

“Ecloud” Measurements with MI IPMs

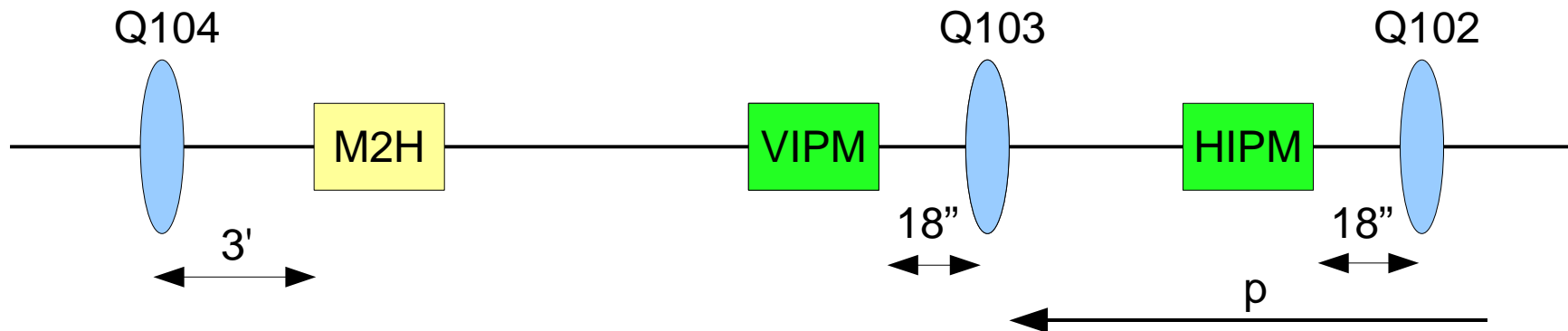
C.Y. Tan
31 Jan 2008

Goal

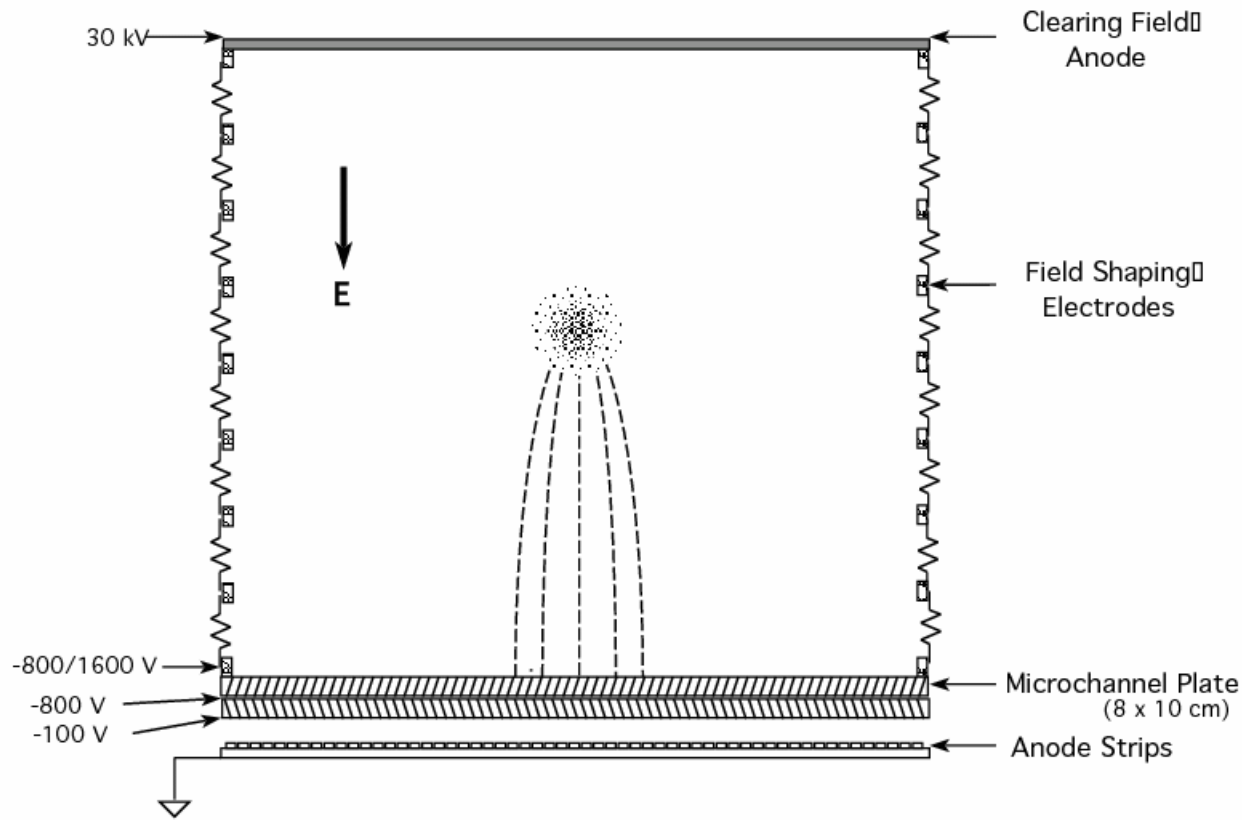
- See if the MI IPMs can see any signal with the sweep field off
 - We want the sweep field off so that we will not perturb any ecloud buildup. --- Looking at the construction of the IPM, I doubt if buildup can happen and that I am really looking at ions.
 - If there is a signal, then see if we can correlate it with I:CLOUD which is the RFA electron detector.

Location of MI IPMs

- There are 4 IPMs available in the MI
 - 2 old style IPMs which sweeps IONs onto MCPs.
 - 1 new style IPMs which sweeps electrons onto MCPs.
- For evaluation, I am using the old style horizontal IPM



