Minutes of the 43rd "ILC-CLIC e+ studies" meeting

Date: 12th (Thu.) December, 2013, 23:00 Jpn (Time slot (c))
(c) 23:00(Jpn), 15:00(Eur), 16:00(Ukr), 6:00(US-CA), 8:00(US-IL)

A part of Attendees (whom Omori was able to hear the voices):
Louis(CERN), Eugene(NSC-KIPT), Friedrich(DESY), Sabine(DESY),
Andriy(Hamburg), Wei(BNL), Wanming(BNL), Steffen(CERN),
Jeff(LLNL), and Omori(KEK)

Agenda:
1. Low energy operation of the undulator e+ source: T. Omori
2. Radiation damage test of the ferromagnetic fluid:T. Omori

Presentations:

http://www-jlc.kek.jp/~omori/ILC-CLIC-e+Studies/20131212/
20131212-Omori_LowEnergy_10Hz.pdf

http://www-jlc.kek.jp/~omori/ILC-CLIC-e+Studies/20131212/
20131212-Omori_RadiationDamageTest.pdf

Summary of discussions:

1. Low energy operation of the undulator e+ source:

   Omori discussed the issues on the low energy operation
   of the undulator e+ source.

   Please look at "20131212-Omori_LowEnergy_10Hz.pdf".

   He presented issues on the physics study and possible
   options of accelerator design.

   Issues: Physics

     (1) Do we need scan at Ecm = 208-240 GeV?
     (2) Do we need Z-pole (Ecm = 91 GeV) running (Giga-Z)?
     (3) Do we need running at W-pair production (Ecm=161 GeV)?

   Options: Accelerator

     (1) Do not employ 10Hz operation. Employ 230m undulator.
          (a la Andriy)
        * We can make initial & operation cost reduction.
        * Do we give up Giza-Z, W-pair, and 208 – 240 GeV?
          If the answer is NO, the solutions are;

(a) Add 10Hz later.
Change all refrigerators and modulators.
This needs very expensive additional
investment, therefore it is not realistic.
(b) Apply 2.5+2.5 Hz operation.
We can go to any low energy with 1/2 luminosity.

(2) Employ 10Hz operation. Employ 147m undulator.
(RDR solution)
* We can make low energy running at Ecm = 91, 161,
and 208-240 GeV.

(3) Employ 10Hz operation. Employ 230m undulator.
* We can make operation cost reduction, but slightly
higher initial cost.
* We can make low energy running at Ecm = 91, 161,
and 208-240 GeV.

Q_and_As, Comments, and Discussions:

Louis-san's Question:
If we do not employ 10Hz, what is the repetition
rate?
Omori's Answer:
Always 5 Hz.

Wei-san's Comment:
If physicists agree, option (1(b)) is good.

Sabine-san's comment:
At Z-pole higher polarization is very important.
We need to consider both luminosity and polarization
issues.

Fridrich-san's comments:
The 10 Hz operation is preferable, because it gives
higher luminosity.

2. Radiation damage test of the ferromagnetic fluid:

Omori reported the status of the radiation damage
test of the ferromagnetic fluid.

Please look at "20131212-Omori_RadiationDamageTest.pdf".

The radiation damage test is ongoing at Takasaki Advanced
Radiation Research Institute of JAEA.

The institute has the Co-60 gamma-ray irradiation facilities (1.1E4 Gy/h).

Omori prepared four sets of sample.
All four sets are the same.

One set consists of four samples.
They are;
  A : Ferromagnetic Fluid of Oil A,
  A': Oil A,
  B : Ferromagnetic Fluid of Oil B, and
  B': Oil B.

Plan of irradiation:

  (1) December 2013: Warming-up
        Set #1: ~ 2.7E5 Gry (0.2% (*))
        Set #2: ~ 3.2E6 Gry (2.5% (*))
        We put first 2 sets (#1 and #2) in the
        irradiation chamber on December 4th.

  (2) End of December 2013:
        Modification of the source is planned.
          1.1E4 Gry/h -> 1.6E4 Gry/h

  (3) Jan.-Mar/2014: Pre Test
        Set #3: ~ 3.0E7 Gry (25% (*))

  (4) Apr/2014-Mar/2015: Full Test
        Set #4: ~ 1.2E8 Gry (100% (*))

      (*) Note: 100% = 1 year of ILC
            assumption:
              300Hz conventional
              rotation target d=200 mm
              no shielding

Q_and_As, Comments, and Discussions:

  Omori's Comment:
    The test is valuable for developments of both
    conventional and undulator e+ sources.
  Jeff-san's Comment:
    Agree.

  Wei-san's Question:
    Which quantities are you going to measure?
  Omori's Answer:
    Evaporation rate and viscosity.

Sabine-san's Question:
  In the "Full Test", do you see the change before
  the end of one-year-test period?
Omori's Answer:
  Good question. We don't decide detail of "Full Test"
  yet. Maybe we put two sets of samples, then we can
  pull out one set from the irradiation chamber after
  half years.

Friedrich-san's Question:
  If the answer of the test is no good, do you consider
  to put radiation shield to protect the vacuum seal?
Omori's Answer:
  Yes.

Reported by T. OMORI

The date of the next meeting is 30th January 2014.
Time slot is (b)
(b) 16:00(Jpn), 9:00(Ukr), 8:00(CET), 1:00(US-IL), 23:00*(US-CA)
    (* In US-CA, it is the previous day)