi