1 Auxiliary material

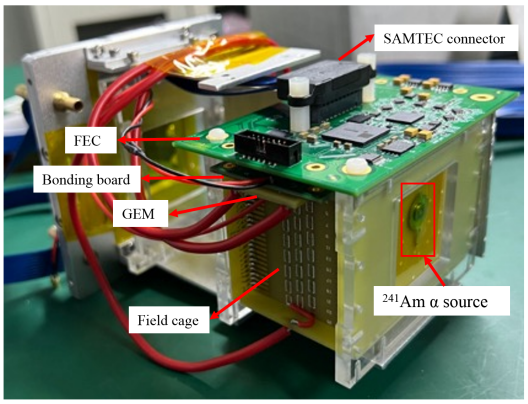


Figure 1. Photo of an ^{241}Am α source placed right outside the field cage.

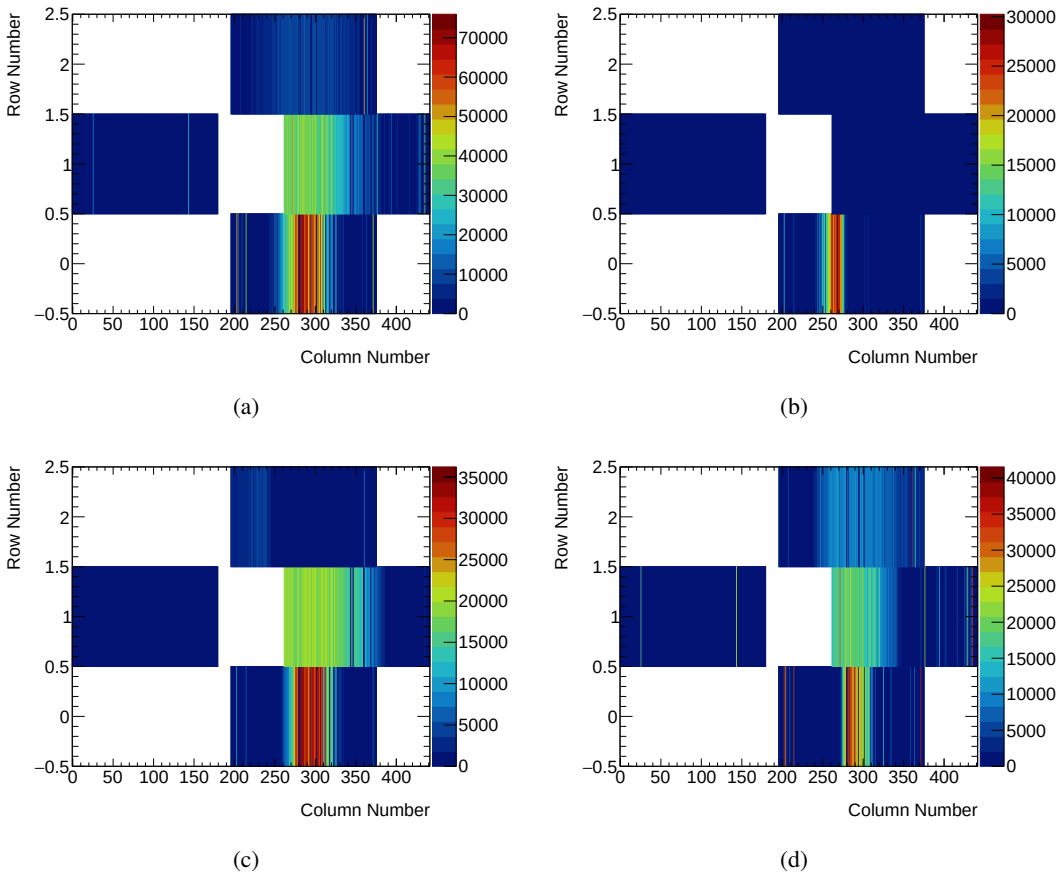
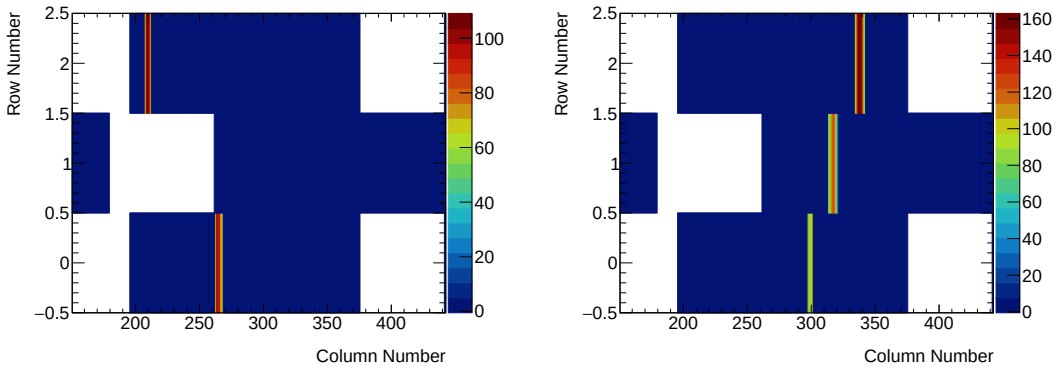


