Setup of Carbon beam at CNAO

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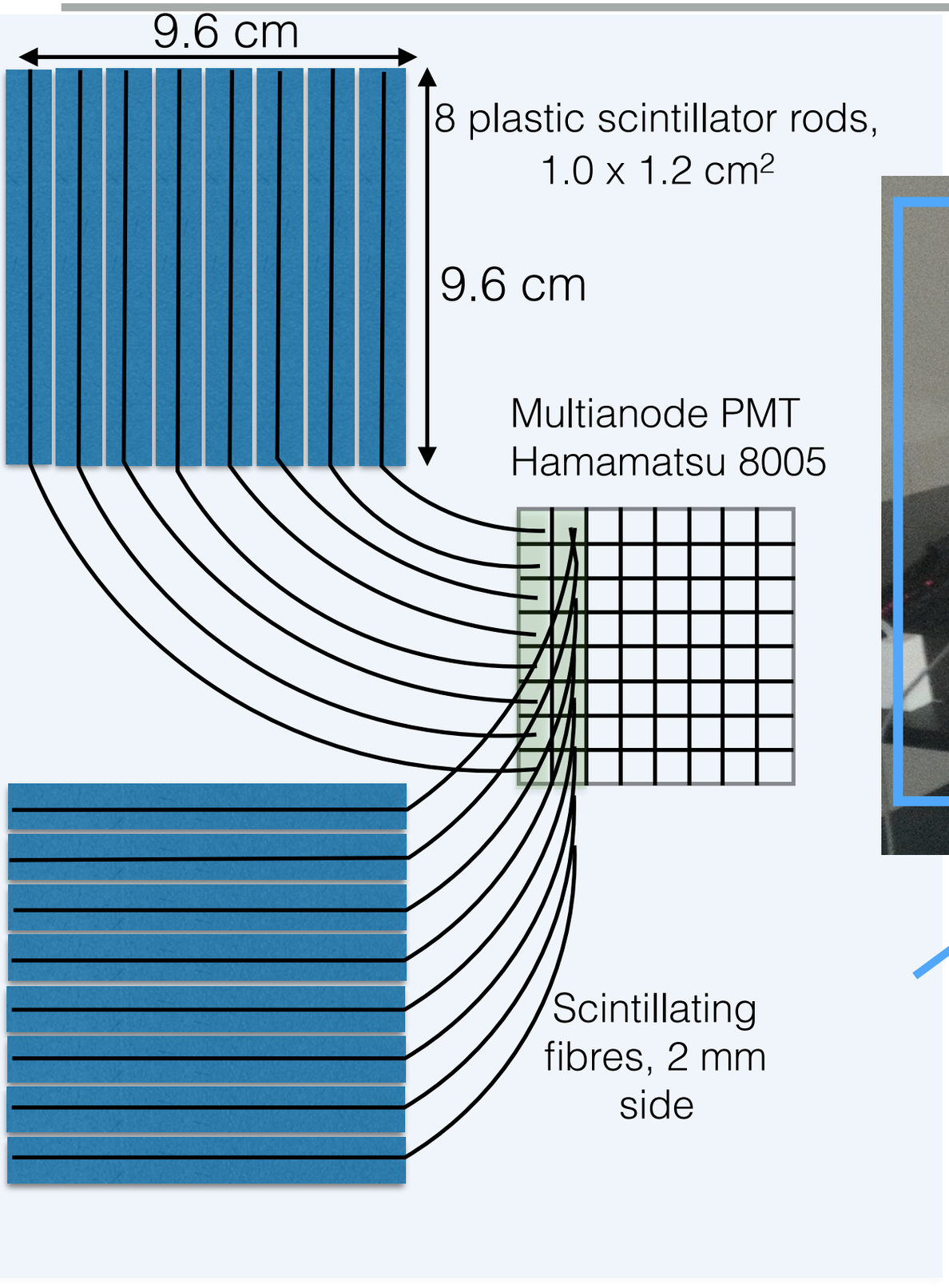
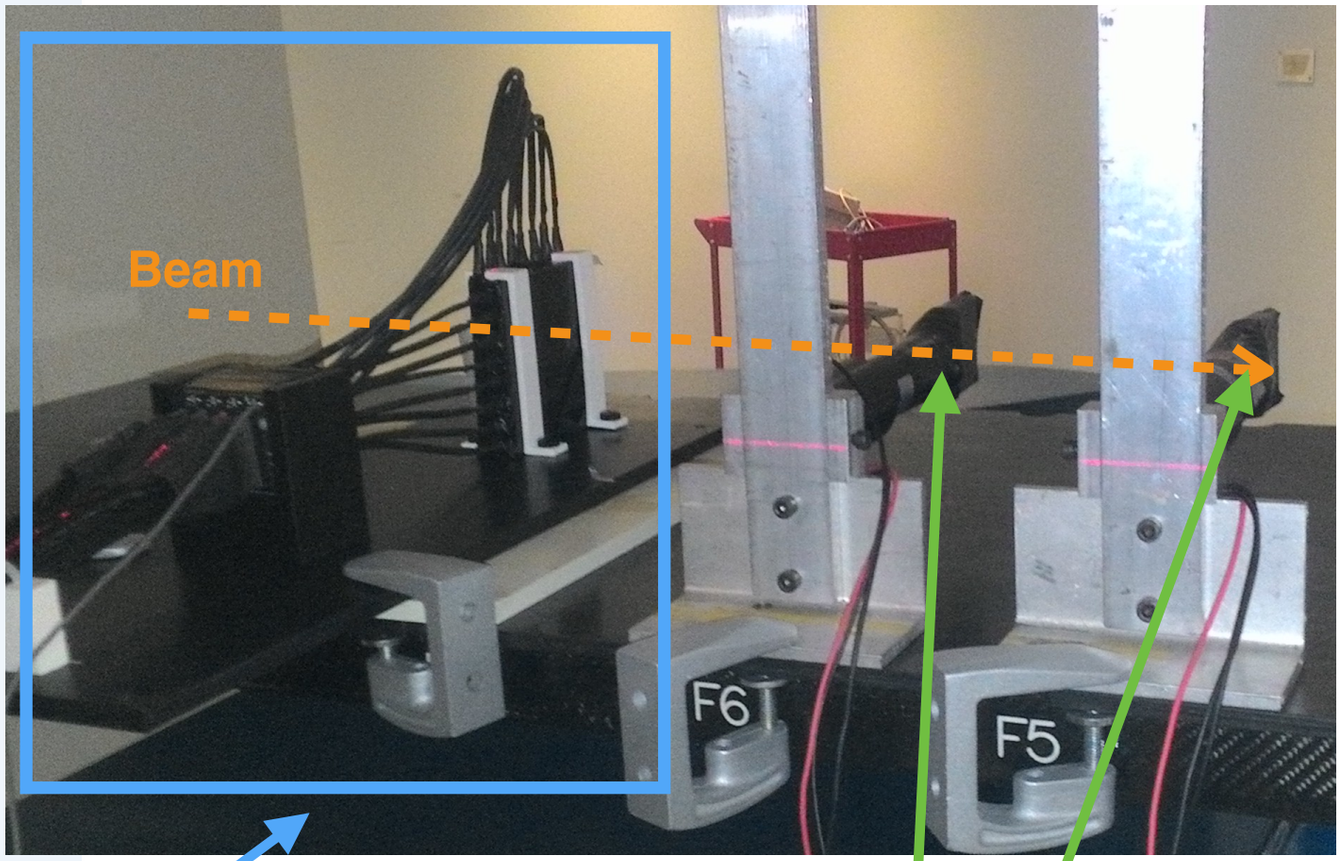
The idea…

- ..was to help the CNAO accelerator technicians to find a setting in order to reach low beam intensities (~kHz)

- We developed a dedicated detector, capable to count the incoming ions and to monitor the beam position in the x-y plane.