Picture of the old style IPM plus some params

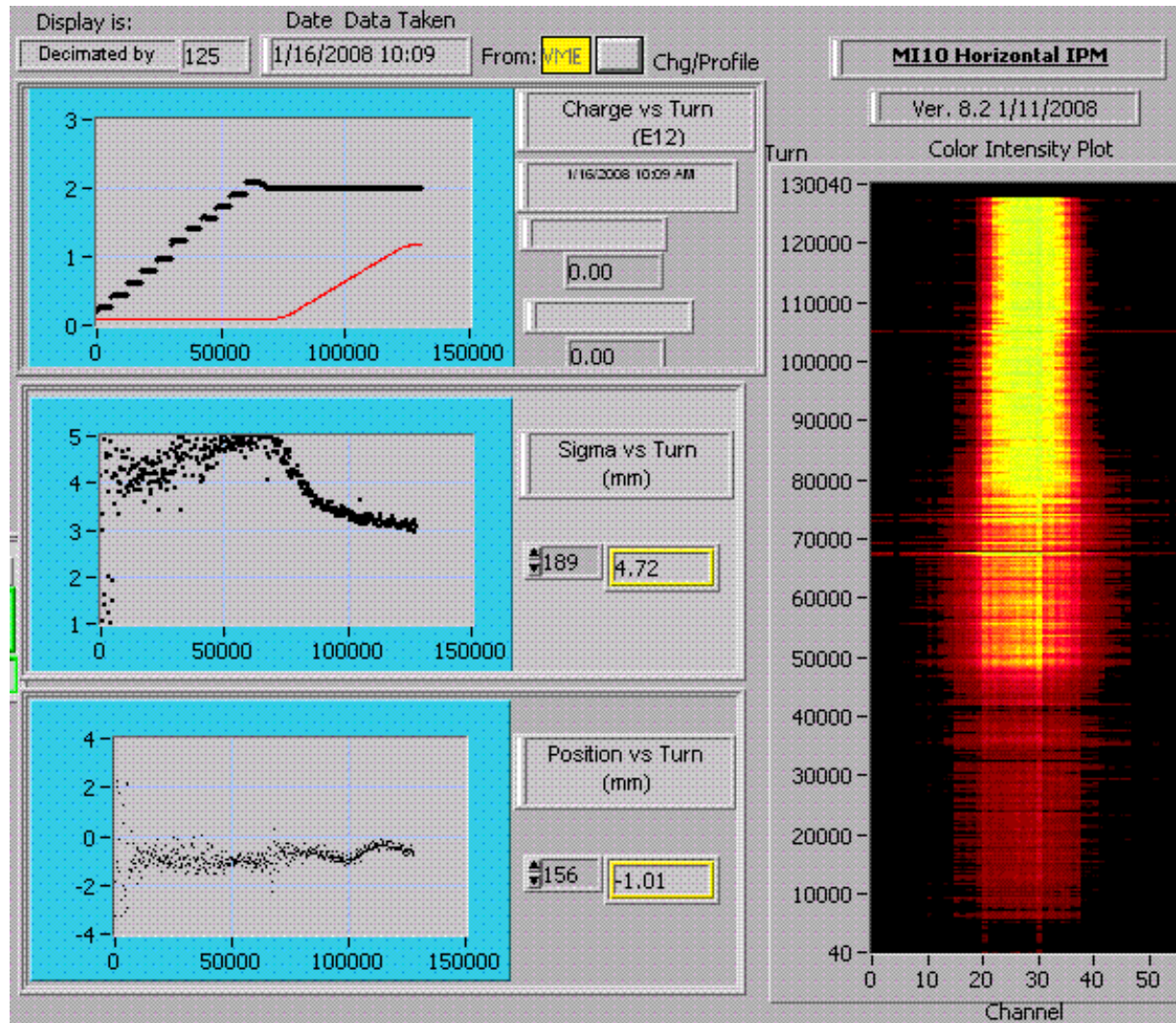


**Ion Profile Monitor
Vacuum Chamber Detail**

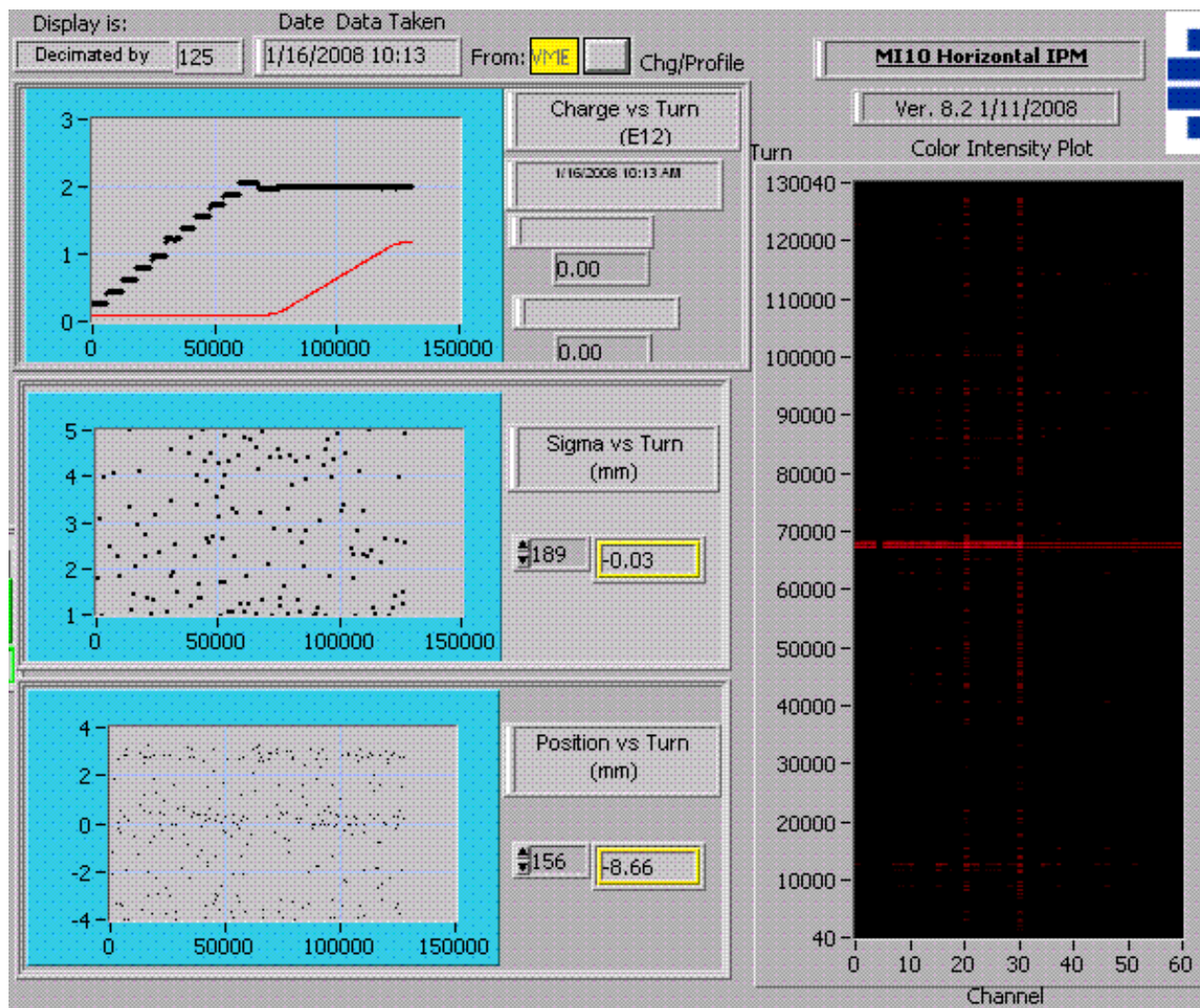
4/15/03 jrjz

Looking at the construction of the IPM, I think I am seeing IONS and NOT electrons even with the sweep field turned off! Can I change sign of the sweep field?