Figure 2. Hit maps measured with the α source in a duration of about 2.5 hours: (a) inclusive; (b) tracks of hits in exactly one row of pixels; (b) tracks of hits in exactly two rows of pixels; (b) tracks of hits in exactly three rows of pixels. The blank areas are where not covered by the charge collection electrodes of the chips. Not to scale.



(a) (b)

Figure 3. The α tracks of hits in two (a) and three (b) rows of pixels, with the color showing the signal amplitude.

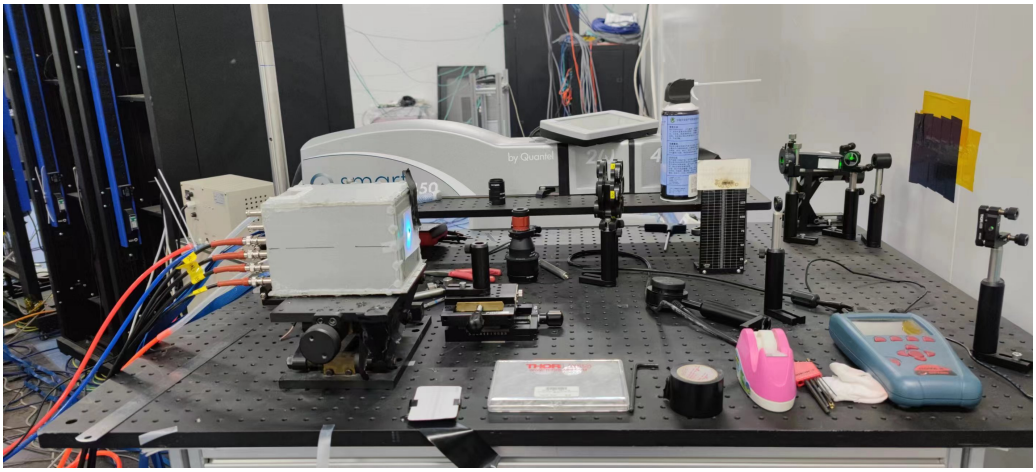
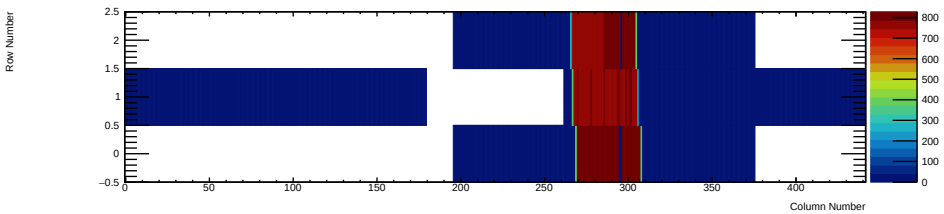
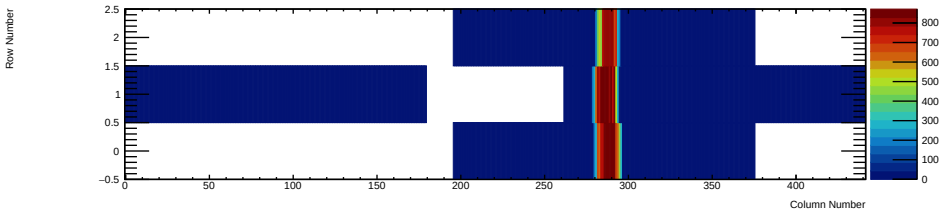


Figure 4. Photo of the setup of laser beam test.