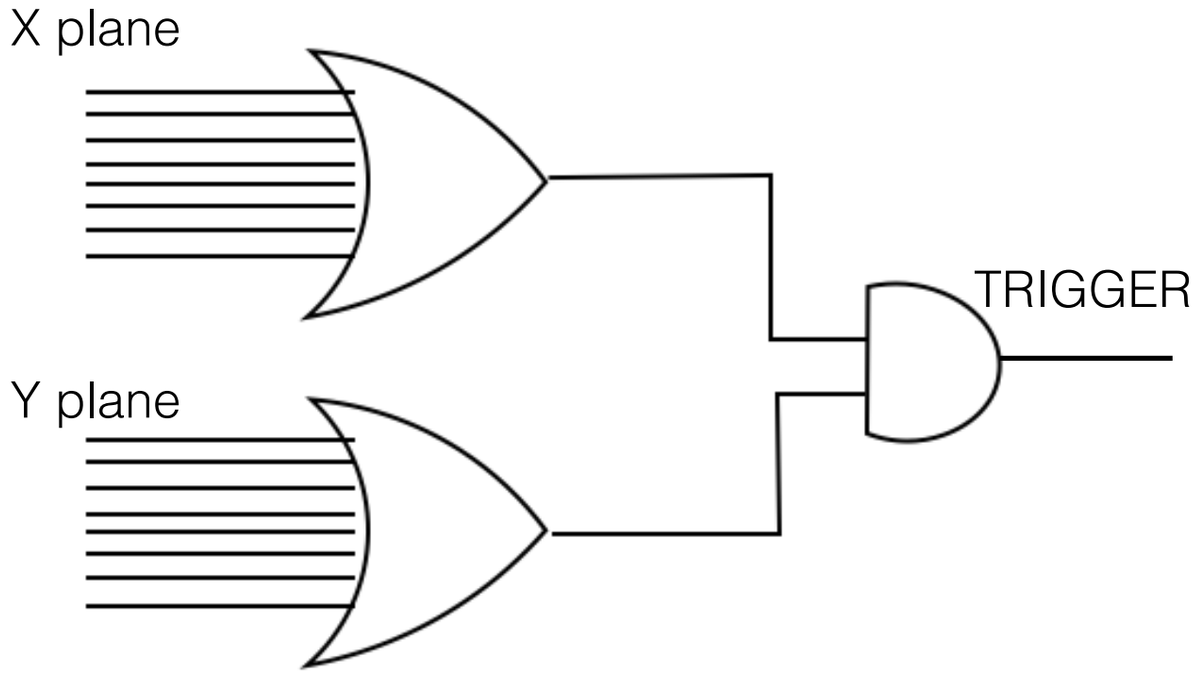
Experimental setup

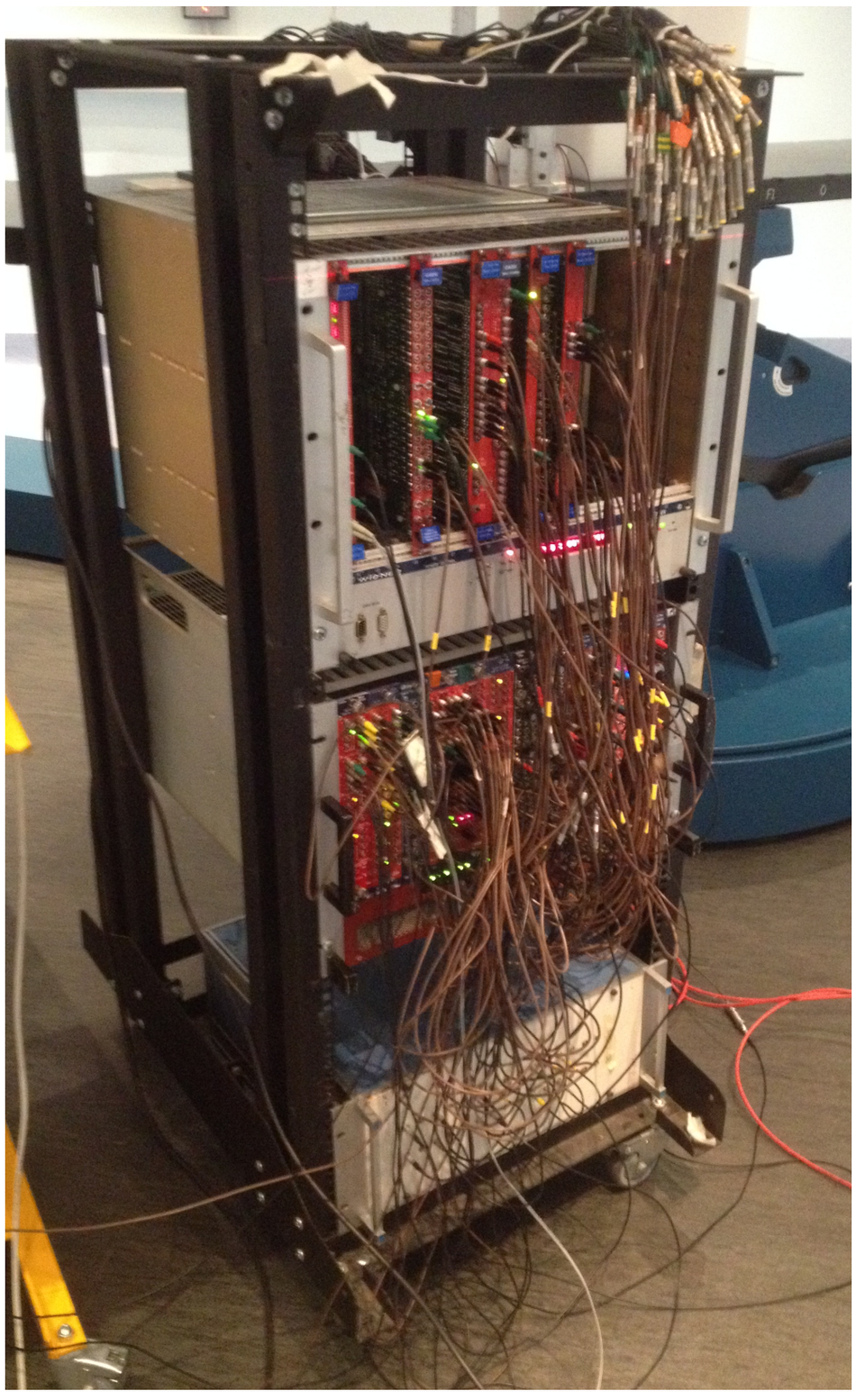




Plastic scintillators 5x5x5 cm³ for efficiency measurement

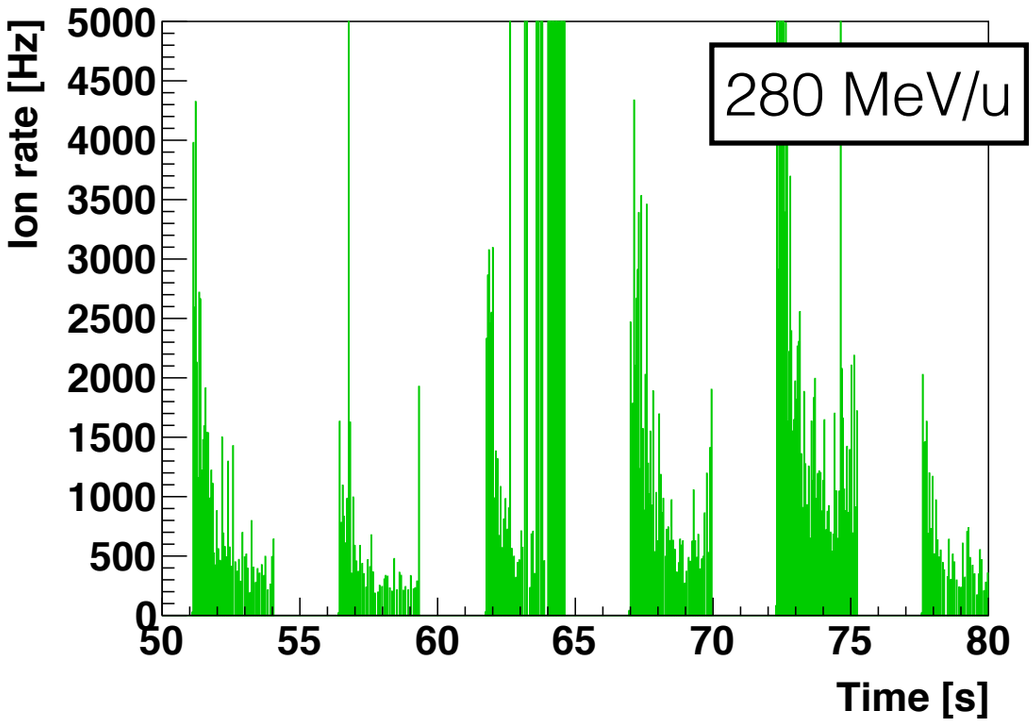
Trigger and DAQ

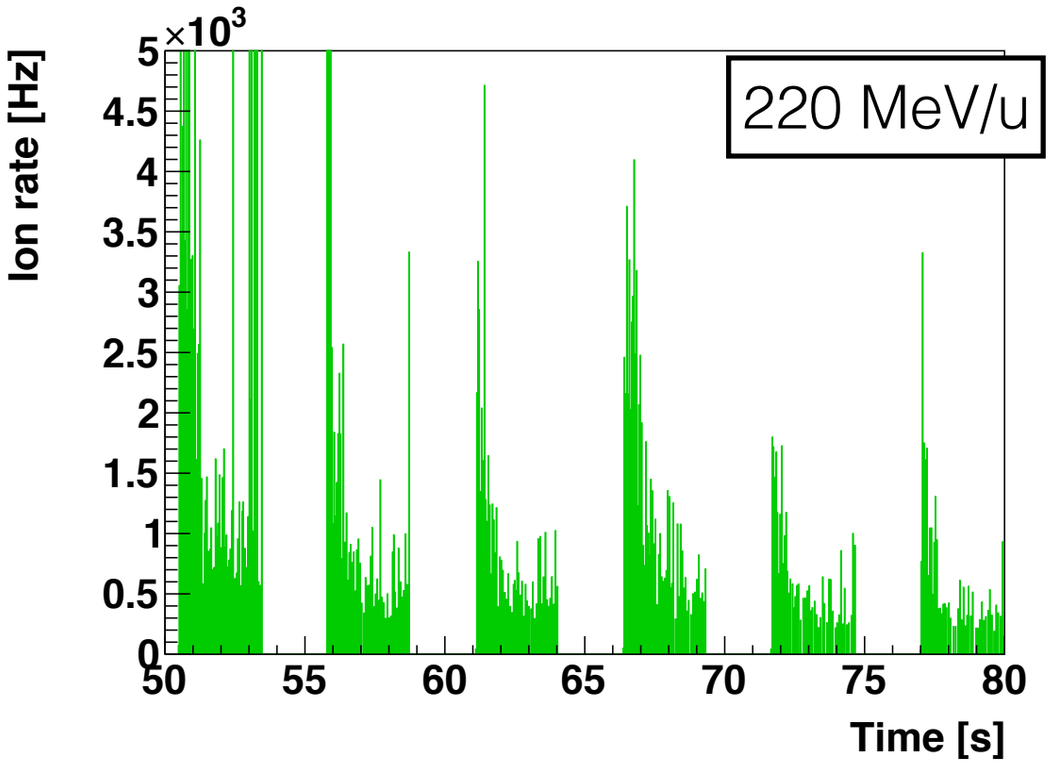


