Sheffield THGEM Update

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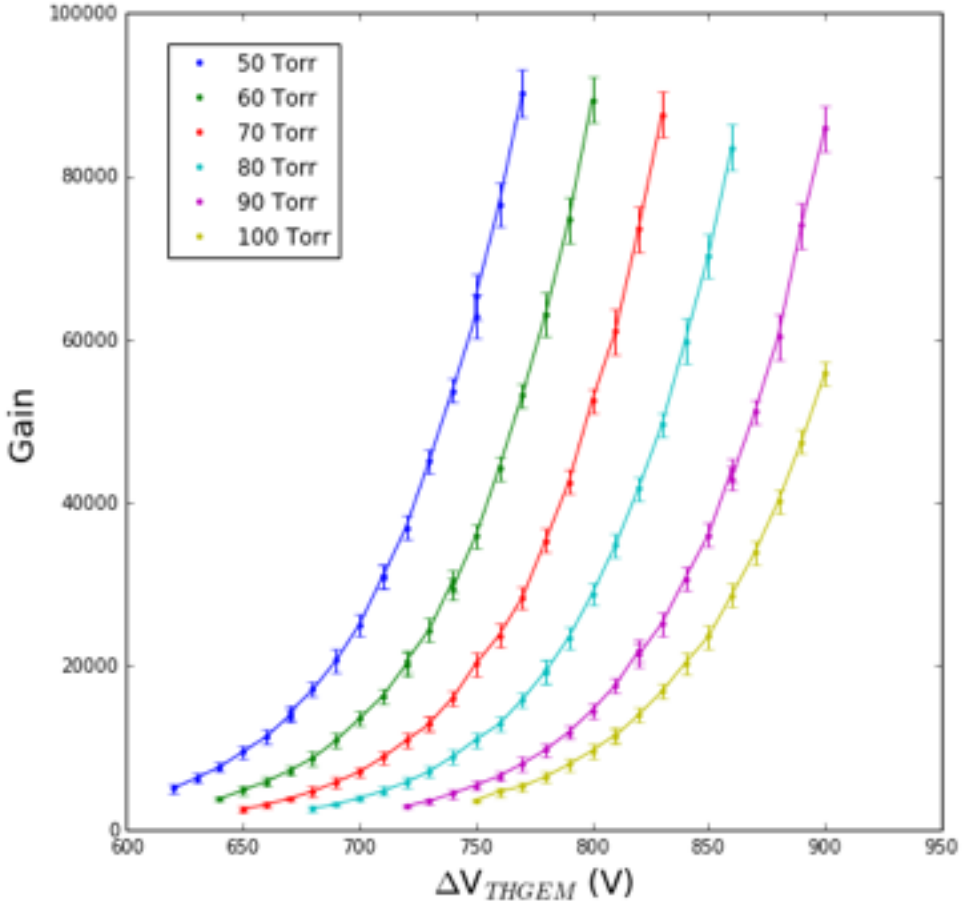
Charge readout.

I used the charge readout to calibrate the gain of the detector and produced the following gain curves in different pressures of CF4, getting up to a gain of > 90,000 in 50 Torr CF4 with a single THGEM.

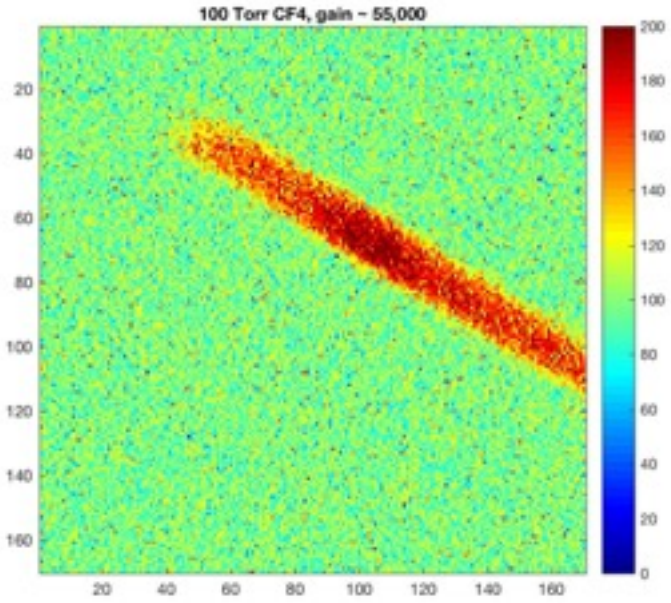
100 Torr curve stops early due to it being the first test done and I decided not to push the THGEMs too far at the start.