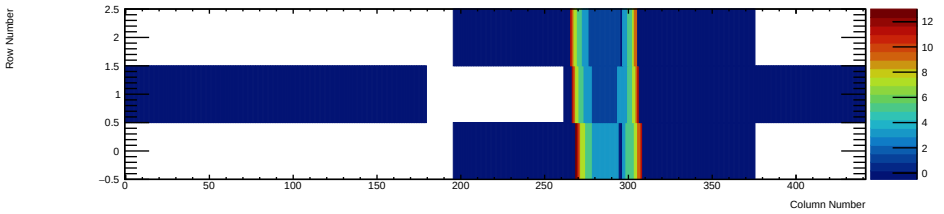


(a)

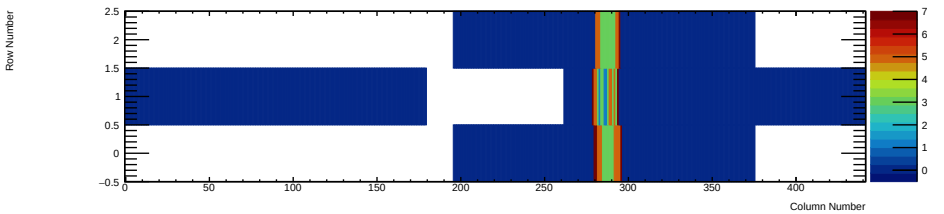


(b)

Figure 5. A single laser pulse in the first (a) and second (b) field cages along the laser beam direction, with the color showing the signal amplitude.



(a)



(b)

Figure 6. A single laser pulse in the first (a) and second (b) field cages along the laser beam direction, with the color showing the signal arrival time.