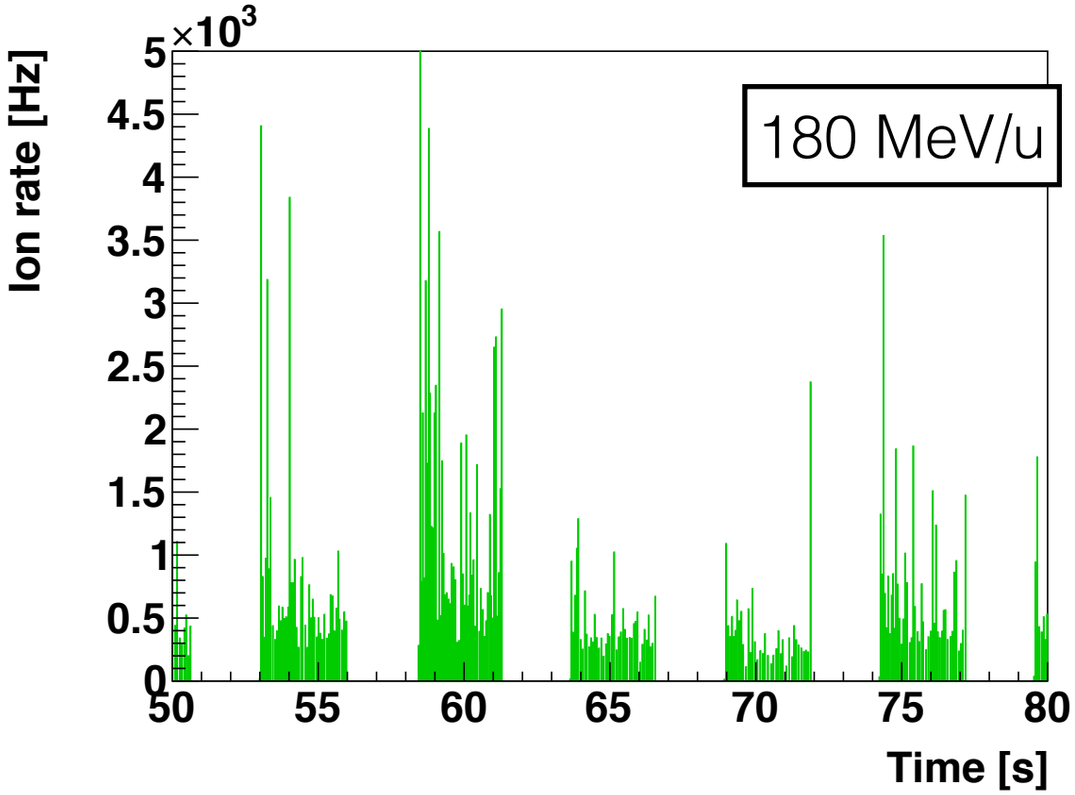


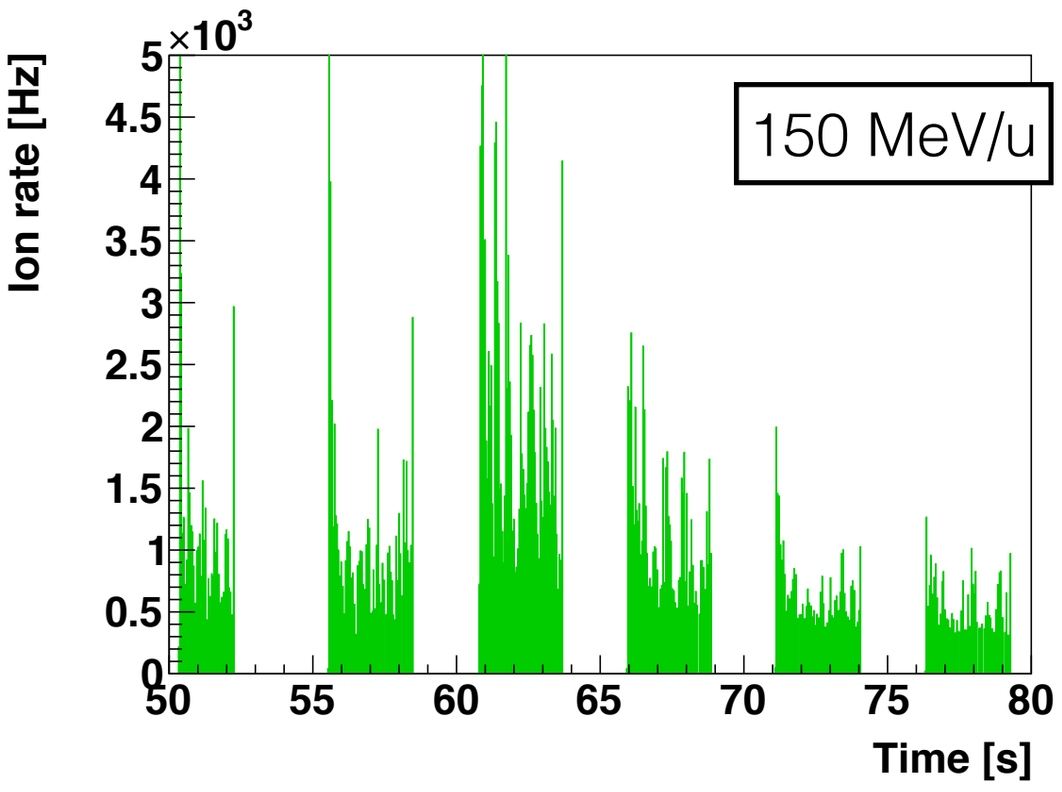
- Trigger: coincidence between the X-Y planes. Fixed dead time of 30 ms
- VME-based data acquisition
- 16 channels, multi-hit TDC V1290
- 16 channels, QDC V792
- Scaler V560, V260