IPM Data with Sweep Voltage ON and MCP at 1100V (nominal op)



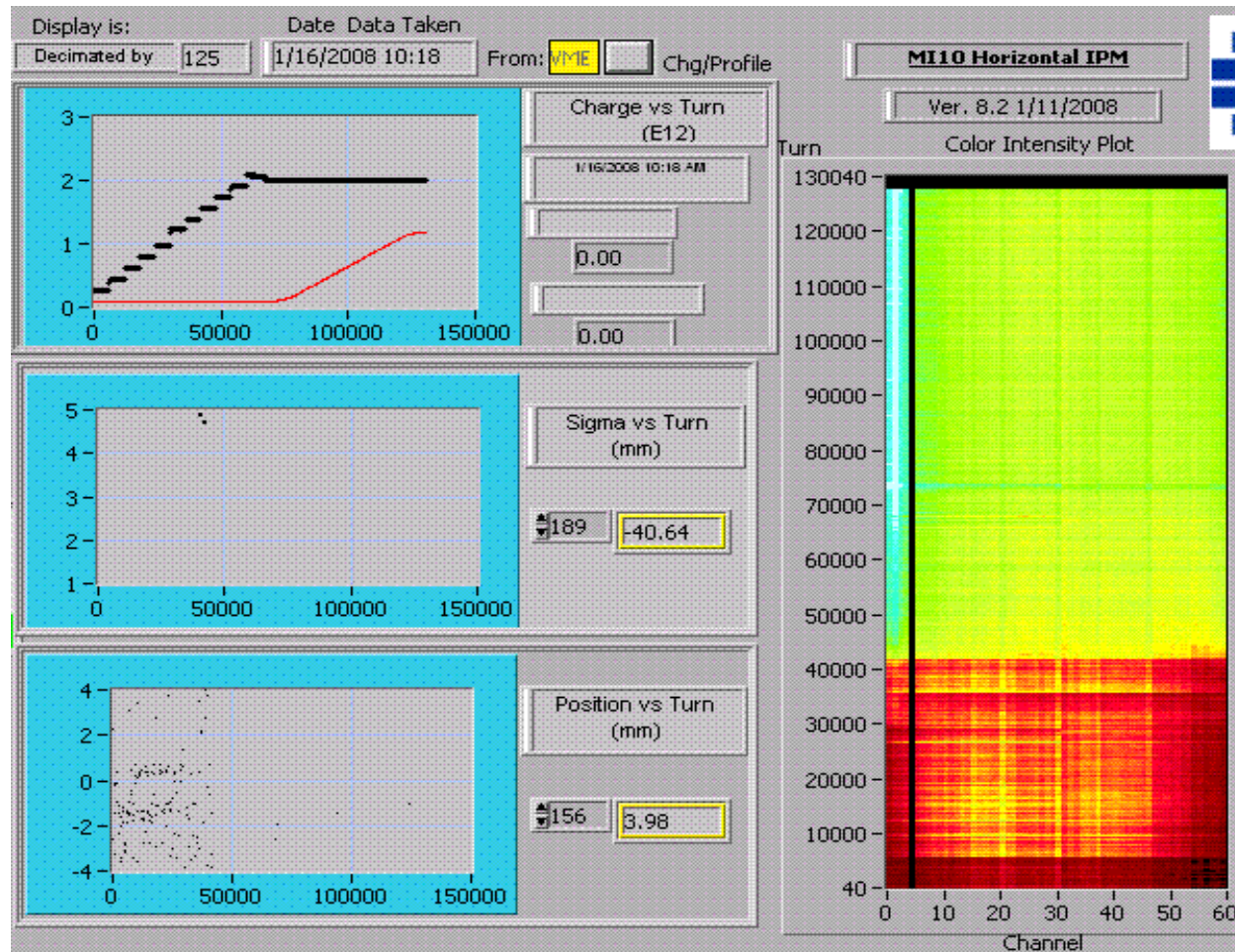
IPM Data with Sweep Voltage OFF and MCP at 1100V



I see nothing.

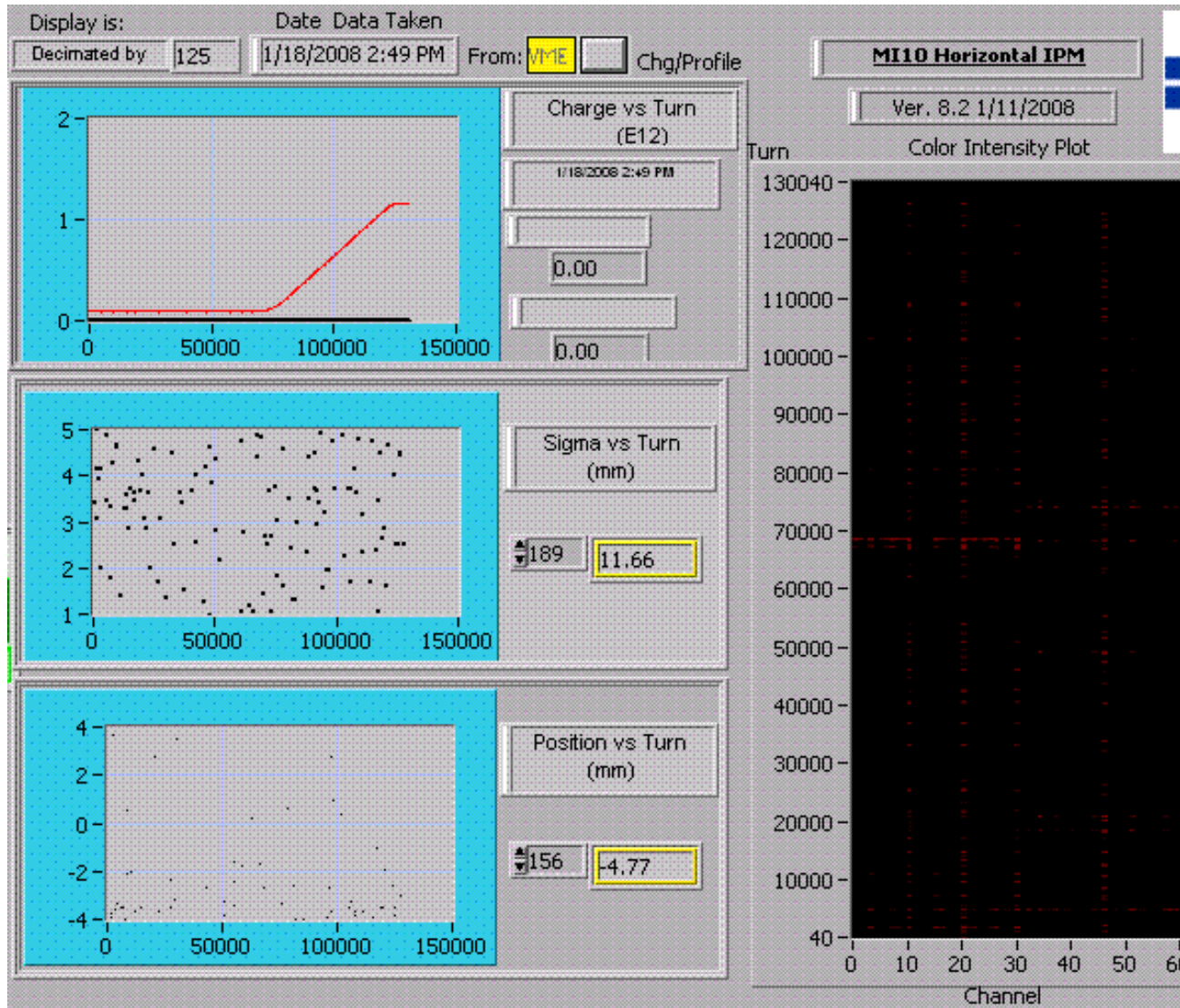
← Looks at something at start of ramp. RF artifact or is it transition?

