

Article Ref: OS2016

Title: Study of Beam-Material Interaction by Using Hydrogen Ion Beam

Authors: K. Fukui, Y. Nakashima, S. Nagata, K. Ichimura, M. M. Islam, M. S. Islam, K. Shimizu, M. Ohuchi, T. Yokodo, M. Arai and K. Ohkawa

Dear referee,

Thank you very much for your valuable comments. According to your comments, we revised the manuscript as follows:

1. P1, line 6 from bottom :

As the referee pointed out, designation of the axial coordinates is not easy to understand. So, we unify the unit of distance as “cm”. Beside this, we modified the sentence as follows.

“The z-axis corresponds to the axial direction of GAMMA 10/PDX with the origin at the center of the device. The distance between ion source and the origin is about 1,600 cm”.

2. P3, after Sec. 4 (new, P3 line 10) :

According to the referee’s comments, the reason why not to use x-coordinate instead of pixels is described as follows.

“ In camera images, the approximate length of per pixel is estimated to be 0.5 cm from the size of the light emission around the surface of the target.”.

3. P1, after Sec. 2 (new, P1, line 3 from bottom) :

According to the referee’s comments, we add the description of PU unit as follows.

“The magnetic field strength at  $z=1,030$  cm and  $z=1,070$  cm are 13.7 kG and 2.82 kG, respectively when the magnetic field strength is 0.91 PU (Power Unit) which is the standard magnetic field strength in GAMMA 10/PDX. This unit is proportional to the coil current intensity. When 1 PU is applied, the magnetic field strength at the end-mirror throat, the calorimeter, the rotating target are 30 kG, 15 kG, 3.1 kG, respectively”.

4. DISCUSSIONS

According to the referee’s comments, we judged it is difficult to discuss where is the position where the beam starts to converge. So we removed the contents of the

DISCUSSIONS chapter and new discussion on the effectiveness of the system to the beam-material interaction studies are added in subsection “Beam Intensity Distribution”.

5. Abstract

Due to modification of discussions chapter, the contents of the abstract is modified.

6. SUMMARY AND FUTURE PLAN

Due to modification of discussions chapter, the contents of summary is modified.

7. According to the referee’s comments, “rotation target” has been changed to “rotating target”.

8. Others:

We improved the quality of english words and scientific explanations.

Thank you again for your comments.