Carbon ion beam - Intensities vs time



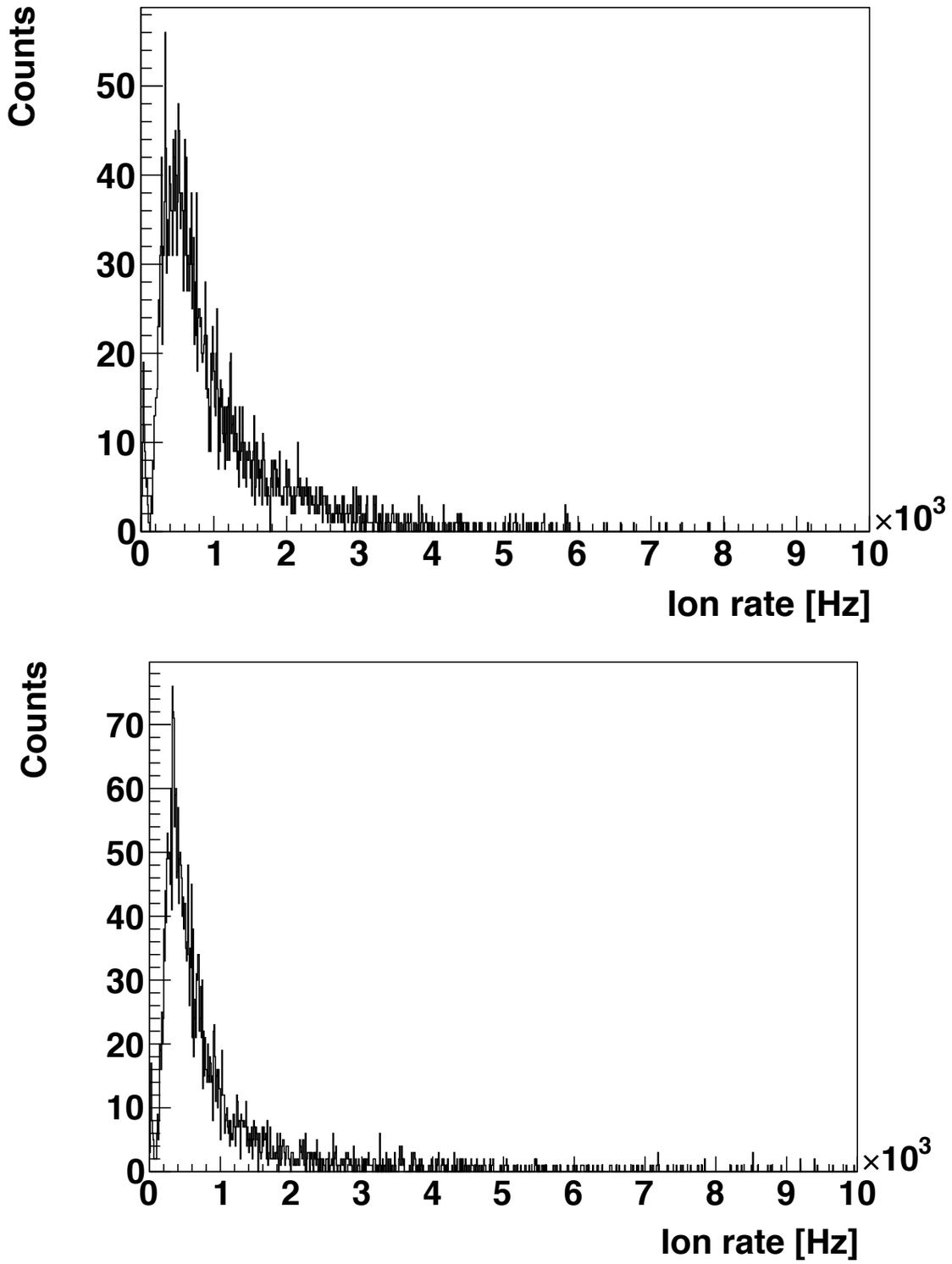


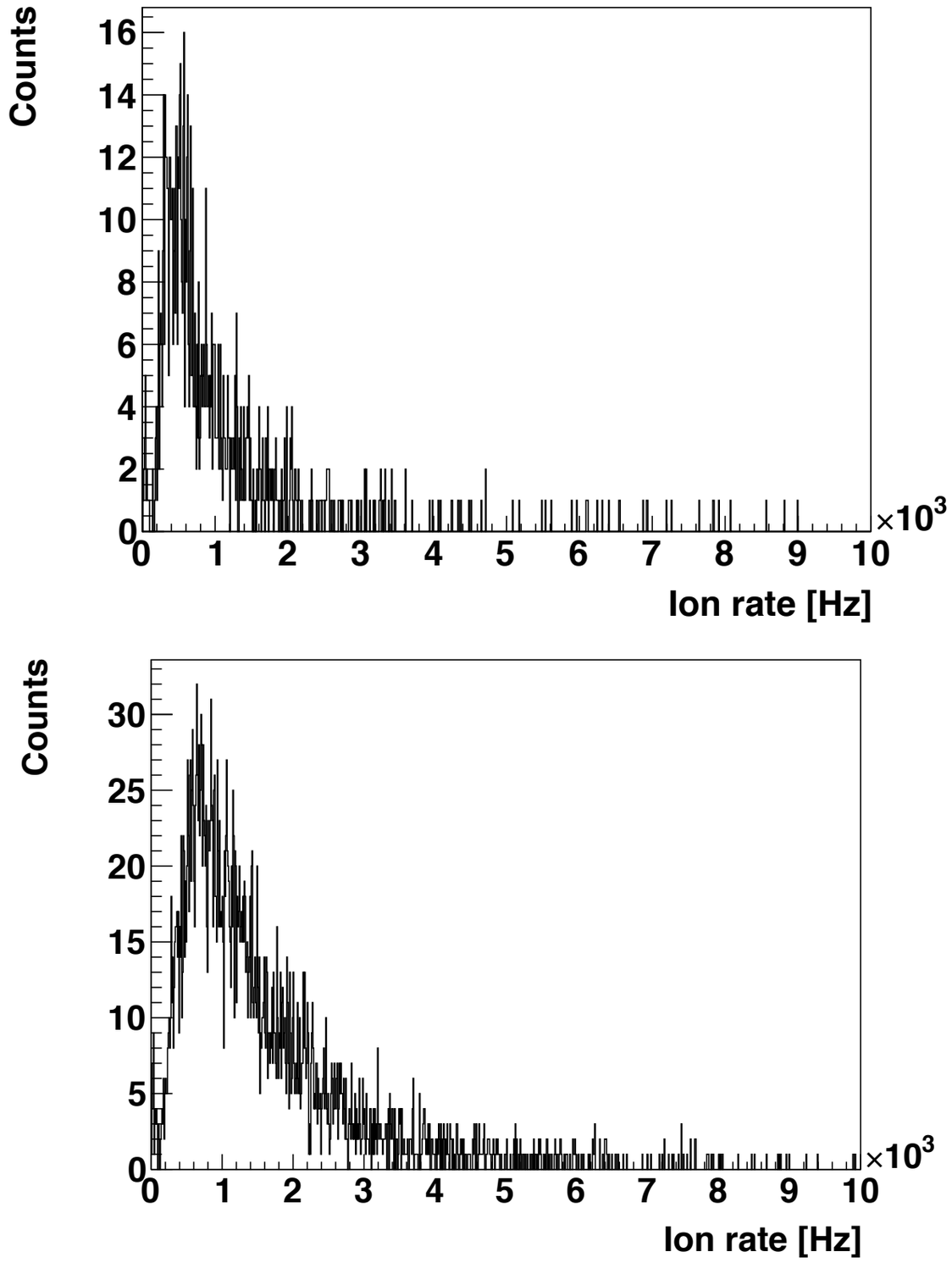




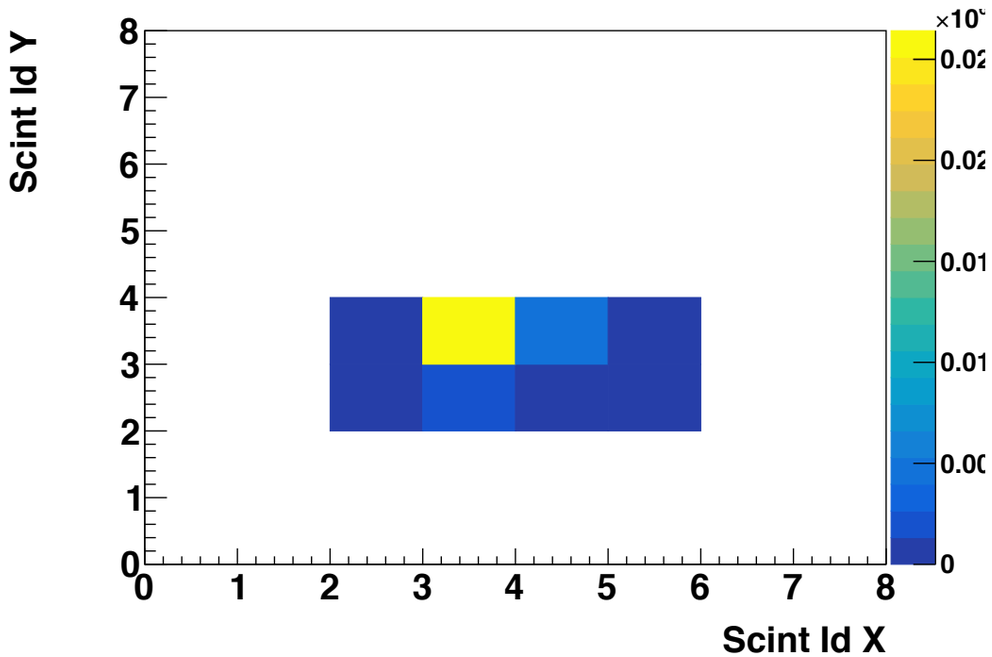
