

## Minutes of the 4th Euro-Japan Compton capture&stacking meeting

Date: December 20th 16:00(JST) 8:00 (CET), 2007

A part of Attendance (whom Omori was able to hear the voices):  
Variola(LAL), Vivoli(LAL), Chehab(LAL) Eugene(NSC-KIPT), Louis(CERN),  
Frank(CERN), Vitaly(BNL), Takahashi (Hiroshima), Kuriki(Hiroshima),  
Kamitani(KEK), Urakawa(KEK), and Omori(KEK)

Presentations:

Agenda:

<http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071220/20071220-Agenda.pdf>

T. Omori, Updates of Comparison of Capture Simulations:  
[http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071220/20071220-Omori\\_CompCapSim.pdf](http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071220/20071220-Omori_CompCapSim.pdf)

A. Vivoli, Updates of Capture Simulation  
<http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071220/20071220-Vivoli.pdf>

E. Bulyak, Choice of e- beam energy: 1.8 GeV or 1.3 GeV:  
[http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071220/20071220-Eugene\\_18GeV.pdf](http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071220/20071220-Eugene_18GeV.pdf)

E. Bulyak, Rod Target:  
[http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071220/20071220-Eugene\\_LaShu.pdf](http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071220/20071220-Eugene_LaShu.pdf)

Summary of the discussions:

### 1. Comparison of the capture simulations:

Please see 20071220-Omori\_CompCapSim.pdf.

Omori again explained the comparison of three simulations:

- (a) Vivoli-san 1 : Vivoli-san's presentation in Posipol 2007  
"A\_Positron\_Capture\_for\_the\_Compton\_Scheme.ppt"
- (b) Vivoli-san 2 : Vivoli-san's recent report  
"RESULTS OF PARMELA SIMULATIONS OF THE CAPTURE  
SECTION WITH PHOTONS FROM 10 LASER CAVITIES"  
See Vivoli20071113c.pdf
- (c) Wanming-san : Wanming-san's recent report  
"Capture under different target and Pz lower cut.ppt".

Omori contacted Wanming-san and confirmed that is value of the phase window (+- 25 degree) was "edge" and "before compression".

Chehab-san pointed that difference of B-field in (b) and (c) could be a part of cause of the difference in the capture efficiency. Omori asked Chehab-san to make a short note which describes the B-field dependence.

Kuriki-san pointed that the distance (0.5 m) between the target and the AMD in (c) seemed too big. May be Omori made mistake in making table. Omori will contact Wanming-san and confirm the distance.

## 2. Capture simulation:

Please see 20071220-Vivoli.pdf.

Vivoli-san explained the progress of the capture simulation. He compared 5 conditions:

- (i) 10 collision points, 1.3 GeV, chicane length = 5 cm,
- (ii) 10 collision points, 1.3 GeV, chicane length = 4.5 cm,
- (iii) 10 collision points, 1.3 GeV, chicane length = 4 cm,
- (iv) 5 collision points, 1.3 GeV, chicane length = 4 cm,
- (v) 5 collision points, 1.8 GeV, chicane length = 4 cm.

In the simulations, shorter chicane length means tighter energy selection.

Every one agreed that "5 collision points" was better than "10 collision points". About the choice of the e- beam energy, 1.3 GeV or 1.8 GeV, the opinions were divergent.

## 3. Choice of e- beam energy: 1.8 GeV or 1.3 GeV:

Please see 20071220-Eugene\_18GeV.pdf.

Eugene-san discussed advantage and disadvantage of 1.8 GeV. Apparently, the 1.8 GeV had significant advantage in the positron yield. However, Eugene-san pointed that the energy spread of the 1.8 GeV e- beam seemed too big after collision.

In Eugene-san's simulation, he put 6 Joule laser energy in single collision point. Omori pointed that the result could change when we distributed 6 Joule over 10 collision points (put 0.6 Joule in each collision point), because of reduction of the effect of the non linear QED.

Omori will make comparison of "6 Joule x 1 CP" and "0.6 Joule x 10 CPs", by using CAIN.

## 4. Rod Target

Please see 20071220-Eugene\_LaShu.pdf.

Eugene-san introduced a rod target. In the example of the targets made by aluminum, the rod had significant advantage. In a small angle, the rod target had 10 times larger e+ yield than the flat target.

The efficiency proportional to the length/radius ratio. When we use tungsten, the length/radius ratio becomes smaller. So we need some cure if we want to employ tungsten rod target.

Also we discussed how to support and cool a rod target.

#### 5. Discussions:

About the choice of the parameter (emittance value) to start stacking simulations, we decided to use the result of "5 collision points"

Frank-san will choose the emittance result of 1.3 GeV, or 1.8 GeV, or a typical value (2 cm rms in Z and 4 MeV rms in E), as a starting point.

The date of the next meeting will be 25th January at 17:00 JST (9:00 CET).

Reported by T. OMORI

#### Post Meeting Materials:

After the meeting, in answering Omori's request, Chehab-san made a short note which describes the B-field dependence of the AMD acceptance.

R. Chehab, B-field dependence of the acceptance of AMDs:  
[http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071220/20071220-Chehab\\_PostMtnng\\_ACCEPTAMD.pdf](http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071220/20071220-Chehab_PostMtnng_ACCEPTAMD.pdf)