Bump juice up on MCP now at 1300V



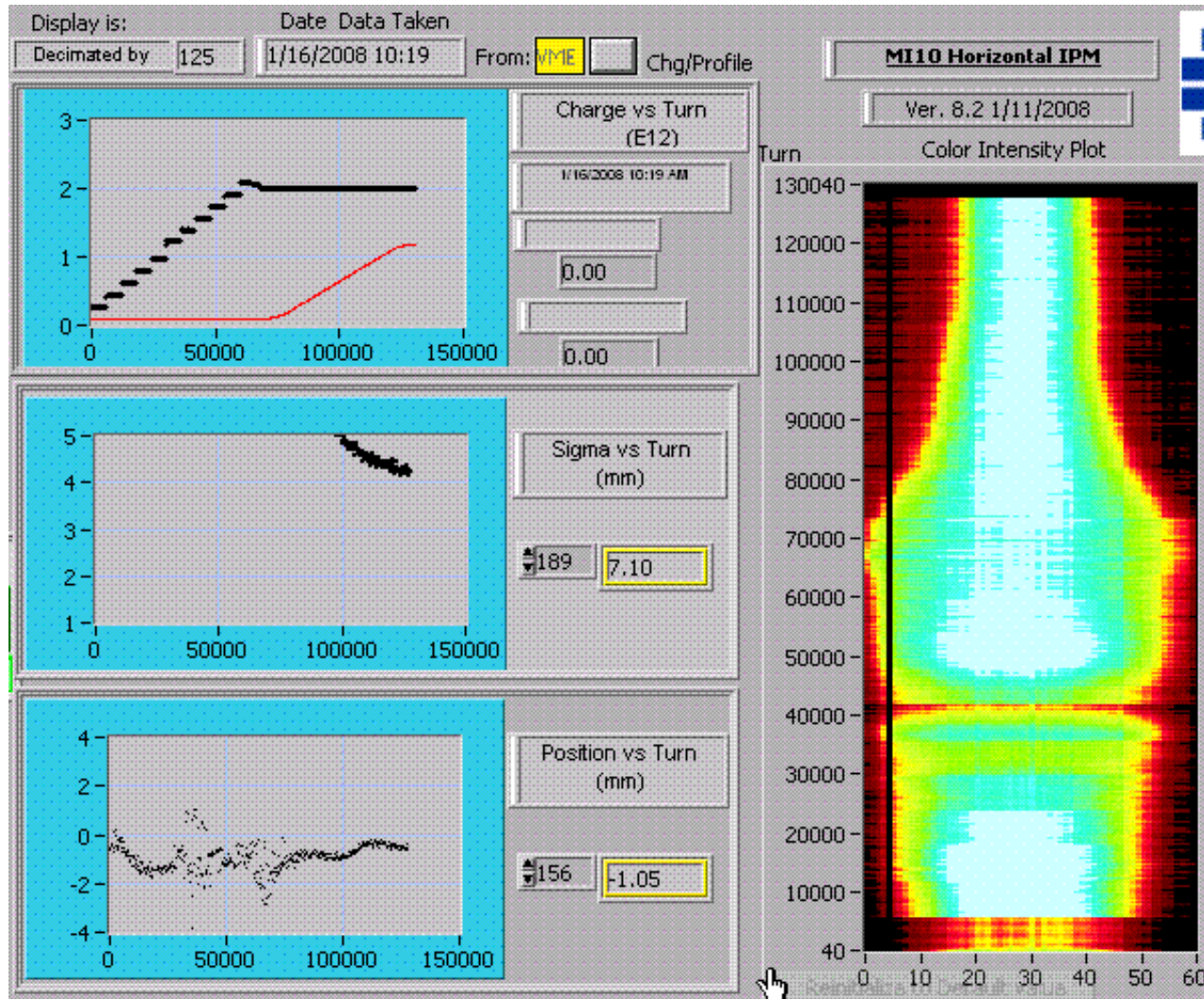
Clear signal!!!!

