Minutes of the 6th "ILC-CLIC e+ studies" meeting

Date: July 21st, 17:00(JST) 10:00(CET), 2009

A part of Attendees (whom Omori was able to hear the voices):
Louis(CERN), Frank(CERN), Vivoli(CERN), Dadoun(LAL), Poirier(LAL),
Chehab(IPNL/LAL), Sabine(DESY), Andriy(DESY), Andreas(DESY),
Stefan(DESY), Kuriki(Hiroshima), Yokoya(KEK), Urakawa(KEK),
and Omori(KEK)

Agenda:

1. Report from Posipol 2009 : Chehab-san
2. Linac-Compton souce for LHeC (Idea from Vitaly-san) : Frank-san

Presentations:

http://www-jlc.kek.jp/~omori/ILC-CLIC-e+Studies/20090721/
20090721-Chehab_POSIPOL2009R.pdf

http://www-jlc.kek.jp/~omori/ILC-CLIC-e+Studies/20090721/
20090721-Frank_LinacComptonLHeC_IdeasFromYakimenko.pdf

1. Report from Posipol 2009:

   Chehab-san made a report from the POSIPOL2009 at
   Lyon (23-26 June).

   Please see "20090721-Chehab_POSIPOL2009R.pdf".

   INTRODUCTION:
     * The venue of the meeting was Institut de Physique
       Nucleaire de Lyon (IPNL).
     * The date was 23rd-26th June.
     * Number of participants was about 30; they came from
       Europe (France, Germany, CERN), Russia, Japan, China,
       USA, and Ukraine.
     * The items covered the fields of polarized and
       unpolarized positron sources. Some emphasis was put on
       the so-called Compton Sources for which, technical
       developments and dedicated applications for X-rays
       production were presented
     * An overview of the different electron-positron colliders
       (ILC, CLIC, SuperB) was also presented to introduce the
       meeting; the LHeC project was only mentionned, as the
       scheduled presentation was withdrawn.

   PRESENTATIONS:
     There were about 30 presentations.
     Those presentations covered following subjects.
       * Compton source:
           Designs (Linac, Ring, ERL), Laser stacking cavities,

Mirrors studies, Gamma-ray generation experiments,
and Applications to X-rays.
* Polarized Positrons from Polazed Bremsstrahlung Photons:
for CHIPS at JLAB and for SuperB at INFN-LNF.
* Undulator source (ILC baseline):
* Hybrid source (non polarized e+ source):
Simulation studies, Application to ILC, and Test
plan at KEK.
* Technical Developments:
Liquid targets, Lithium lenses, and Flux concentrator.
* Polarimetry:
Compton transmission, Bhabha, and Compton recoil
methods.
* Theory and Models:
Theories of polarization treatments of particles in
electromagnetic showers and Simulation codes for
modeling of polarized positron sources.

CONCLUSIONS:
* Repeated interest for polarized positron sources
for all the collider projects (ILC, CLIC, SuperB).
* Merging of some R&D for the different projects:
capture, heating, target.
* Improvement in simulation tools following better
theoretical understanding.
* Importance of experimental tests : Tests@KEK will
bring useful informations on hybrid sources, liquid
targets, matching devices (Flux Concentrator,..)
* Improved exchanges and regular meetings between the
people working on positron sources : POSIPOL appears
as a continuation of an uninterrupted discussion.

2. Linac-Compton souce for LHeC:

Frank-san presented the discussions about e+ source
of LHeC.

Please see
"20090721-Frank_LinacComptonLHeC_IdeasFromYakimenko.pdf".

LHeC is the highest-energy high luminosity ep, eA
collider based on LHC. Here, e stands for electron
and positron.

Two options are considered: ring-ring & ring-linac.
(Here linac include both pulsed linac and ERL.)

Generation of e+'s is a challenge for ring-linac option.

In low energy, Ee below 60 GeV, the ring option
has advantage. It's luminosity is higher than other
options. In middle energy, 60 < Ee < 80 GeV, ERL
option has advantage in luminosity.
On the other hand, only pulsed-linac option can

reach Ee grater than 100 GeV.

The challenges for e+ source were (i) large number
of positrons (x10 more than ILC in average),
(ii) large number of bunches (dampring ring difficult).

There were several candidates:
 * ERL-Compton source for CW operation
 * undulator source using spent e+ beam
 * linac-Compton source for pulsed operation

Frank-san discussed about the design of linac-Compton
source, which was under study by Frank-san, Vivoli-san,
and Vitaly-san.

The design assumed to use a 6 GeV pulsed drive linac
with 5-10 nC electron bunches. It also assumed multiple
targets/capture (3 to 5), but it did not assume bunch
merging. Multiple targets were used to increase number
of bunches (not to increase bunch charge).

Frank-san discussed transverse emmittance of generated
e+s and PEDD on the target.

3. Announcement: ILC Positron Source Collaboration Meeting

Stefan-san made an announcement.

We will have a "ILC Positron Source Collaboration Meeting"
28-30 October 2009
IPPP, Durham, UK

The date of the next phone meeting will be August 25th.

Reported by T. OMORI
