

Minutes of the 4th "ILC-CLIC e+ studies" meeting

Date: May 14th, 17:00(JST) 10:00(CET), 2009

A part of Attendees (whom Omori was able to hear the voices):
Louis(CERN), Vivoli(CERN), Dadoun(LAL), Chehab(IPNL/LAL),
Poirier(LAL), Eugene(NSC-KIPT), Sabine(DESY), Andreas(DESY),
Stefan(DESY), Clarke(CI), Takahashi(Hiroshima), Suwada(KEK),
Kamitani(KEK), Urakawa(KEK), and Omori(KEK)

Agenda:

1. Upcoming meetings and POSIPOL in the next year : Omori
2. ERL scheme for CLIC with two small stacking rings: Omori

Presentations:

http://www-jlc.kek.jp/~omori/ILC-CLIC-e+Studies/20090514/20090514-UpcomingMeetings_and_POSIPOL2010.pdf

http://www-jlc.kek.jp/~omori/ILC-CLIC-e+Studies/20090514/20090514-Louis-and-Omori_CLIC-ERL_Compton.pdf

1. Upcoming meetings and Posipol in next year

Please see "20090514-UpcomingMeetings_and_POSIPOL2010.pdf".

(a) Upcoming meetings:

Here is the list of the upcoming meetings.

- (1) FJPPL meeting 20th-22nd May 2009 at KEK
- (2) POSIPOL workshop 23rd - 26th June 2009 at Lyon
- (3) GDE meeting at 29/Sep-3/Oct 2009 at Albuquerque
- (4) CLIC workshop 12th-16th October 2009 at CERN
- (5) ILC Positron meeting at 28-30 October 2009 at Durham

(b) POSIPOL in the next year (POSIPOL 2010)

Omori presented the proposal of POSIPOL 2010.

The proposal was to held the next-next POSIPOL workshop at KEK in 2010. The proposed time of the workshop was around the end of May to the beginning of June.

The subjects of the workshop were proposed to include a little wider area than the current POSIPOL workshop series. The proposed subjects were, mainly

the positron sources for ILC and CLIC, but also the positron sources for other future colliders, and related applications.

It was proposed to keep the name "POSIPOL" but add a subtitle "ILC-CLIC e+ studies"

POSIPOL 2010 (large fonts)
-- ILC-CLIC e+ studies -- (small fonts).

We reached rough consensus. The proposal was supported by attendees.

There were some comments about subtitle that a more general one was preferable.

About the time, Clarke-san pointed that the week just before or after IPAC 2010 (May 23-28 2010, Kyoto) was convenient for some of us.

2. ERL scheme for CLIC with two small stacking rings:

Omori presented a new proposal of the ERL Compton scheme for CLIC with two small stacking rings. The proposal was made by Louis-san and Omori.

Please see "20090514-Louis-and-Omoti_CLIC-ERL_Compton.pdf".

The point of the proposal was that putting two stacking rings (SRs) between the ERL and the pre damping ring (PDR) to separate stacking and damping functions.

Here is the list of parameters.

e- beam (ERL) assumed:
3 x 10⁹ e-/bunch
E = 1.8 GeV

Laser assumed:
600 mJ / cavity
1 cavity in the ERL

Number of gamma-ray created:
5 x 10⁸ gamma-rays/bunch:

Number of e+ produced&captured:
2.5 x 10⁶ e+/bunch

Assume 2003 stacking in the same bucket in a SR
5 x 10⁹ e+/bunch (CLIC requires 4.2 x 10⁹)

Stacking Ring (SR):

SR makes stacking and pre² damping.
Circumference of the SR is 48 m.
We stack in the same bucket every 64th turn
Number of stacking in the same bucket = 2003.

Stacking takes 20 ms and damping (pre² damping) in a SR takes 20 ms. The SR repeat cycles at 25 Hz. Two stacking rings operated at 25 Hz matches the 50 Hz operation of PDR. No stacking in the PRD is assumed. A SR makes 321 bunches in a train, while CLIC requires 312 bunches. So nine bunches are killed in the way from the SR to PDR.

Summary:

- * A solution where stacking and damping are decoupled seems possible to fulfill CLIC requirements with an ERL scheme
- * Challenge remains to be demonstrated in order to make 2000 stacking in a same bucket
- * Stacking ring with 48 m circumference and 2.8 GeV is also a challenge.
- * The cost increase with 2 storage rings is not an issue compared to the rest of the complex.

After Omori's presentation we made discussions.

Question by Clarke-san's:

Why SR has 321 bunches instead of 312?

Answer by Omori:

We have a restriction of the number of bunches in a SR in order to realize stacking and filling in the SR. So we can not choose 312 in the SR. To change number of bunches in the CLIC is another solution, but we do not want to bother the CLIC design team.

Question by Clarke-san:

A kicker to fit this scheme seems very difficult.

Answer by Omori:

Yes, it is challenging.

Comment by Andreas-san:

If we kill 9 bunches out of 321 bunches, we can use a kicker with 3 ns rise time.

Answer by Omori:

Yes, for the extraction from the stacking ring we can do such a way. But for injection to the stacking ring we need a very fast kicker.

Question by Chehab-san:

What is the thickness of the thin target?

Answer by Omori:

About 0.5 X0.

Question by Eugene-san:

Why two stacking rings instead of single stacking ring with twice of circumference?

Answer by Omori:

We can not fill/extract a half circumference of

the stacking ring.
Comment by Eugene-san:
How about interleave bunch injection/extraction?
Answer by Omori:
We will think.

The date of the next meeting will be June 18th.

Reported by T. OMORI