MCP at 1300V with no beam



No signal when there is no beam

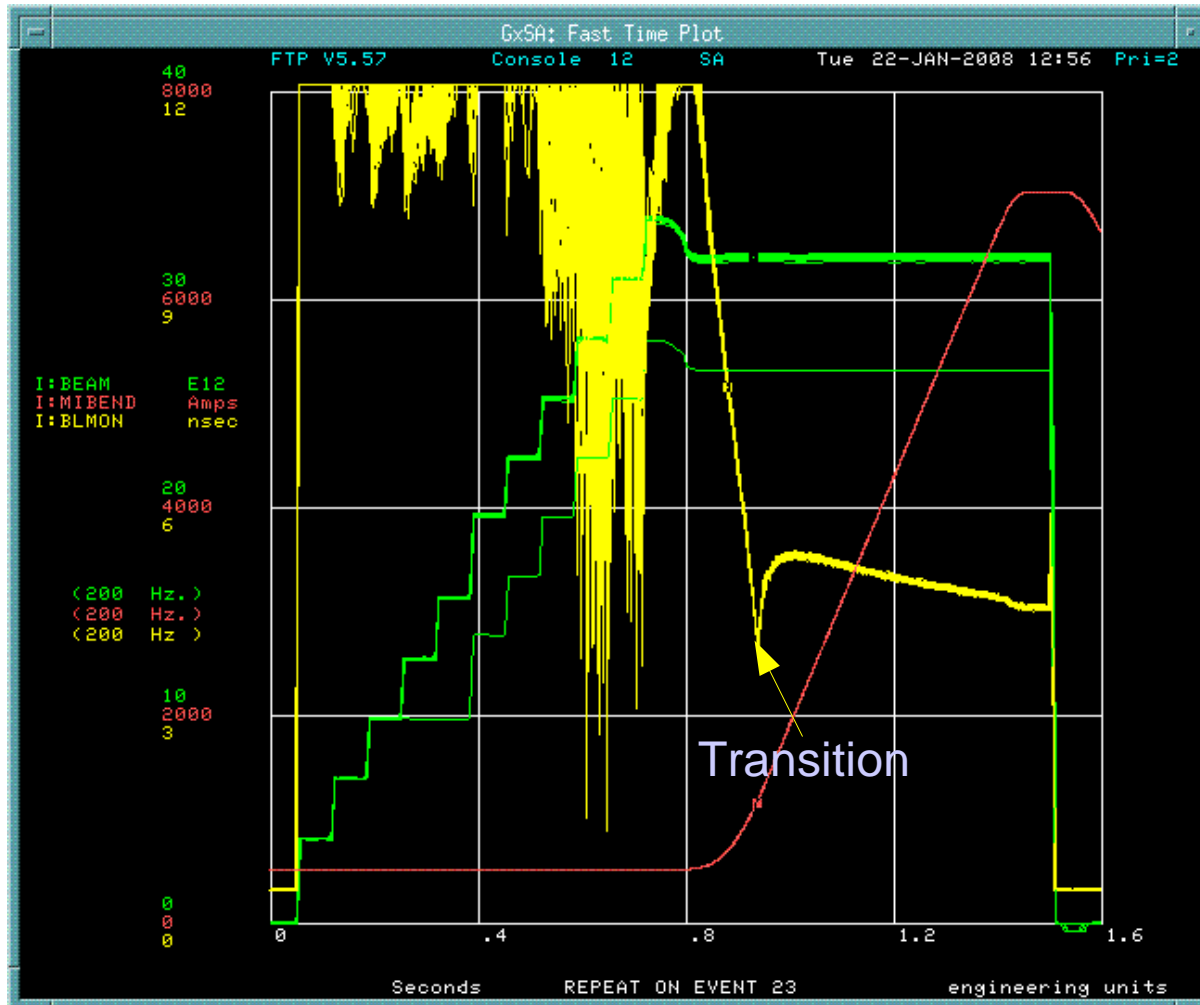
Sweep field on and MCP at 1300V



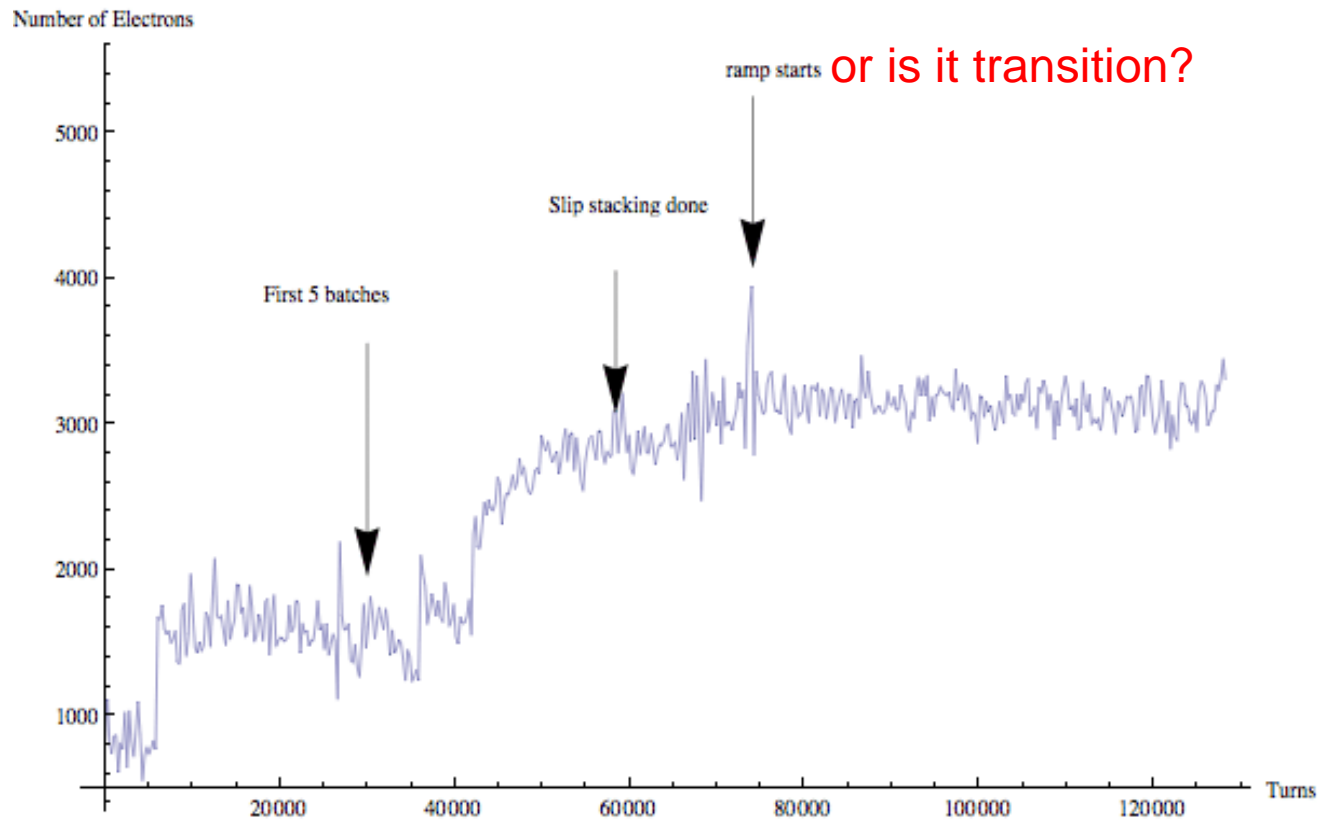
Note: we are looking at IONs hitting MCP.

There may be saturation effects.

