

Minutes of the 2nd Euro-Japan Compton capture&stacking meeting

November 13rd 17:00(JST), 2007

A part of Attendance (whom Omori can hear the voices):
Variola(LAL), Vivoli(LAL), Chehab(LAL), Eugene(NSC-KIPT), Louis(CERN),
Kuriki(Hiroshima), Kamitani(KEK), Urakawa(KEK), and Omori(KEK)

Presentations:

Agenda:

<http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071113/20071113-Agenda.pdf>

A. Vivoli, Capture Simulation:

<http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071113/20071113-Vivoli-c.pdf>

T. Omori, Comparison of Simulations:

<http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071113/20071113-Omori.pdf>

Related materials are also in the WEB:

<http://www-jlc.kek.jp/~omori/EuroJapanMeeting/20071113>

Summary of the discussions:

1. Capture simulation:

Vivoli presented the results of the capture simulations.

See 20071113-Vivoli-c.pdf

He made several choices of the positron diaphragm after acceleration (150 MeV/c point) and energy selection (also after acceleration), and made comparison of emittances and observed number of positrons. It seemed that the positron diaphragm after acceleration was not effective. On the other hand, energy selection was effective. It improves "Yield/Emittance". However, the improvement was not good enough in this moment. We need further improvement. Omori pointed that the positron diaphragm before acceleration may be better than diaphragm after acceleration.

A typo was found in his document "RESULTS OF PARMELA SIMULATIONS OF THE CAPTURE SECTION WITH PHOTONS FROM 10 LASER CAVITIES". In the document, the accelerating structure was described "aperture of radius = 23 mm", but the correct value was 20 mm. In the documents in the WEB, this typo was corrected.

2. Comparison of the capture simulations:

Omori presented 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".

See 20071113-Omori.pdf.

The point of comparison was that why "Ne+(captured)/Ng (no cut)" differed in three simulations. "Ne+(captured)/Ng (no cut)" were about 2%, 0.77%, and 0.5% in (a), (b), and (c) respectively.

At first, Omori thought that both "Vivoli-san 1" and "Vivoli-san 2" assumed the same accelerating gradient (7 MV/m) in the capture section. However Vivoli-san pointed that "Vivoli-san 1" assumed 7 MV/m average gradient but "Vivoli-san 2" assumed 7 MV/m peak gradient. The other difference in "Vivoli-san 1" and "Vivoli-san 2" were spot size of gamma-rays on the production target. "Vivoli-san 1" assumed single collision point, but "Vivoli-san 2" assumed 10 collision points. This makes the gamma spot size of the "Vivoli-san 2" much bigger than that of "Vivoli-san 1". So difference of "Ne+(captured)/Ng" between "Vivoli-san 1" and "Vivoli-san 2" can be explained by the different accelerating gradient and gamma spot size.

Chehab-san pointed that the difference between "Vivoli-san 2" and "Wanming-san" can be explained by the difference of B-fields in ADM and accelerating structure.

After the meeting, Omori contacted Wanming-san and got the information of the accelerating gradient and iris size. The table of comparison (20071113-Omori.pdf) in the Web included those information.

3. What is necessary to start stacking study?:

- (a) distribution or Gaussian approximation?
We discussed that whether we need the distribution of positrons (data of particles) or just a value of emittance. If we give Frank just a value of the emittance, Frank should assume Gaussian distribution as an input of the stacking simulation. The conclusion was that just the value was not good enough because the distribution of positrons were far away from the Gaussian.
- (a) CAIN simulation of "5 collision points"
In order to evaluate the effect of the gamma spot size, Omori will make a CAIN simulation of "5 collision points".

Reported by T. OMORI