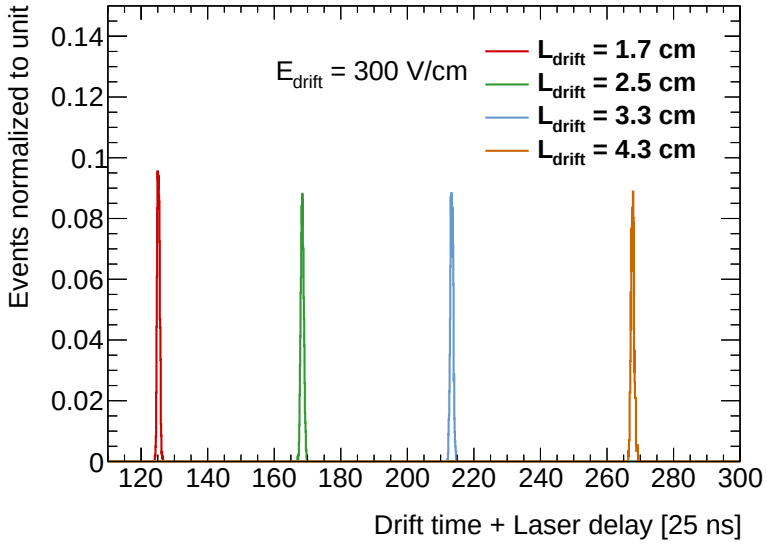
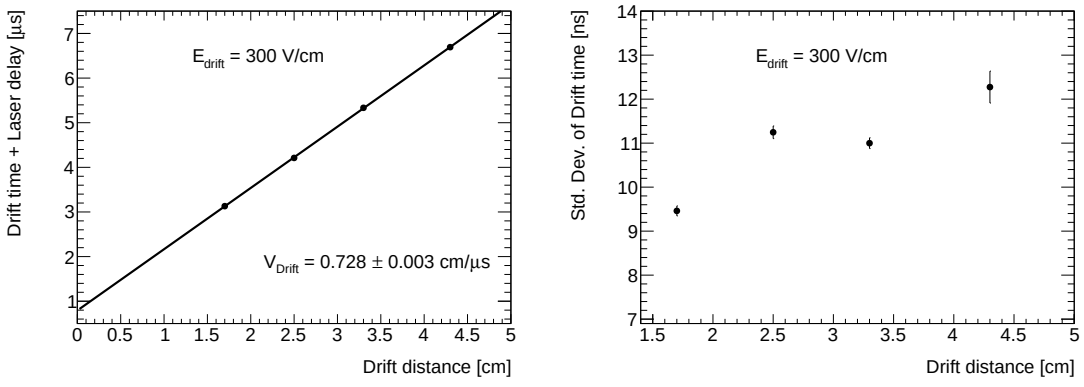
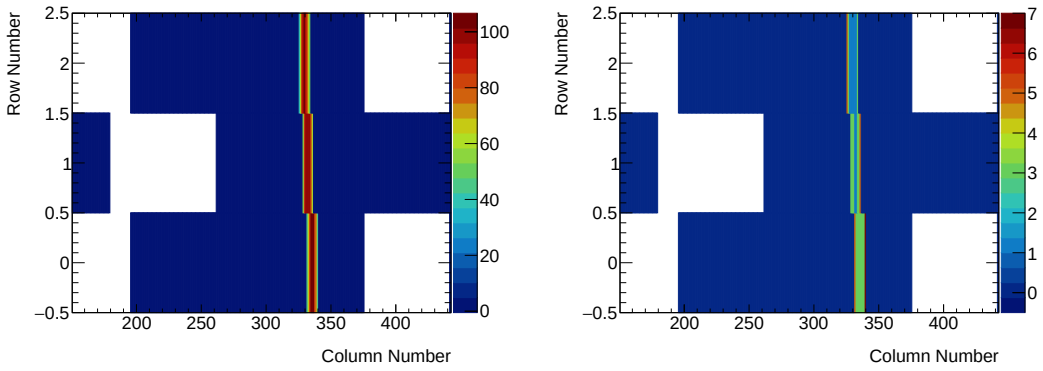


Figure 7. The distributions of signal arrival time for different drift distances in the laser beam test.



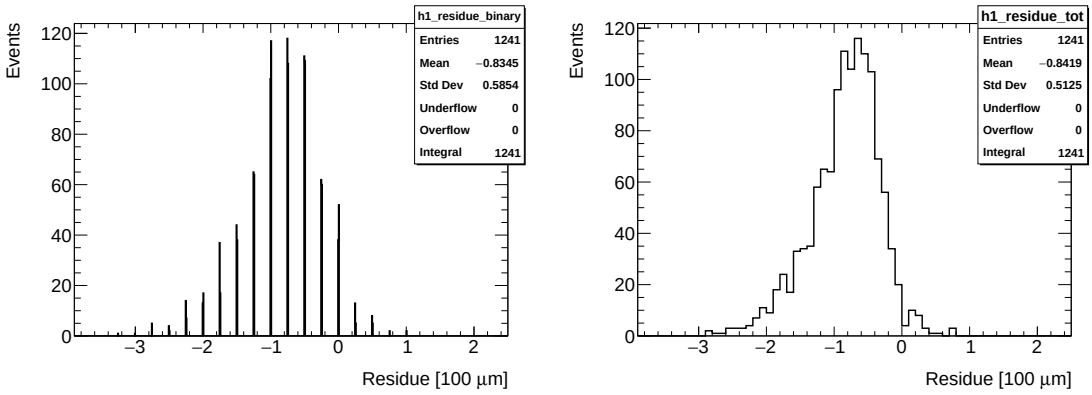
(a) (b)

Figure 8. The mean (a) and standard deviation (b) of signal arrival time for different drift distances in the laser beam test.



(a) (b)

Figure 9. A Kr ion track with the color showing the signal amplitude (a) and time (b).



(a) (b)

Figure 10. The unbiased residual distribution with the cluster position calculated by the geometrical center (a) and center of gravity (b) in the Kr-ion beam test.