The cycle

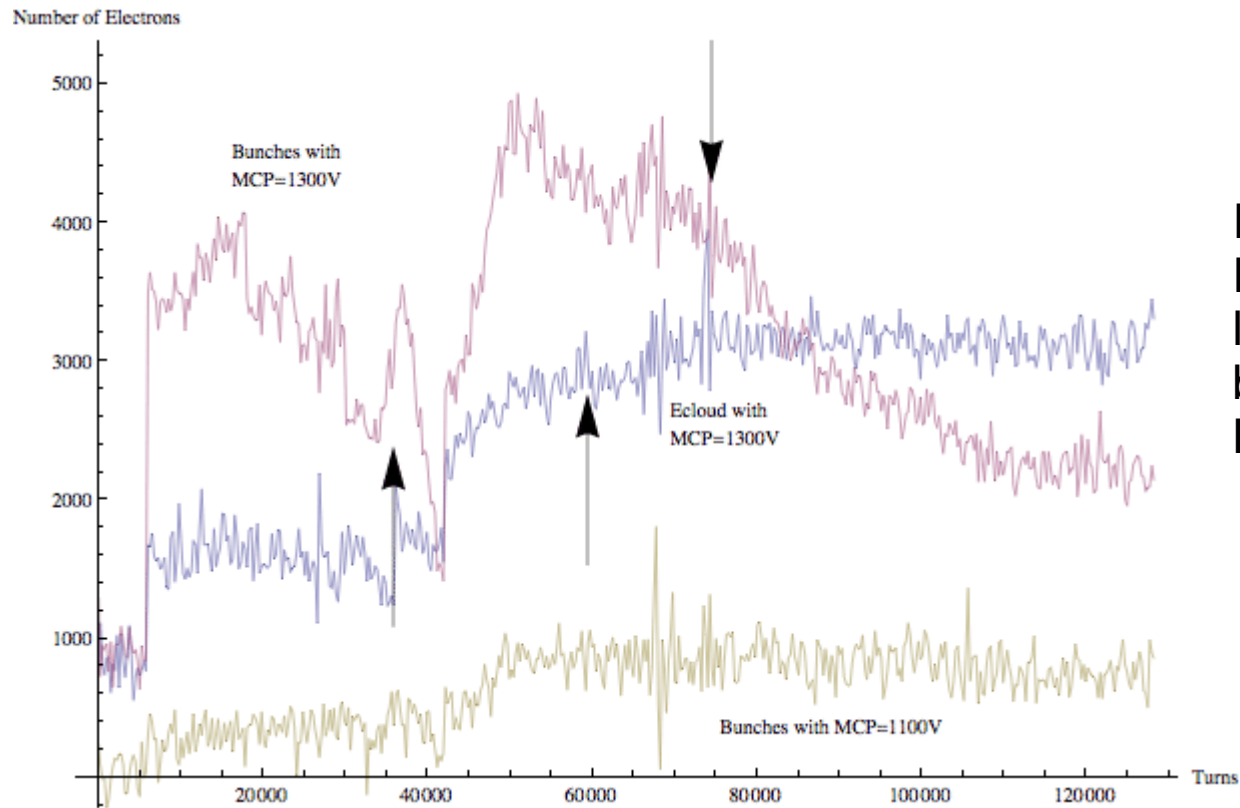


Sweep Field off for MCP at 1300V



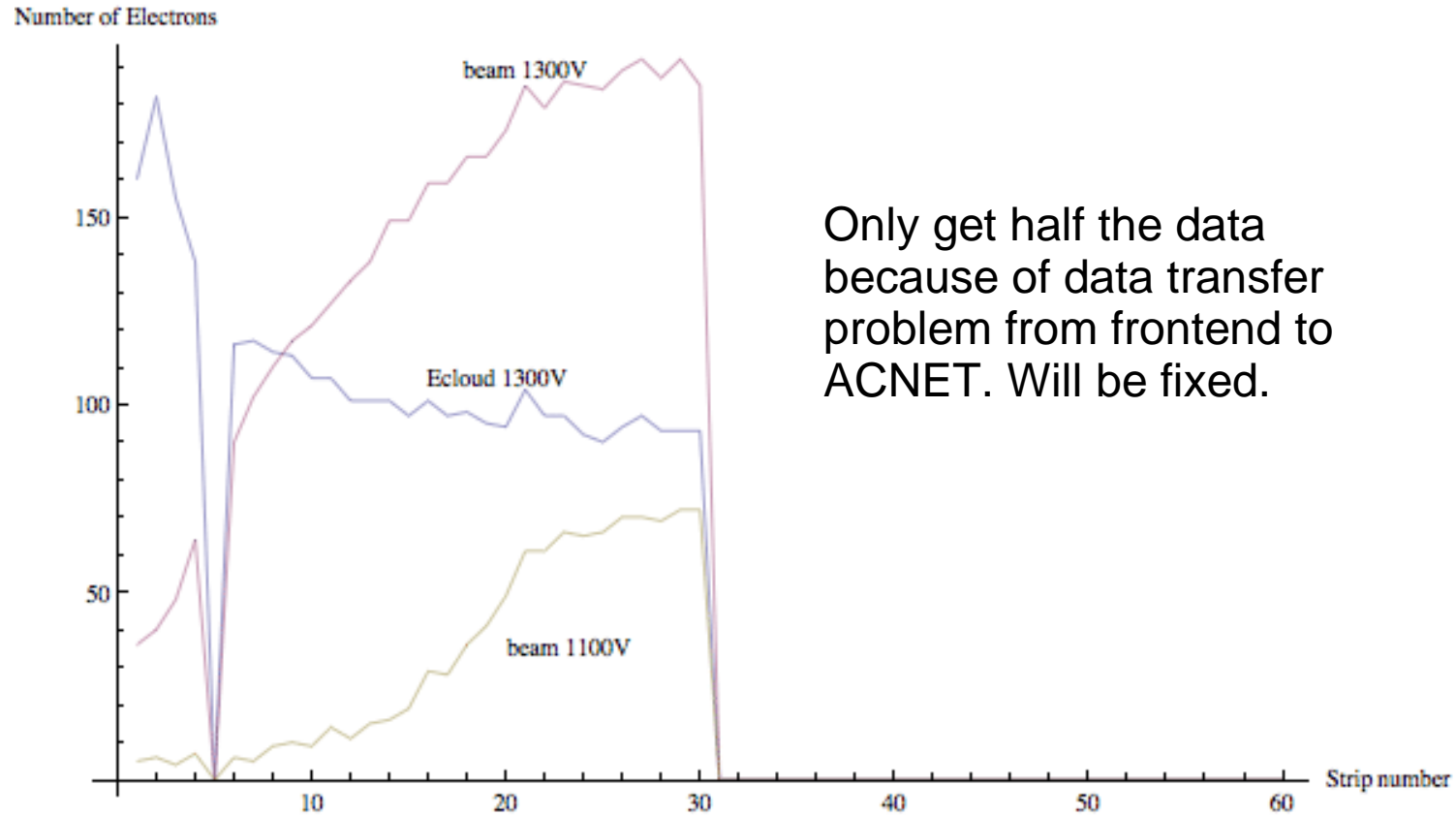
Don't see anything for smaller MCP voltages

