

WRAPPING UP: DISCUSSION SUMMARY

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2011 PARAMETERS AND LHC BEAM OPERATION PLANS – JOERG WENNINGER

Steve Myers expressed his surprise regarding the number of remaining 2011 Physics days (125 days for a total time of 260 days) and asked that this is again reviewed. Jörg Wenninger added that all special demands implying a re-set up of the LHC –and injectors- will take time and will even cut more into the Physics days.

Concerning the 2011 ion run, if a normalisation run corresponding to 4 TeV is performed, it was proposed that another one is done at the same time for the 2013 energy – so setting up for two special energies, but only once and for all.

Werner Herr clarified that keeping alternating crossing scheme in IP1 and 5 is highly important in order to compensate for long range beam-beam effects. This is less important for the other IPs.

Jörg Wenninger said that the criteria for the large increase of bunch number needs further discussion. 3 weeks in total have been accounted for the increase of number of bunches.

Massimiliano Ferro-Luzzi proposed to start with 150 ns bunch spacing –w.r.t. to the proposed 75 ns- to restore the 2010 conditions. Jörg Wenninger said that every time the beam parameters are changed, it is reflecting in the time it takes to restore the same conditions. So the less changes are done, the more will be gained in Physics operation. The scrubbing run will already imply a bunch spacing change (50 ns). With 75 ns bunch spacing operation, a total of $1-3 \text{ fb}^{-1}$ is at reach.

Massimiliano Ferro-Luzzi said that an alternative scenario could be to start with 150ns bunch spacing operation, perform the scrubbing run with 50 ns and continue with 50 ns operation for Physics. It was argued that 75 ns is not given yet and 50 ns will be even more difficult.

It was said that a single Pilot would become a batch of 16 bunches at the considered luminosity. This would be an argument to go to 50 ns. Steve Myers reminded that the experiments always said that they can take whatever pilot intensity we can provide them.

Ralph Assmann reminded that in the middle of the LHC run, a collimator set-up would most probably be needed. This is to be taken into account in the overall planning.

Django Manglunki reminded that the 2010 ion run was performed with 50% more intensity than nominal.

However, if the number of bunches is increased in 2011, there will, of course, be much less intensity per bunch.

It was reminded that the machine aperture is to be measured at 450 GeV, this is important for the β^* reach– it was scheduled for this year and was not done.

WORKSHOP SUMMARY – MIKE LAMONT

Mike Lamont highlighted the main points of each the presentations made during the workshop. Mike Lamont thanked all the teams involved in the LHC operation for their excellent work. Some of the humorous moments during the 2010 operation were highlighted.

The actions gathered during the workshop will be summarised at Chamonix, together with the name of a responsible person for follow-up and a time schedule for the implementation.

CLOSING REMARKS– STEVE MYERS

Steve Myers said that many actions have been gathered during this fruitful workshop and follow-ups are to be done within the new operations committee and LMC.

The possible issues with 900 bunches and 75 ns bunch spacing operation are:

- Electron clouds, with the interrogation concerning the cleaning at 450 GeV being sufficient for 4 TeV operation (additional effect of synchrotron light when reaching $\sim 1.5-2$ TeV) and therefore a possible need to scrub with 25ns;
- UFOs: what are they? Why is there an energy dependence (no UFOs at 450 GeV);
- Machine protection with ~ 100 MJ.

Steve Myers asked to consider luminosity levelling -by reducing the β^* - in all IPs, not only for LHCb.

Steve Myers proposed that the “LEP efficiency factor” concept is used as well for the LHC efficiency calculation.

When pushing the beam parameters to their limits – emittance of $1.5 \mu\text{rad}$, head-on beam-beam tune shift of 0.01, bunch intensity of 1.5×10^{11} , $\beta^* = 1.5\text{m}$ -, the luminosity reach could be between 3 to 5 fb^{-1} .

Steve Myers was surprised to hear that no check of the LHC alignment was scheduled during the shutdown and reminded that it was regularly performed in LEP.

Steve Myers pointed out that a combined ramp and squeeze is interesting and may be done.

