

Minutes of the 47th "ILC-CLIC e+ studies" meeting

Date: 22n (Tue.) April, 2014, 22:00 Jpn (Time slot (c'))
(c')22:00(Jpn), 16:00(Ukr), 15:00(CET), 8:00(US-IL), 6:00(US-CA)

A part of Attendees (whom Omori was able to hear the voices):
Eugene(NSC-KIPT), Friedrich(DESY), Sabine(DESY),
Andriy(Hamburg), Felix Dietrich, Wei(ANL), Wanming(ANL),
Song(IHEP), Seimiya(Hiroshima), Kuriki(Hiroshima),
Takahashi(Hiroshima), Urakawa(KEK), Yokoya(KEK), and Omori(KEK)

Agenda:

1. Capture&Booster linac Simulation (Conventional): Seimiya-san
2. Dr. Martyshkin's Simulation of FC (Undulator): Omori
3. FNAL workshop (AWLC14) source working group agenda: Wei-san
4. Others:

Presentations:

[http://www-jlc.kek.jp/~omori/ILC-CLIC-e+Studies/20140422/
FC_DesignStudy_Martyshkin.pdf](http://www-jlc.kek.jp/~omori/ILC-CLIC-e+Studies/20140422/FC_DesignStudy_Martyshkin.pdf)

[http://www-jlc.kek.jp/~omori/ILC-CLIC-e+Studies/20140422/
20140422-Seimiya_Capture.pdf](http://www-jlc.kek.jp/~omori/ILC-CLIC-e+Studies/20140422/20140422-Seimiya_Capture.pdf)

Summary of discussions:

1. Capture&Booster linac Simulation (Conventional):

Seimiya-san reported the simulation of capture and booster linac for the 300 Hz conventional e+ source.

Please look at "20140422-Seimiya_Capture.pdf".

Seimiya-san made full simulation which included the capture section, the booster linac, and the energy compression system (ECS).

First he made simulations with the analytically defined adiabatic matching device (AMD) with maximum field 7 Tesla. He also employed completely constant solenoid field at the capture section.

His simulation showed that we could achieve the yield about 1.3-1.4 with 14 mm target thickness, 6 GeV drive beam energy, 4 mm (sigma) drive beam size, and 7-8 mm R_AMD.

Note: The yield was defined by
(e^+ in DR acceptance)/(e^- on target).
Note: R_{AMD} is the input hole radius of AMD.

His simulation showed that if R_{AMD} was big, for example 8 mm, lower AMD field such as 5 tesla was good enough.

According to his simulation, when we increased target thickness to 20 mm, we could achieve the yield 1.5. Both 14 mm and 20 mm thick targets gave the same PEED, 26 J/g, with drive beam energy 6 GeV and size (σ) 4 mm.

His simulation showed that if we normalized the yield by PEED, larger spot size gave larger yield.

Up to here, all sections of the booster linac consisted of L-band structures. Seimiya-san studied to apply S-band structures at the downstream of the linac. His simulation showed that we were able to use S-band structures about last half of the linac with keeping the yield.

Seimiya-san tried to replace the AMD and the solenoid field by more realistic ones. The more realistic ones were actually those of SuperKEK design but maximum field was scaled to about 5 Tesla. His simulation showed that the yield dropped about 30% if we employ the realistic magnetic field.

Seimiya-san noted that effect of the electrons created at the target should be considered. The beam loading by the electrons should be take into account. It was not included in the current simulation. We need to put a chicane to separate the electrons in the simulations in future.

2. Dr. Martyshkin's Simulation of FC (Undulator): (Long pulse (1 m sec) flux concentrator)

In the last meeting, Omori reported the result of the simulation by Dr. Pavel Martyshkin of BINP. But Omori didn't have Dr. Martyshkin's slide, so he just made report with no graphs.

After the last meeting, Omori got the slide. Then he made the report again with the slides.

Please look at "FC_DesignStudy_Martyshkin.pdf".

Dr. Pavel Martyshkin made a seminar at KEK on March 13th. In the seminar he presented the simulation study of flux concentrators. He made simulation of short pulse flux concentrators for SuperKEKB and long pulse (1 m sec) flux concentrators for ILC.

The simulation of long pulse flux concentrator showed that we could not keep pulse height constant in time.

Pulse height at the peak in space can be kept constant. However to do so, we have to increase the current as time goes. As the result, the pulse height at downstream drastically increase as time goes.

We need to check the effect on the capture efficiency.

Wanming-san will contact Jeff-san and will check the effects.

3. FNAL workshop (AWLC14) source working group agenda:

Wei-san presented the plan of the source working group agenda. It was divided in three sessions.

- (1) Positron source 1: Tuesday morning,
topic: Undulator sources, update, and Flux concentrator.
- (2) Positron source 2: Tuesday afternoon,
topic: conventional source layout, CFS issues, and interface with damping ring.
- (3) Electron source 1: Wednesday morning or afternoon,
topic: e- source and update from various activities.

Wei-san and Kuriki-san are conveners.

If you have presentations/suggestions please contact them.

4. Others:

Sabine-san reported that an undergraduate student is going to work for ANSYS analysis of the target of the 300 Hz conventional e+ source.

Reported by T. OMORI

The date of the next meeting is 5th June 2014.

Time slot (b')

(b')15:00(Jpn), 9:00(Ukr), 8:00(CET), 1:00(US-IL), 23:00*(US-CA)

(* In US-CA, it is the previous day)