Summary of three cases



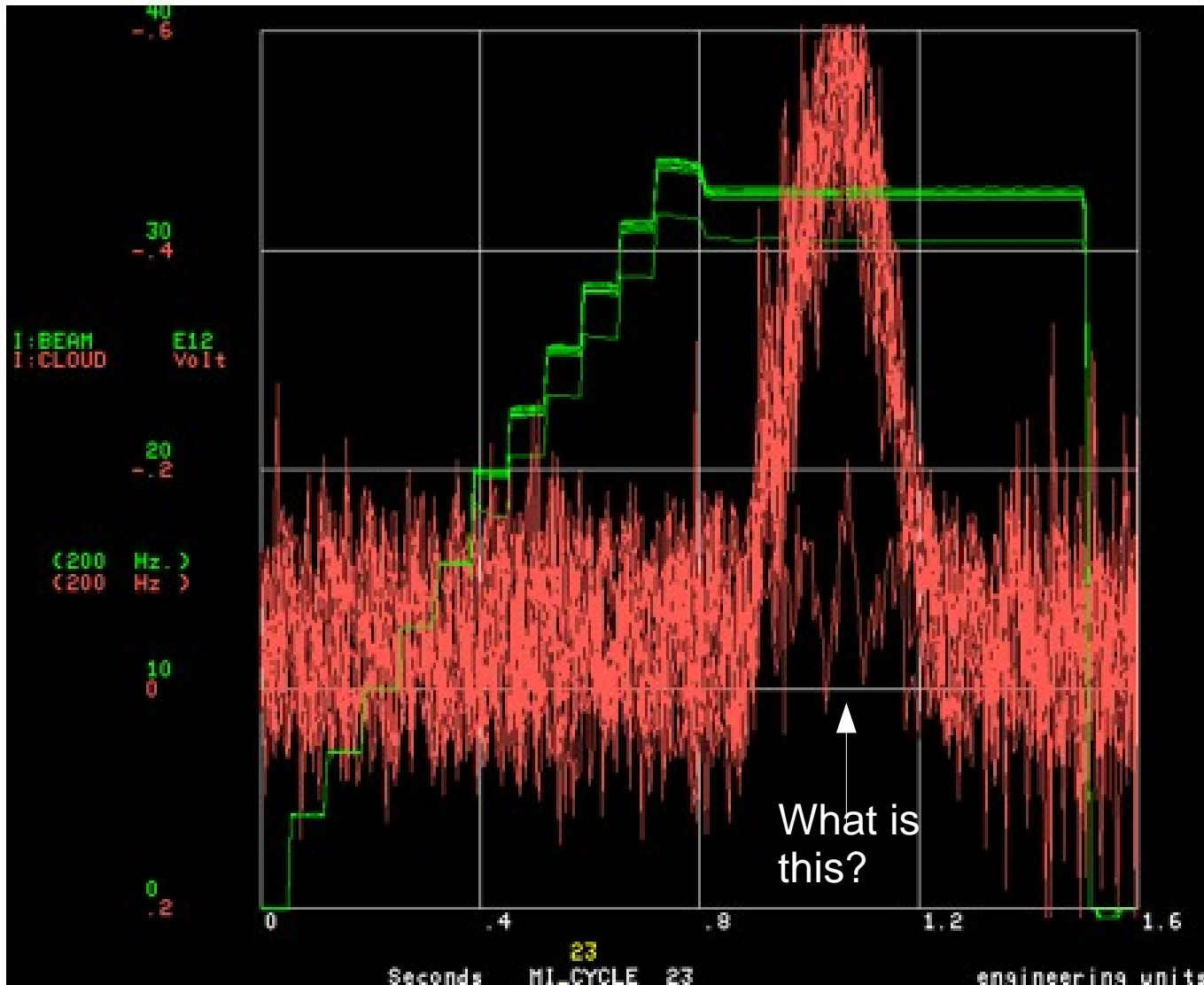
Interesting to note that Ecloud MCP=1300V looks very similar to bunches at MCP=1100V. But slices look different!

Cross section at turn 75000



Only get half the data because of data transfer problem from frontend to ACNET. Will be fixed.

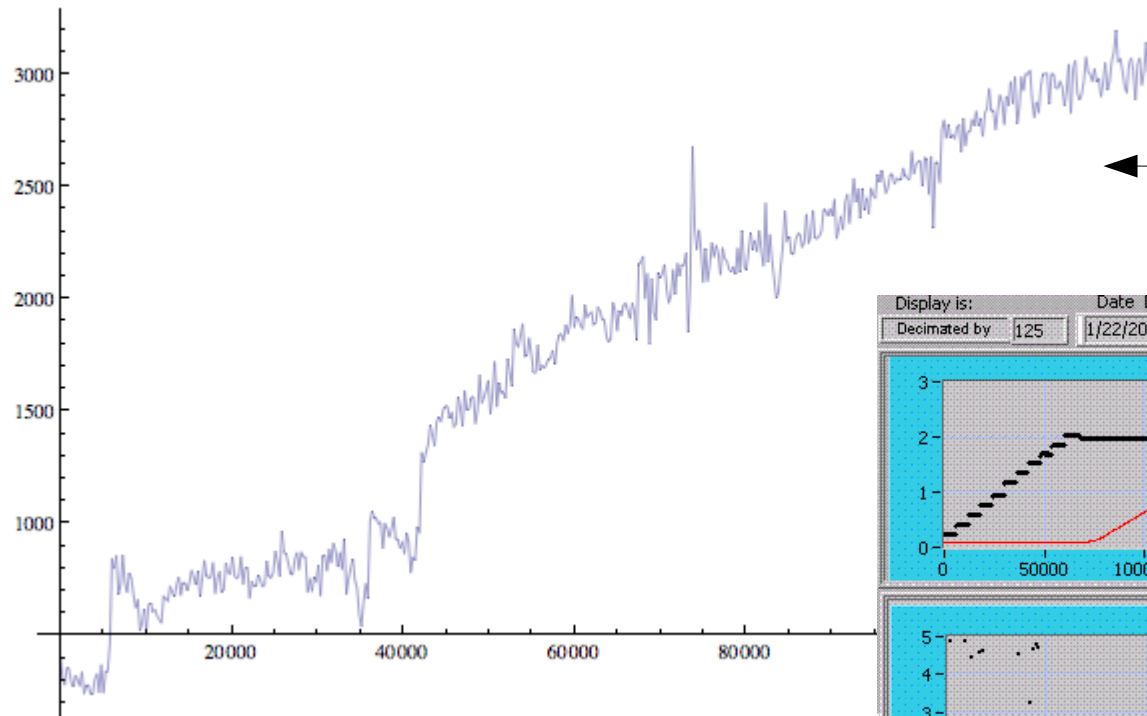
Ecloud data from RFA (Retarding Field Analyser)