Carbon ion beam - Intensity distributions

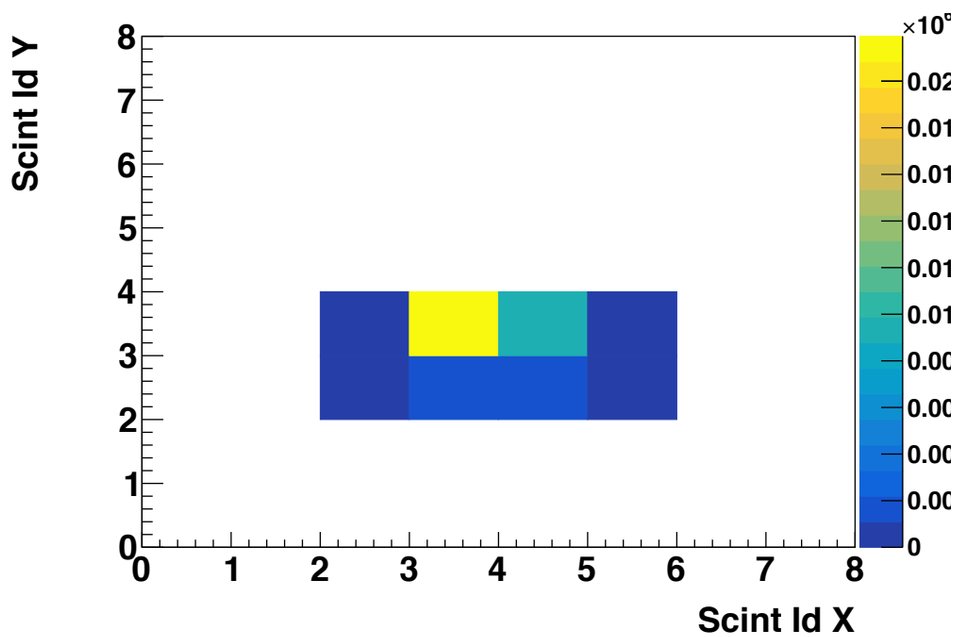
~90% efficiency has been measured, not applied in this analysis

