

## Minutes from the First FCC-ee optics meeting, 26th of May 2015.

**Participants:** Katsunobu Oide, Bernhard Holzer, Rogelio Tomas, Helmut Burkhardt, Bastian Haerer, Luis Eduardo Medina, John Jowett, Roman Martin, Sandra Aumon

**Presenter:** Katsunobu Oide

Katsunobu Oide presented and discussed the plan for the Optics Working group for the next months. The aim is to establish a consistent optics scenario for the important review of September 2015.

Katsunobu presented the package of important studies that have to be included for the review. Bastian Haerer asked more informations about the emittance tuning. Katsunobu replied the emittance tuning should include the emittance expected from the lattice but also from the tolerance study.

Katsunobu proposed to concentrate on the crab waist lattice with 2 IPs at low and high energy (respectively 45 and 175 GeV) in order to study two extreme cases and then interpolate for the intermediate energies (80 and 120 GeV).

Bernhard Holzer pointed out that the working group did not work on this option at the moment. He added that Michael Benedikt told some times ago, 120GeV is the most important energy (Higgs production). Bernhard added that the emittances at 45GeV presented on the slides, are by far much smaller than in the baseline parameter list (29.2nm in horizontal and 60 pm in the vertical plan, compared to 0.13nm and 2pm in the slides).

Katsunobu replied that these parameters and the strategy will be reconsidered depending on the results of the study in the next month.

Katsunobu presented important upcoming dates. The BINP colleagues will come in June and the 12/06 will take place a mini-review. By the end of July, the baseline parameter list can be revisited according to the results of the optics study. End of September will take place a larger review where, at least, one consistent scenario should be presented, taking into account all the important points such as the Arc design, Dynamical aperture studies, chromaticity correction, Sawtooth etc..

Rogelio Tomas and Bernhard discussed the fact that no manpower is available at the moment from the Magnet group for the quadrupoles at the IPs. Bernhard added that Michael Benedikt could make an official statement to get support for this subject.

Katsunobu continued his presentation with the simulation tools used for the FCC-ee optics studies. In particular, Katsunobu asked about the modelisation in MADX of a tilted solenoid and the calculation of the synchrotron radiation inside in it. It was pointed out from John Jowett, Rogelio and Helmut Burkhardt that MADX does not model well the solenoid with synchrotron radiation. John shared his experience from LEP where the solenoid and the quadrupoles were sliced and the distance between slices increased. However he was not sure about the synchrotron radiation. Katsunobu said that this is implemented in his code SAD and Bernhard proposed to learn from SAD how it is performed in order to possibly implement the solenoid with synchrotron radiation into MADX.

The question for PTC arose and Rogelio replied that the synchrotron radiation does not work properly. PLACET tracking tool is used for the CLIC studies

Helmut said that he could look at slicing a solenoid in MADX and Katsunobu added that Ghislain

Roy and Laurent Deniau can be invited to come to the Optics meeting to discuss this kind of issues.

John said that LEP was limited in Dynamical Aperture by the quadrupoles at the IPs due to particles jumping of the bucket. Bernhard asked which kind of tracking was made for LEP. John answered the tracking was made in MAD8 and the DA tracking was performed with a scan in 4D of the transverse phase space around the synchrotron phase.

Then Katsunobu pointed out that the sawtooth effect is very important in FCC-ee and provokes important effects on the optics. Helmut asked whether it would be possible to try to correct the sawtooth effect with, for instance, correctors, since there are two rings. Katsunobu and the audience agreed it is worth to try.

Finally, Katsunobu proposed to meet every week.

Minutes written by Sandra Aumon, 26 of May 2015