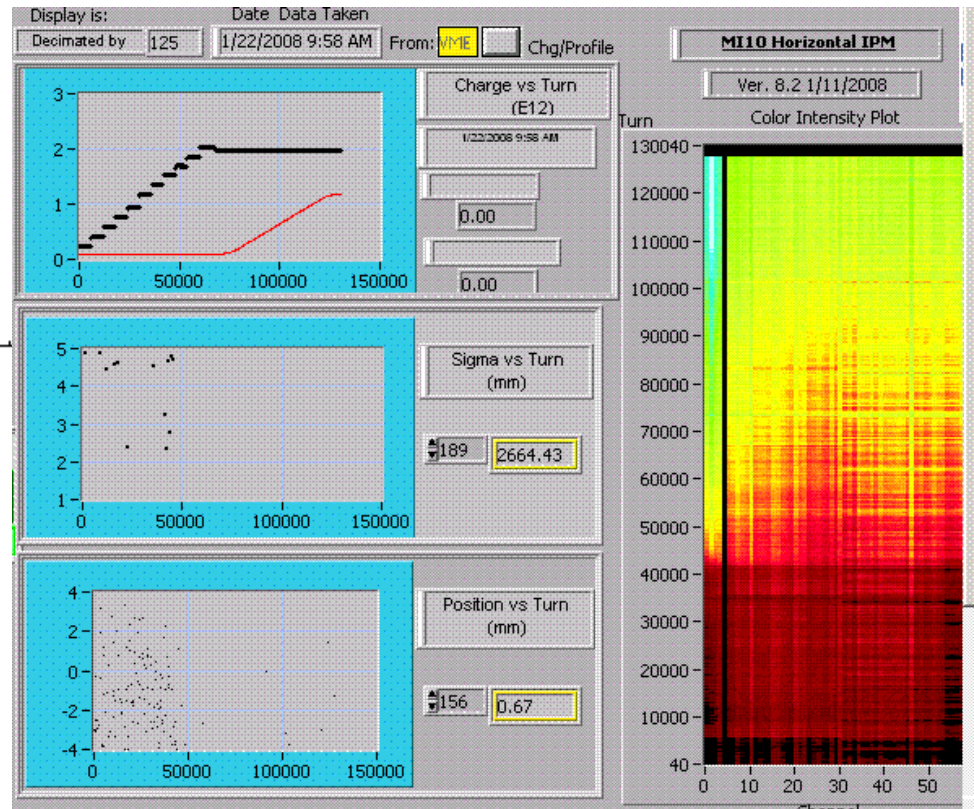
Large signal probably up the ramp just after transition?
Some signal before and after ramp.

Other interesting observations

Number of Electrons

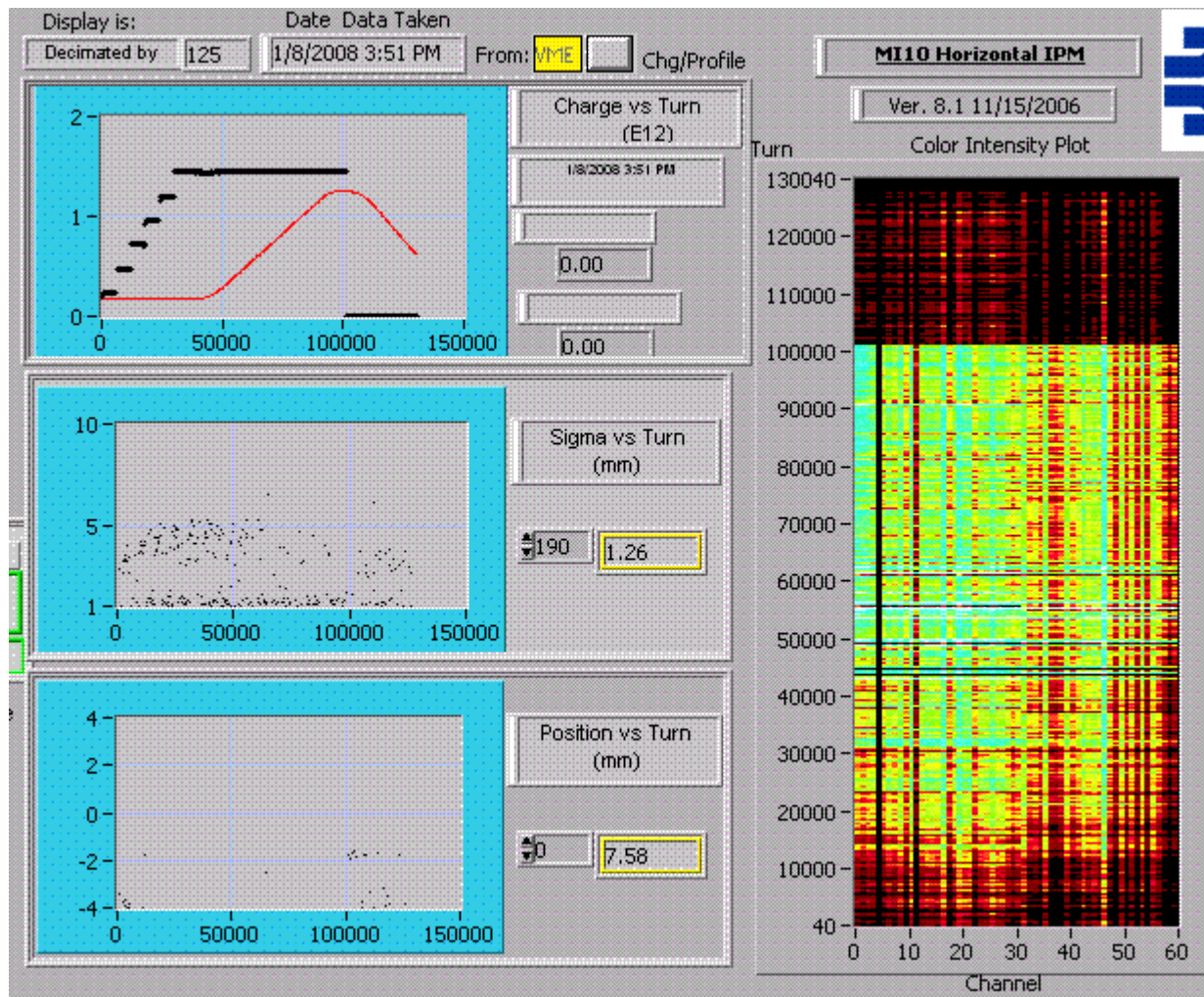


Note: rising not flat!



Data taken on 22 Jan 2008 compared to all previous data taken on 16 Jan 2008

Bunch Structure for no slipstacking!



Unfortunately, I don't have the projected data. But can clearly see a large signal when MCP is at 1250V compared to 11 batch slip stacking!

This is no longer used during accumulator to recycler transfers.

Summary

- At least got something!
 - Can see a lot of structure.
 - May agree with RFA. Need to get ramp data and beam data! Also can use non decimated data (8MB full data set).
- Things to try out
 - See if signal changes with trigger set to look at different bunches. Currently set to 1st bunch and 1/5 of ring. -- Done, don't see too much of a difference.
 - Change polarity of the anode. -- This will not allow e cloud to build
 - Use the other IPMs.