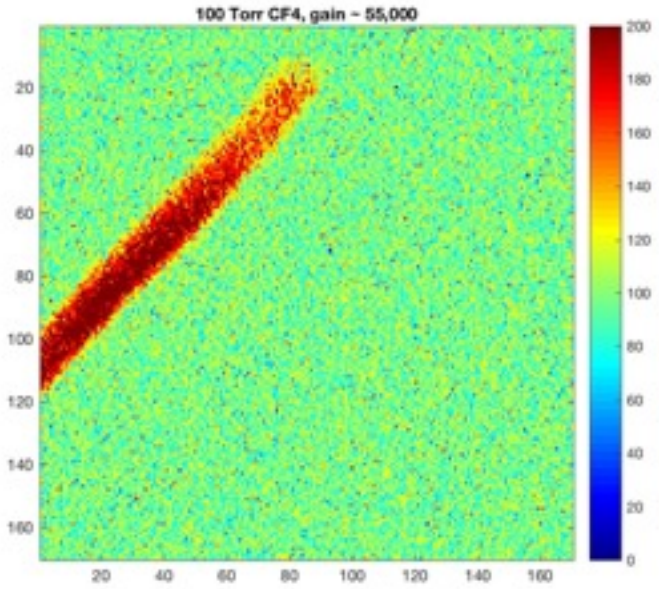
Setup diagram is shown on the final page.



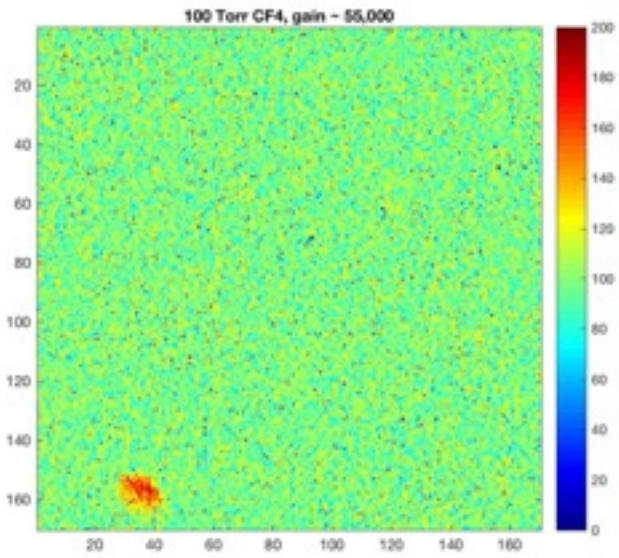
Optical readout

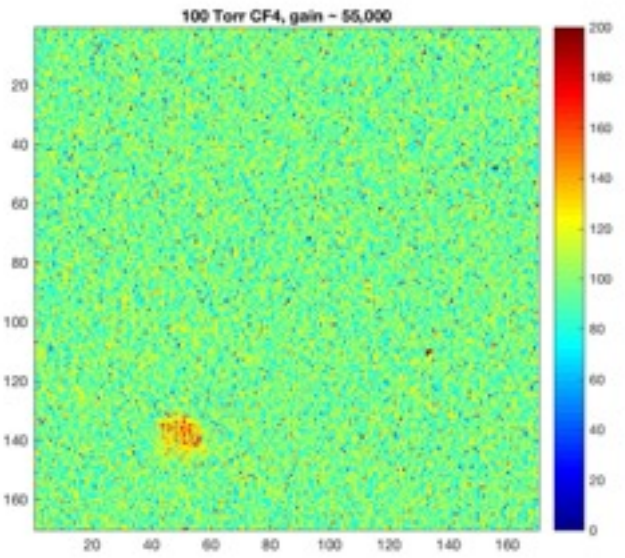
I am now optimising the optical readout. Some example alpha images are shown below. These were take in 100 Torr with a gain of ~55,000. The camera used 6x6 binning with a 2 second exposure. The imaging area is ~ 1 x 1 cm.





I also have some possible Fe55 candidates, shown below. I am just doing control tests to make sure these are source events and not background as the rate seems lower than expected when extrapolating from the charge rate.





Analysis and next steps

Progress is now being made on the MATLAB scripts to analyse these events.

The next steps will be to test with a Co60 source to look for electron recoils and a neutron source to see nuclear recoils with the optical setup. Then I will start with SF6.

Setup diagram

Only upper THGEM used for these tests, but lower has been tested and works well with charge readout.