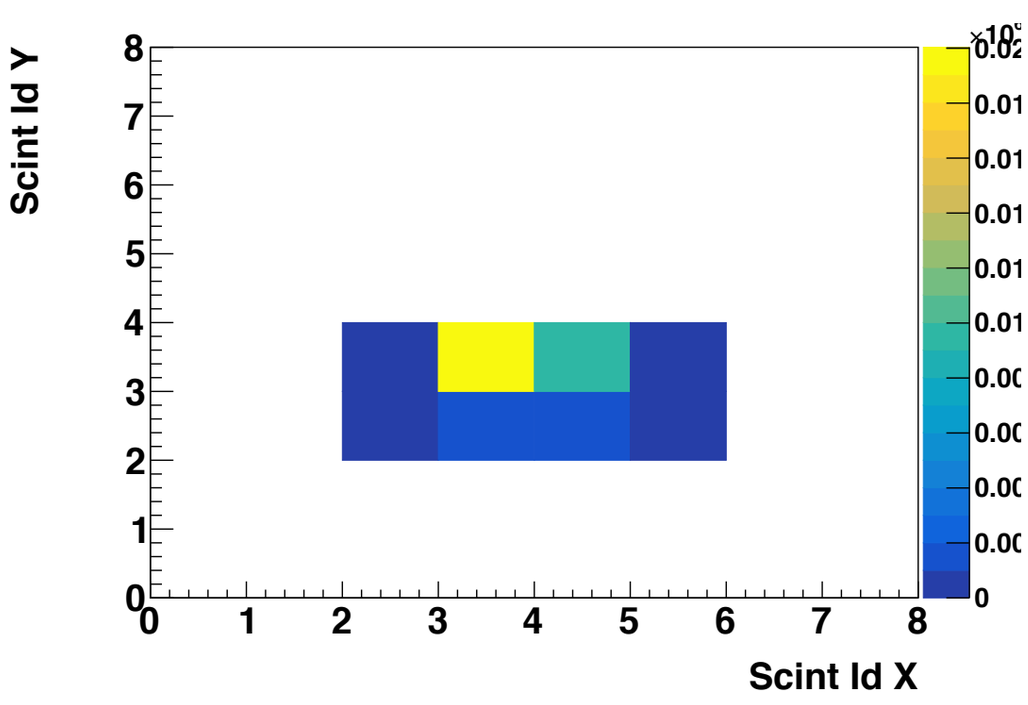


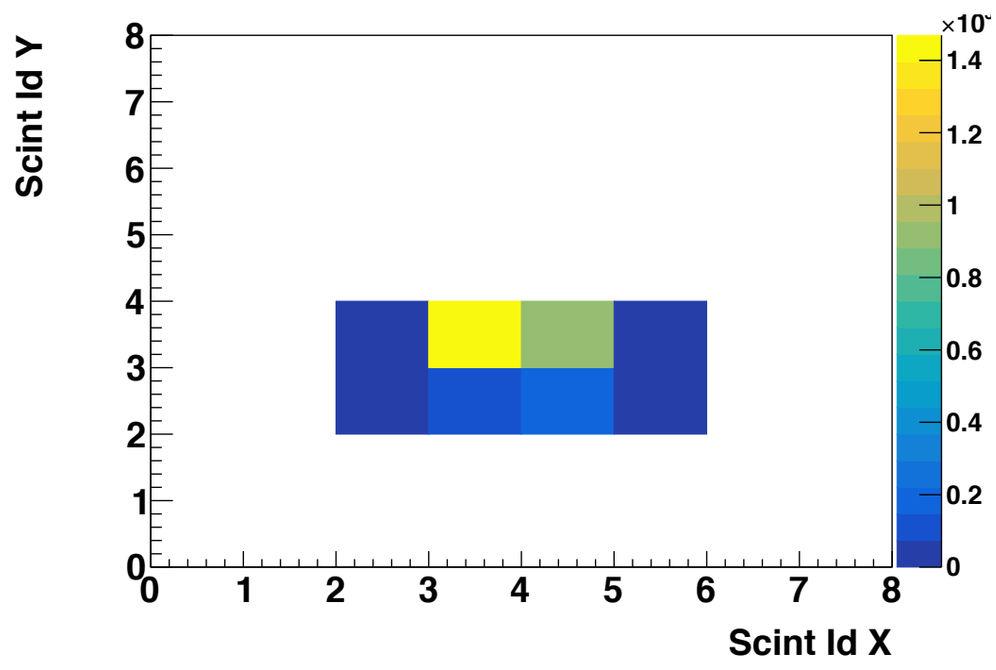


Carbon ion beam - Spatial distribution



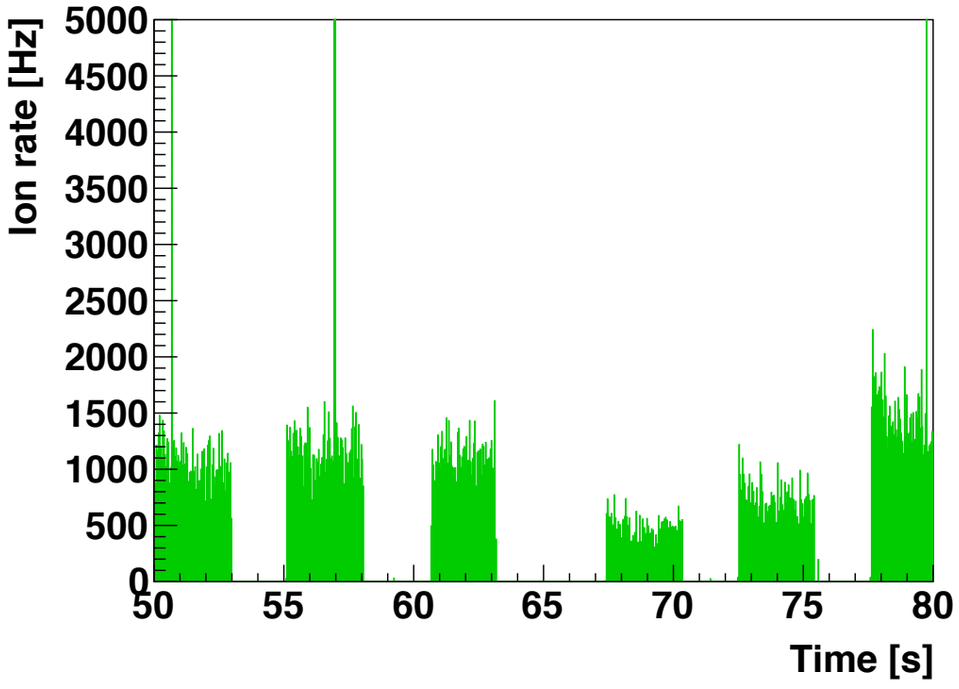


