The Generation of Ultra-relativistic Positron by Gas-Solid Target Based on Ultra-intense Laser

J. Jiang,[1*] L. Feng[1], Z. J. Zhao[1], L. C. Tian[1],
Y. Y. Ma[1, 2,] , S. Li[2], Nasr A. M. Hafz[2], M. Peng[1] and Y. Cui[1]

[1] College of Liberal Arts and Sciences, National University of Defense Technology, Changsha 410073, China

[2] IFSA Collaborative Innovation Center, Shanghai Jiaotong University, Shanghai 200240, China

Recently the ultra-relativistic positron beam was produced via the interaction between ultra-intense laser and gas-solid targets[1-2]. In the experiments, the positrons and the electrons were separated by magnetic field after passing through the collimator, and the energy spectras of positrons and electrons were given by the Image Plates (IPs) . The results showed that the positron beam above 1MeV temperature was produced and the average positron yield was ~5.33 ~5.33×10^{7}/shot. In addition, a model of solving the wakefield electrons energy spectrum was established based on the maximum entropy method (MEM). Meanwhile, the simulation results by Monte Carlo agreed well with the experimental results.

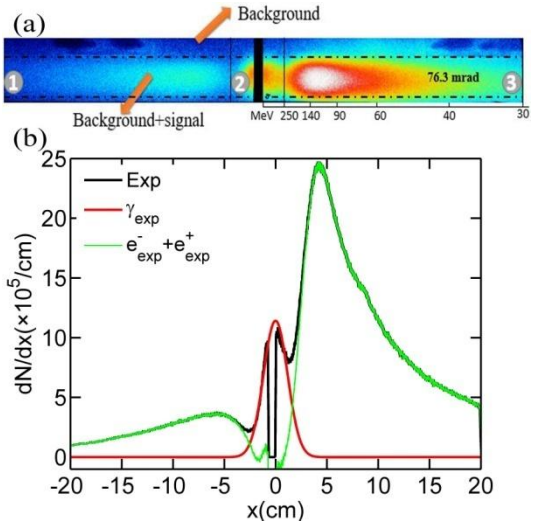

Figure 1 *(a)Typical signal of positrons and electrons recorded on IPs of 5 shots; (b) The black line is the integrated signal of IPs.The red line is the gaussian fitted photon signal. The green line is the real signal of elelctrons and positrons.*

References

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*Corresponding author, Email: jiang-jing.68@163.com