Minutes of the 13th Euro-Japan Compton capture&stacking meeting

Date: July 28th 17:00(JST) 10:00 (CET), 2008

A part of Attendees (whom Omori was able to hear the voices):
Vivoli(LAL), Chehab(LAL), Louis(CERN), Frank(CERN),
Eugene(NSC-KIPT), Wanming(ANL), Kuriki(Hiroshima), Variola(LAL),
Urakawa(KEK), and Omori(KEK)

Agenda:
1. Report from e+ WebEx meeting (22nd/July) : Kuriki-san
3. Capture simulation update : Vivoli-san
4. Discussions

Presentation:

A. Vivoli: Capture Simulation Update
http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20080728/
20080728-Vivoli_Table.pdf

Materials: presented in the previous Euro-Japan meeting (July/15)

R. Chehab: Advanced Conventional Source with Hybrid Target
http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20080715/
20080715-Chehab_HYBRID.pdf

A. Vivoli: Capture Simulation Update
http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20080715/
20080715-Vivoli_Update.pdf

T. Omori: Pre-damping ring option of Ring Compton scheme
http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20080715/
20080715-Omori_EntireSystemPreDR_YAG_ver2.pdf

T. Omori: Large Compton Ring Option
http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20080715/
20080715-Omori_EntireSystem_LargeCR.pdf

Summary of the discussions:

1. Report from e+ WebEx meeting (22nd/July) and related discussions:

(a) Kuriki-san made a report from the e+ WebEx meeting which was held on July 22nd.

(a-1) Minimum Machine discussions:
In the e+ meeting, there was a presentation of

the Minimum Machine concept by Clarke-san and also there were active discussions. So far, Minimum Machine did not assume a change of machine parameters related to physics output.

(a-2) PosiPol_2008 report:
In the e+ meeting Kiriki-san mdae a PosiPol_2008 report. He reported the hybrid (crystal-amorphous) target scheme.

(b) Discussions:

After Kuriki-san's report from the e+ meeting, we made discussions.

Omori mentioned about a study after PosiPol_2008. The 300 Hz mini-train production scheme with the hybrid target has a reasonable possibility as a ILC positron source.

About the 300 Hz scheme with the hybrid target, please see "20080715-Chehab_HYBRID.pdf" which was presented in the previous meeting.

Chehab-san mentioned that he asked Dr. Tom Piggott of LLNL to make a study of thermal shock on the hybrid target. The point of the study is the time structure of the pulse. The time structure of the pulse in the 300 Hz mini-train production scheme is very much different from the time structure in the SLC. So we need detailed study in order to extrapolate the SLC target experience to the target of the ILC 300 Hz scheme with the hybrid target.

In this scheme, we assumed that the amorphous part of the target is rotating but the crystal part is stationary.

3. Capture simulation update:

Viloli-san reported the progress of the capture simulation.

Please see "20080728-Vivoli_Update.pdf".

There are two ways to reduce the energy spread at 5 GeV

One is the energy compression at 5 GeV before the injection to DR. The other is the bunch length compression at before the linac.

This time Viloli-san reported the energy compression at 5 GeV. The energy compressor consisted of chicanes and superconducting RF cavities.

As a result of energy compression, the RMS energy spread was reduced to 16-17 MeV. The typical value of the energy spread without the energy compressor was about 35 MeV (please see the plot in the page_3 of "20080715-Vivoli_Update.pdf" which was presented in the previous meeting.). Therefore, the compressor

reduced energy spread by factor 2.

He tested three different conditions of the energy compression. Those three were "n", "o", "p" (="1", "2", "3") in the table in the page_4 of "20080728-Vivoli_Table.pdf".

In the view point of the RMS spread, there was no significant difference among the three conditions. However, if we see the positron population within +-2 MeV (or +-3 MeV) at 5 GeV, there was a difference. The condition "p" (="3") showed the best performance.

About the bunch length compression at before the linac, Vivoli-san is now proceeding the study with Dr. Christelle Bruni.

3. Discussions

We had discussions about the pre-DR scheme and the Large Compton ring scheme.

Plsease see the materials which were presented in the previous Euro-Japan meeting on July/15th.
"20080715-Omori_EntireSystemPreDR_YAG_ver2.pdf"
"20080715-Omori_EntireSystem_LargeCR.pdf"

Frank-san pointed out that if he evaluates the stacking in a pre-DR, he needs basic parameters of pre-DR such as RF-voltage, momentum compaction factor, and damping time.

Frank-san made question what was the advantage of introducing a pre-DR.

Kuriki-san pointed out that the pre-DR was not necessary to have small emittance. This may give us a flexibility of a design and give a pre-DR a large momentum acceptance at injection.

According to Frank-san's experience, generally, a large circumference ring has larger momentum acceptance than a small circumference ring.

Maybe a large circumference pre-damping ring is preferable?

Variola-san pointed out that a small circumference has advantage to achieve a small damping time.

Louis-san made a question about a relation between a choice of a Compton ring circumference and a choice of a pre-DR circumference. Omori answered that there was no relation. (I think that Omori needs to think again carefully for making a sure conclusion.)

Variola-san pointed out the possibility to use both pre-DR and DR for staking: first stage fast stacking in pre-DR and second stage stacking in DR. He will make a first version conceptual design and will distribute it by e-mail.

Kuriki-san mentioned an importance of a small stacking loss in a view point of the radioactivation of the ring.

The date of the next meeting is 25th(Monday) August, 17:00 JST (10:00 CET).

Reported by T. OMORI