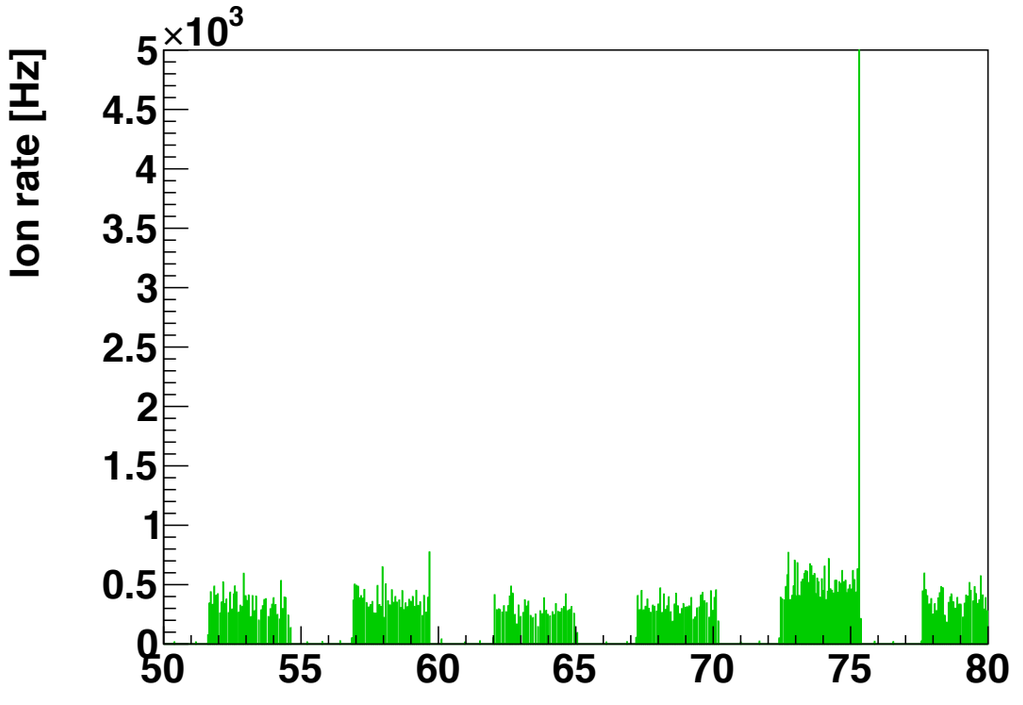


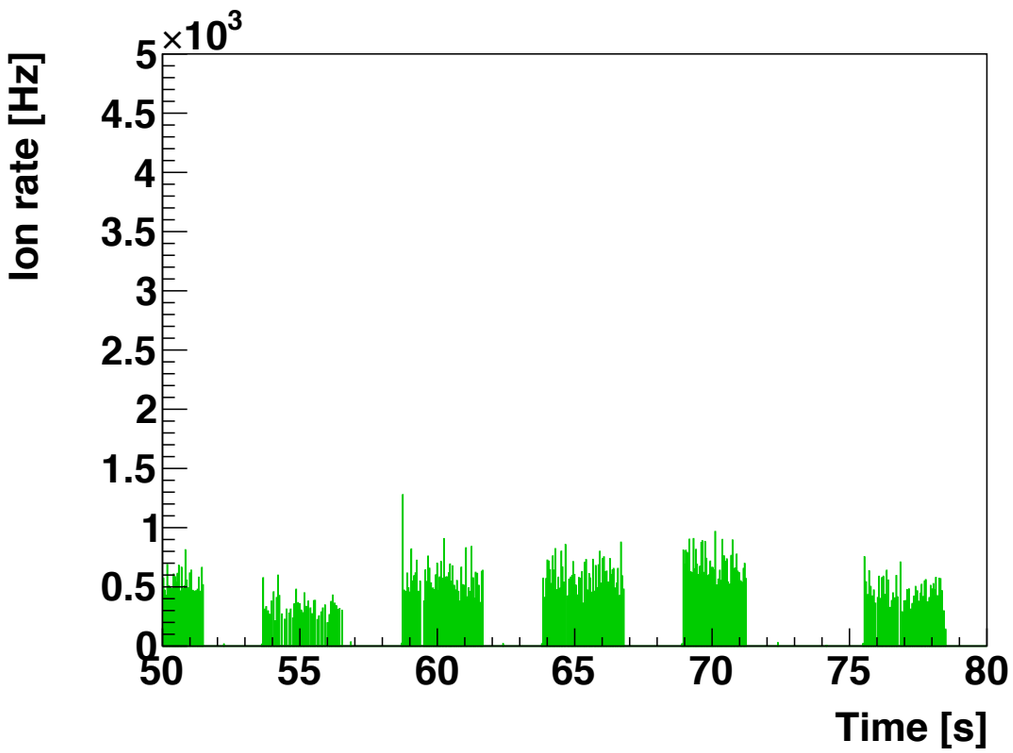


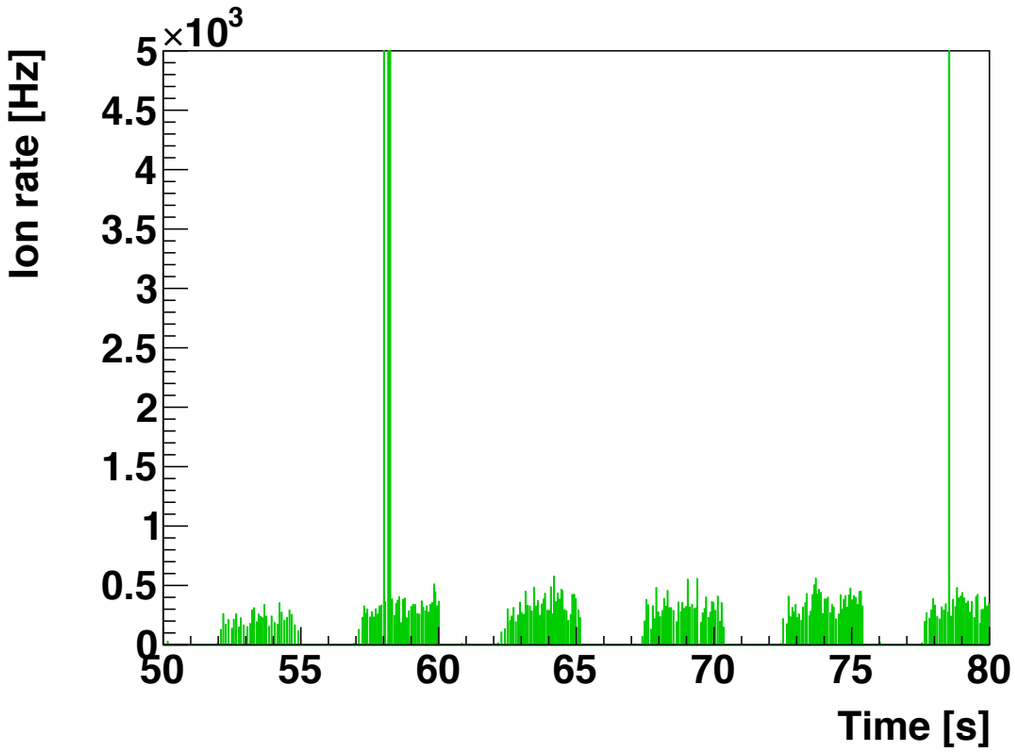
- No significant beam spot movement!

Protons beam - Intensities vs time

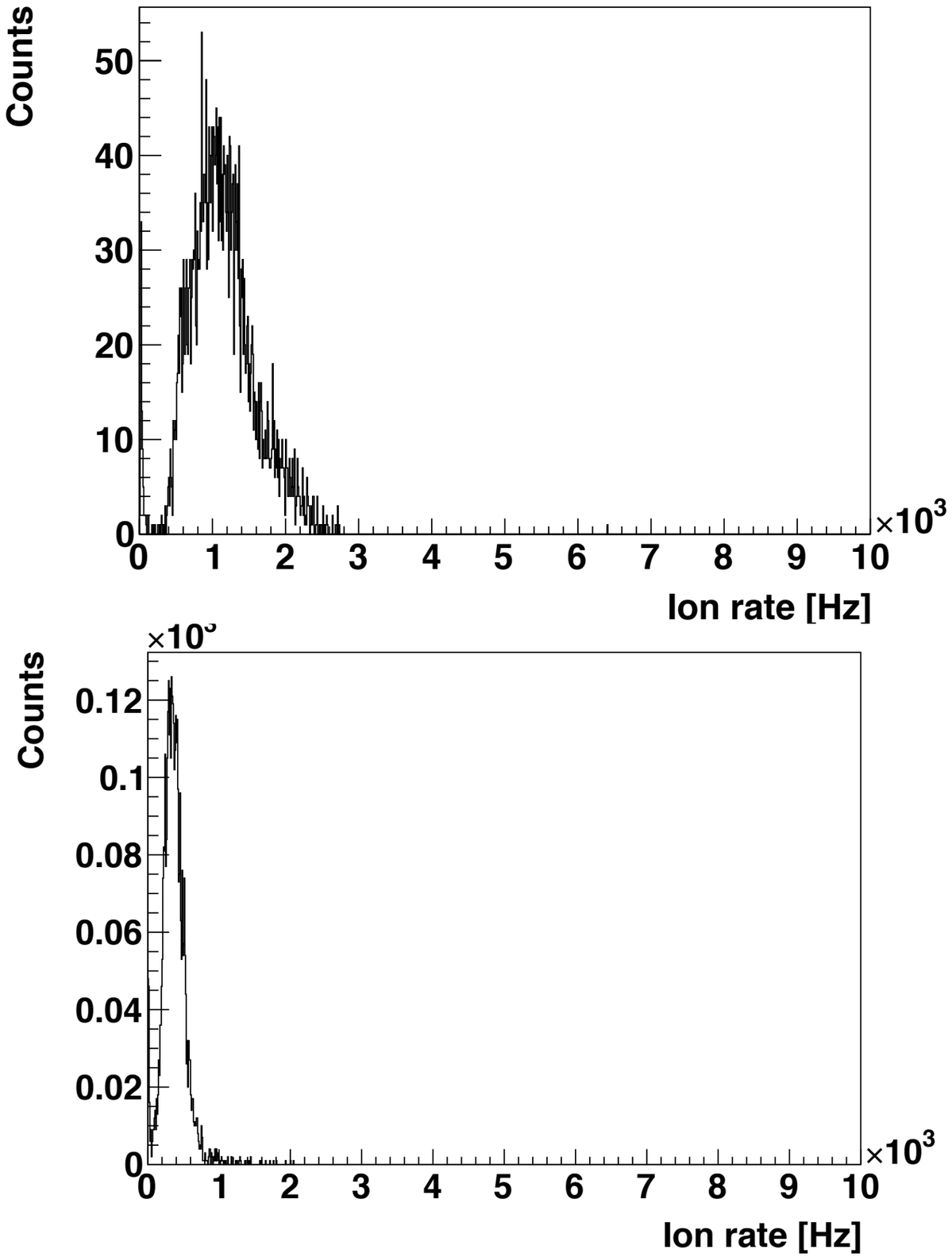


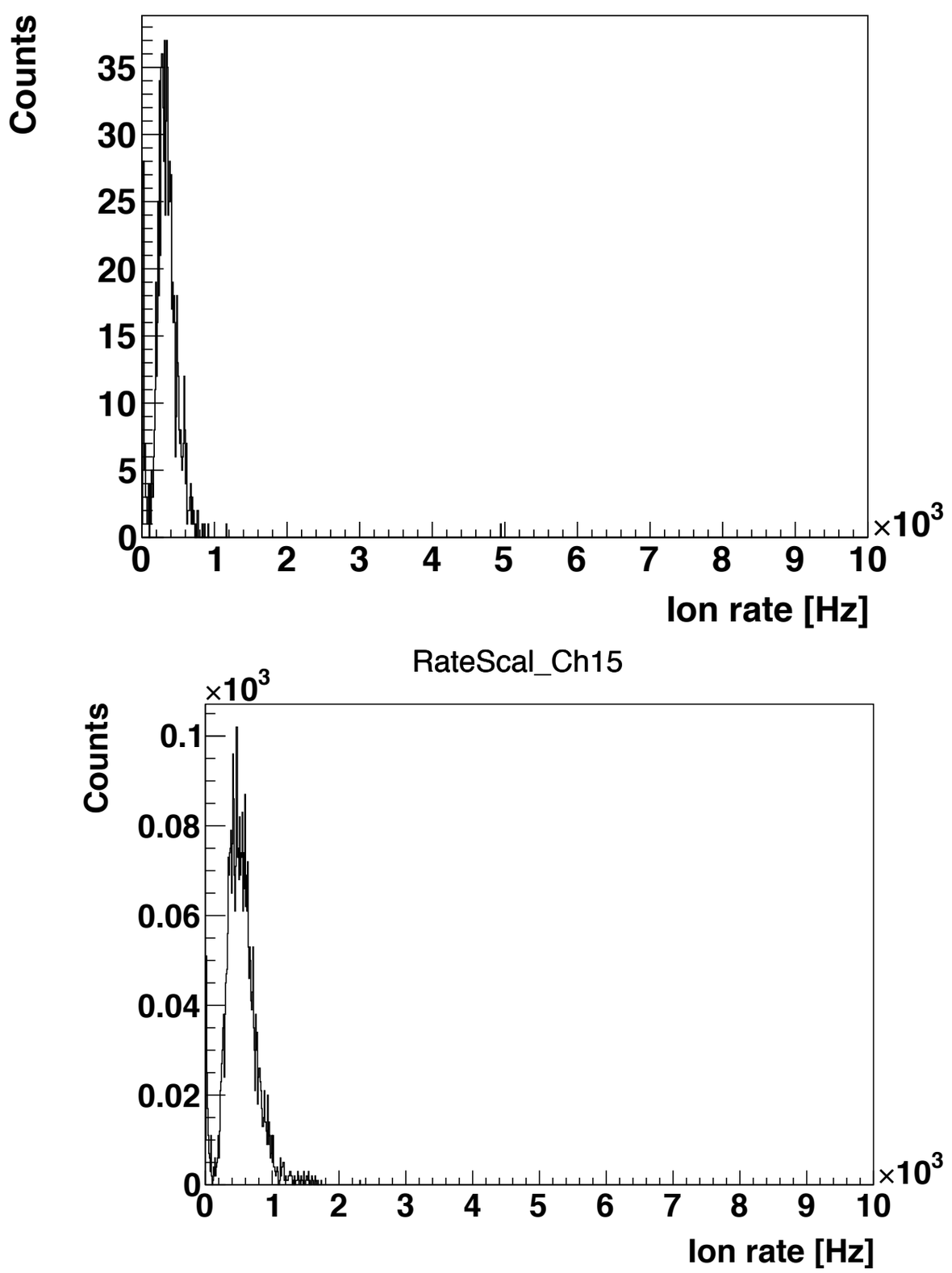






Protons beam - Intensity distribution





Conclusions

- It is possible to reach beam intensities of the order of kHz at CNAO, both for Carbon ions and protons a different energies.

- The beam spot does not significantly change its position wrt the isocenter.